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Charting the Metaverse

The metaverse will prove transformative for M&E. But only when the entire industry gets on board.

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CHARTING THE METAVERSE

P. 20 High Risk, High Reward

Out there in the metaverse is a fortune waiting to be grabbed, a gold rush among tech companies. However, there are guardrails that need installing to ensure we get to responsibly realize this through trust and safety measures, block-chain-based content IP protection and audits.

By Jay Chauhan @ Tech Mahindra

P. 24 Let's Get Ready for the Metaverse

The ambitious concept of the metaverse promises to merge our digital and physical realities together with an interconnected hub of next-gen apps, platforms, and marketplaces — buoyed by massively large amounts of data. While the data complexities involved in building, collaborating, and exploring these new worlds seem unfathomable today, serving up a unified virtual experience at scale is the next wave of transformation for media organizations.

By Richard Whittington and Jonathan Chen @ SAP

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In the past year, companies within the media and entertainment industry have been forced to evaluate their own aspirations and policies related to the concepts of the metaverse, spurred partially by tech giants like Meta (Facebook) and Microsoft making highly publicized metaverse investments. But more importantly, there are clear trends toward widespread metaverse adoption.

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The metaverse has everyone's attention with major brands making headlines as they double down on their investment. While some companies have entered the metaverse or have plans to build digital experiences, many in the media and entertainment space are wondering what the metaverse really means to their business.

By Drew Hilles @ Veritone

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The metaverse holds a lot of promise — the promise of connection, entertainment, and commerce, all in a virtual setting. While the eventual scope of the metaverse may be unknown, one thing is certain: extensive testing by trained eyes will enable users to maximize their experience by limiting frustrations in the user interface.

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With teams working remote due to the pandemic, studios like Final Pixel and Prismax had to look for ways to develop assets virtually. These studios leveraged game engines and other virtual production tools to produce commercials, music festivals, and more.

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YOU UNLOCK THIS DOOR WITH THE KEY OF IMAGINATION

By Guy Finley, President, MESA



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Welcome to the metaverse issue. Never before have we embraced a technology for so long, building experiences around different aspects of the fundamental technology driving the “meta” experience, while also sitting with arms folded exclaiming it’s a fad or gimmick. “Cue eyeroll” for many who sit outside of the day-to-day and don’t fully understand how the metaverse will transform our entire global economy (much like the internet did 30 years ago).

But we are still so very early in the metaverse game, even after 75 years of transformative metaverse experience.

Seventy-five years you say? What are you talking about? Wasn’t the term metaverse coined in Neal Stephenson’s 1992 science fiction novel “Snow Crash,” where humans, as programmable avatars, interact with each other and software agents, in a three-dimensional virtual space that uses the metaphor of the real world? No. I’m talking about the “meta” universe that was unveiled on July 17, 1955, when Disneyland opened its doors to the public. Walt Disney took fictional, two-dimensional characters, and their homes/neighborhoods/universes, and brought it to life in 3D, essentially bringing the full “meta” to humanity. What we are doing now is transforming the internet experience to mirror the reality created in theme parks. And the real mind-bend is that this will extend experience into even the most mundane of activities.

And how will it transform those activities? The metaverse is perfect for storytelling. It breaks down physical barriers and the limitations of actual physics. It allows creatives to truly go where their mind takes them ... and it’s also the reason why Hollywood is so important to the future of the metaverse. The metaverse is a combination of multiple elements of technology, including virtual reality, augmented reality, and video where

THE METAVERSE IS PERFECT for storytelling. It breaks down physical barriers and the limitations of actual physics. It allows creatives to truly go where their mind takes them ... and it’s also the reason why Hollywood is so important to the future of the metaverse.

users “live” within a digital universe. Its users work, play, and stay connected with friends through a common experience incorporating the internet, video games, and M+E. The reason why it’s “meta” is in the unlimited combinations of these elements to drive new experience and we continue to try to put it into a bucket with our existing products and knowledge. However, we are now challenging these ideas as more robust metaverse products are being launched.

That’s the hidden gem behind the metaverse. As storytellers, we are a logical choice to drive new experiences because the metaverse is being “created” in real-time. Creatives determine the use case then manipulate the technology to suit that use case. Technologists will not “invent” (or reinvent) the metaverse, it’ll be creatives that drive expansion. There are multiple companies innovating in the space and there will be open-source components in its broad future. But why Hollywood? Our creatives have been working inside this environment (whether physically with Imagineering and amazing theme park attractions/rides, or digitally by crafting incredible worlds/illusions with Unreal Engine) for years!

Which brings us back to Walt. He created

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MESA is a community dedicated to shaping the media and entertainment industry's future. MESA's 150-plus members and content advisors collaborate to advance change management, new workflow solutions, and production/supply chain efficiencies. Launched in 2008 as Media & Entertainment Services Alliance, MESA produces quarterly events (in-person and hybrid), daily email newsletters, webinars, and the M&E Journal on behalf of its members. MESA is the management company responsible for the community efforts of Media & Entertainment Data Center Alliance (MEDCA), Hollywood IT Society (HITS), Smart Content Council, and Women in Technology: Hollywood (WiTH), as well as the business operations of the Content Delivery & Security Association (CDSA), the Entertainment ID Registry (EIDR) and the WiTH Foundation.

For more information, visit mesaonline.org

THE COST OF BAD DATA

By Hollie Choi, Executive Director, EIDR



Hollie Choi is the executive director of the Entertainment ID Registry (EIDR). During her 15-plus years in media and entertainment she's become an expert in supply chain automation, metadata governance and workflows, and digital and media asset management systems. hchoi@eidr.org @eidrdotorg

Data Management Review puts the financial impact of bad data within an organization at an average of 15 percent of net revenue annually. Let's do a tiny bit of math. Variety reported that in 2019 (pre-pandemic), the media and entertainment industry was said to have made \$101 billion across theatrical and home entertainment. Fifteen percent of that is approximately \$15.2 billion. Bad data causes this much damage to your bottom line? It's not hard to believe.

Everyone has bad data lurking somewhere in their organization. Many content creators started putting out movies in the early 1900s, others started only a few years ago. Both business models produce the opportunity for bad data. It is understandable. It's not as if anyone at the start said, "Hey, let's make movies and television shows, but first, let's get a taxonomist in here and build a governance team." Data is a byproduct of content production, and therefore, understandably, a secondary concern.

It can be difficult to quantify losses resulting from bad data, or to understand the consequences, because some causes are not always immediately clear. I'm going to suggest that bad data hurts your brand. Don't believe me? Let's say you settle in with your family and your popcorn to stream your favorite show. You turn on your device and navigate to the streaming service of your choice, find the title, and hit play. But the description you read does not match the episode that plays. What I think when I see this is, "Wow, their metadata is lacking proper controls." Most consumers don't think that, though. What they think is, "What is this? This isn't what I want. Wow, this studio is messed up."

In the olden days (you know, five years ago), most people could not identify which studio made their favorite show. Now the major studios have streaming platforms with some variation of their name. The consumer is now drawing a direct connec-

*THAT'S DATA GOVERNANCE:
finding the authoritative
source of data and then
managing the quality.*

tion from the data and content they see to the creator and their brand. If I see bad data, or the wrong content shows up, it causes a ding in our relationship. Enough dings and I might just call the service a piece of junk.

What about the more obvious causes? Operational and system inefficiencies create a huge loss of productivity in that they enable duplication of effort, manual work, broken business processes, and/or poorly designed line of business applications? These are possible to quantify, but it can be challenging. If we were to look at the operations of a single business unit in a single company, I'll bet we could find at least one process that is caused by a lack of automation, which is only used to mitigate data issues from upstream sources. Let's follow that stream metaphor for a minute.

Imagine you're standing next to a stream. Suddenly, you hear a person yelling. They are in the water, holding on for dear life, in danger of drowning. So, you get in the water, safely of course, and you save them. Just then, you hear another person calling out for help, and another, then another. Soon, all you're doing is pulling people out of the water. Would it not make more sense to send someone upstream to find out how those people keep getting in the river in the first place, and put up some sort of fence, or a warning sign at least?

That's what data governance is: finding the authoritative source of data and then managing the quality. Without doing that initial scan of the upstream processes and

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‘THAT’S NOT A DATA CENTER’

By Eric Rigney, VP, and Sean Tajkowski,
Technical Director, MEDCA

The term data center must be defined. By and large, the M&E industry is unaware of what exactly constitutes a data center and the standard boards that govern their construction and maintenance.

When M&E pictures a data center, it typically envisions hyper-scale installations like Amazon Web Services (AWS), Microsoft Azure, Google Cloud, and so forth, with its rows and rows of racks filled with servers, routers, and data storage devices. As a result, since Hollywood isn’t normally in the business of building hyper-scale data centers, it sees no need to concern itself with data center infrastructure standards. It’s not their field of expertise.

This uneducated view of what constitutes a data center plays a large role in setting Hollywood up for the self-inflicted crisis described above. In actuality, data centers encompass much more than hyper-scale installations. The data center spectrum stretches from the hyper-scale cloud support and edge data centers of which typically Hollywood recognizes but encompasses service installations all the way down to the personal data acquisition devices like cell phones and wrist watches that we carry and wear. Whether Hollywood is aware of it or not, its stages, machine and equipment rooms, facilities, production service carts and more are full-fledged data centers. Before discussing data center construction, the M&E community must first be made aware of its misperceptions. MEDCA tasked itself with bringing this fundamental awareness to the M&E industry.

Fun fact: The term “machine room” is a carry-over from when video and audio decks played a large role in production. “Machine” encompasses the mechanical nature of tape-based (and film-based before) technology with its motors, belts, gears, etc. M&E’s move to file-based workflows brought with it the installation of file-based (data) hardware. The correct term describing

THE DATA CENTER SPECTRUM stretches from the hyper-scale cloud support and edge data centers of which Hollywood recognizes and encompasses service installations all the way down to the personal data acquisition devices.

an installation of predominantly data processing hardware is ‘equipment room.’ That said, many film terms live on even though rarely is film used. Terms such as “reels,” “footage,” “rolling,” “speed,” “cut,” “MOS,” etc. are common nomenclature used in today’s file-based production workflows.

To realize the benefits gained by a properly constructed data center, it helps not only to know what constitutes a data center, it helps also to realize which governing boards are tasked with defining what “properly constructed” means. Let’s begin by describing governing boards that do not oversee data center construction: the Society of Motion Picture and Television Engineers (SMPTE) and the Audio Engineering Society and European Broadcasting Union (AES/EBU). These stalwart boards of the Hollywood community respectively set standards for picture and sound for motion picture and sound production, postproduction, and exhibiting communities. For example, M&E production and post facilities configure rooms to see and hear how the program will look and sound in any other similarly configured room. The visual and acoustical standards for such reference environments were established and are regulated by SMPTE and AES/EBU.

As such, when and wherever that program is played



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back in any other reference room that fully adheres to SMPTE and AES/EBU standards, the program playback will look and sound the same as they will in any other properly configured reference room. Without these standards, when is white “too” bright or black “too” dark or a color “illegal”? When is loud, too loud, and which speaker(s) should the right sound channel truly play out of? Implementing these standards allows one studio to playback its program in any studio in North America with the same result. Interoperability defines this characteristic. Interoperability is one of many benefits that come with the implementation of an industry’s standards and practices. While data centers process and send/receive picture and audio files, the medium is not audio/visual. It’s data.

Hollywood is accustomed to following AV standards as established by its venerable governing boards: file formats, protocols, applications, etc. And while some overlap exists, in general, SMPTE focuses on picture and AES/EBU on sound. Neither focus on data center infrastructure. Data center construction standards and practices are overseen by governing boards established within the data industry. Therefore, facilities and service providers that build their data centers to data industry standards, whether an equipment room supporting a

volumetric stage, a postproduction operation, or wireless video village with digital intermediate technician’s (DIT) cart, carry with them the interoperability advantage of “plug’n’play,” seamlessly interconnecting among themselves and the rest of the data world’s infrastructure. For those operations less willing to avail themselves to decades of hard learned lessons of the data industry, a world the data industry built, relying instead on M&E tribal knowledge born of its own trials and tribulations, all but guarantee an unnecessary, painful, and costly experience.

The crux of M&E’s forthcoming production crisis so defined, the importance of MEDCA grows clearer. Through education, advocating and encouraging Hollywood to acquire an overall awareness and appreciation of the world they unwittingly encroached: the data industry. Secondly, guide Hollywood toward the data industry’s well-established standards and practices supporting data centers in general and M&E specifically.

By so doing, MEDCA aims to protect M&E’s ever and exponentially growing investment in data centric technologies, processes, and operations supporting stages, facilities, service providers, and more. It is MEDCA’s hope that someday soon Hollywood will look at a camera, light, or an edit or upload cart station, and realize that, “That is a data center.” ■



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THE SECRET TO AVOIDING DATA FATIGUE

By Mary Yurkovic, Director, Smart Content Council, MESA



Mary Yurkovic is the director of MESA's Smart Content Council. She has more than 15 years' experience in the publishing, entertainment, and technology sectors. mary.yurkovic@mesaonline.org @chicagoMY

Digital transformation is not new. It's been around for over 30 years.

Despite being a buzzword, digital transformation should be a part of any IT leader's strategy every day. Alongside it, change assurance is one of the most important factors for ensuring successful transformation; and probably one of the reasons the CIO position is now one of the most coveted and compensated roles in our industry.

Companies are increasingly finding themselves managing more than just employees, customers, and products. They're also managing the introduction of new technologies, the sudden appearances of new market opportunities, and shifts in the way consumers choose, interact with, and apply standards to their brands.

As with any drastic upheaval or transformation in an organization, formulating a structured change assurance plan can be challenging. The ability to address and adapt to change within an organization is becoming a critical element of survival for many businesses in the current digital transformation landscape.

Digital transformation and change assurance goals are almost the same. They vary from organization to organization, but all strategies usually share three primary goals:

- To improve the ROI of the workforce.
- To create a competitive advantage.
- Energize and empower employees.

CURRENT PROBLEMS: CHANGE AND THE TRANSFORMATION

Making big changes to existing business processes is often a long journey and not easy, particularly when making necessary upheavals to business components that have been in place for many years.

Failure in digital transformation projects almost always comes down to a lack of preparation and strategy. Clear communication and objectives, and consistent reporting

of progress, are crucial to see an initiative through. Having a tight change assurance strategy should be an organization's top priority when embarking on adopting and implementing new technology. These are the most important aspects that make up a great overall change assurance strategy.

1. Start from the top

Changes which affect the fundamental operation of the business will affect the company's culture. Therefore, such changes must start from the C-suite. The leader's presence, guidance, and support signals to their employees that they knew about and supported what was happening. It allays fears, reduces anxiety, and helps employees feel more confident about the future.

2. Make sure the change is necessary and desirable

Introducing too much too soon can often be a huge problem down the line if a business doesn't have a solid strategy in place. Take an audit of processes and tools. One of the primary reasons for failures is that decision makers are unsure of how to correctly approach a digital transformation and the impact it will have on their business. A lack of a comprehensive audit can lead to the implementation of solutions which are unnecessary for an organization's needs, meaning added costs, additional training, and increased — often unrealistic — expectations.

3. Minimize disruption

What employees feel is necessary or desirable change may vary from department, level, or performance record. The main indicator? How much a change disrupts their daily role. All too often, employee anxiety around change stems from the introduction of new strategies or technologies designed to make management and business operations more efficient.

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MESA'S LUNCH & LEARN: A WINDOW INTO PRESSING TOPICS, AMAZING LEADERS

By Richard Atkinson, President, CDSA



Richard Atkinson is president of CDSA and his experience covers 15 years in classified defense and 22 years in M&E senior leadership positions, driving profound business revenue and change. ratkinson@cdaonline.org @CDSAonline

As the host of MESA's new, weekly Lunch & Learn series, maybe I'm a bit biased, but I've had a front-row seat in engaging with some of the most amazing industry leaders speaking on amazingly diverse topics.

The Lunch & Learn series, which debuted March 3, is a weekly session held noon-1 PST where a special guest shares their perspectives and experiences on a particular topic. It's done live via Zoom and in MESA's metaverse using [Rendez.vu](https://rendez.vu) and recorded for later viewing. We sometimes also have a live, in-person audience as well, when we host from one of our events. Think a TED Talk meets "Inside the Actors Studio," meant to be interesting and entertaining, no matter the subject. And, so far, we are definitely delivering.

To date our speakers included Asleigh Faith, an expert in data organization and searching (finding what you are looking for among HUGE amounts of data, without even structuring it). Boring? Not when Asleigh brings her incredible passion and expertise and teaches us that while there are highly technical aspects to her world, there are also lessons for all of us. There was Joe Devon, a leader focused on accessibility. It's not what you think. Joe brings an amazing degree of insight in his work to make the world a better place, for all of us. Or Chris Taylor, the director of the Media & Entertainment Information Sharing & Analysis Center (M&E ISAC), and part of the CDSA. Chris brought a deep technical perspective (and dry humor!) to our media-centric world that spans traditional InfoSec aspects mixed with the less-defined areas of content protection. We've had Loe Vaccarelli, a media executive and TV producer that shared his perspectives on life, careers, and attitudes within the media business. And life and career can be a win-win-win when you can be selfless and connect people. By the way, Lou was a past chairman of CDSA, and we were beyond

THINK A TED TALK MEETS 'Inside the Actors Studio,' meant to be interesting and entertaining, no matter the subject. And, so far, we are definitely delivering.

happy to have him engaged again and sharing his incredible leadership and experience.

I've personally done a few Lunch & Learn sessions, spanning themes from "Careers are Never Straight Lines," to "How My Team Added \$1B to Disney's Top Line," to "A Perspective on Leadership," my take on what I have learned, observed, and absorbed (hopefully!) from great leaders that I've had the opportunity to work for and with.

The streak continues going forward with great speakers and topics (some of which will have happened by the time of this article's publication and will be available on demand). Natascha French will share her perspectives on how the areas of marketing are evolving across our digital lives. Having spoken to her a bit, I'm sure that she will have perspectives and insights that will go far beyond our expectations. And James Dunkelberger will be joining us to talk about "Traits of Great Leaders." As a senior leader at Microsoft, past chairman of CDSA, and trusted advisor, I'm really looking forward to more of those unexpected insights that James always has, and in ways that we can all learn from and use in ways to guide our lives. And we have Joseph Busch, one of the world leaders in advanced metadata structures and taxonomies. Dry? Technical? Not even close.

The overall format for Lunch & Learn is simple: the host gets things kicked off, introduces the guest, and is the audience advocate by asking clarifying questions and managing

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WiTH HIT ITS STRIDE DURING THE PANDEMIC

Even during difficult times, the individuals of WiTH continued to support communities by giving their time

While many organizations struggled during the pandemic, Women in Technology: Hollywood (WiTH) only became stronger, adding nearly two dozen events to help better serve our community and the industry. And it brought us closer together, put us all on an equal playing ground, and made our message even more effective, because we were able to reach out remotely and increase our collaboration within the broader media and entertainment sector.

Collectively, this group of individuals proved they are fearless leaders, that are determined to make a difference. Even during unprecedented times, the individuals of WiTH continued to support our communities by giving their time selflessly. And giving back has proved an opportunity for all of us to shine together.

By respecting and celebrating differences, we are creating a space where people will thrive and bring each of their unique geniuses. When we are developing environments where people feel safe, their curiosity to explore new and emerging technologies fuels paths of learning, innovation, and change. The opportunities are endless.

Beyond our outreach to charities and communities, WiTH continues to grow as a go-to community for women working at major studios, creating a hub for the technologically-minded to come together, network, contribute, and pass on what they've learned to the next generations. WiTH is a place where you can have an impact on the community, go to schools and work with kids, help your peers with professional development, mentor a new college graduate or first-time employee.

From grade school to college, WiTH is involved in helping to develop STEM training and education. Beyond schools, we help support training, networking and the development of established professionals, all helping to feed the hunger for talent among all the major media companies. We facilitate a pipeline of young people who need jobs and, between our jobs board, our mentoring program and our community outreach, we bring a spotlight on what they offer to employers.

We're proud of the diverse conversations that can happen among those in WiTH. The conversations about how your data journey is going, where your workflow is evolving to, what's possibly missing from

your resume, and what the industry at large needs to be doing better to tap all of this diverse talent.

And we provide our membership opportunities to personally get engaged with the charities they're supporting. They volunteer their time, their expertise, and their insights into their respective professions.

Networking connections, coaching through interviewing, help with brainstorming on how you're going to position yourself. The general encouragement that the WiTH's members offer each other makes a big difference for a lot of people.

DOING WHAT WE DO BEST

Each year WiTH raises tens of thousands for charities, and beginning with the HITS Spring event in May, running through the SoCal Women's Leadership Summit in November, the WiTH Foundation's annual drive will be looking to meet its goal of \$75,000 raised for organizations that reflect the values of WiTH: diversity, equity, inclusion, accessibility and belonging. Those organizations include:

- **STEM Advantage**, a nonprofit organization providing science, technology, engineering, and math (STEM) career opportunities to California State University students, the largest and most diverse public university system in the nation with over 50 percent student body comprised of people of color.

- **Codetalk**, a digital web technology job training program for low income, underemployed and underserved women. In an intensive and rigorous 16-week program we provide the skills, tools, training, professional development, and support so that our graduates can pursue entry level positions in the technology sector. Interested in science and technology. Since 2012, the program has served more than 2,000 girls from grades 4-12, helping them develop skills as engineering and designers.

- **PepUp Tech**, which gives motivated, underserved students the access, skills, mentors, and confidence needed to begin careers in tech and help diversify the

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WHAT ARE YOU RENDERED ON?

BOBBLEHEADS

The Movie

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CHARTING THE METAVERSE



Only the biggest of tech companies are dipping their toes in the metaverse so far, but that won't last long, with an entire new world available for media and entertainment to monetize. But if this really is a new gold rush among tech companies, what guardrails need installing (trust and safety measures, blockchain-based content IP protection, audits)? What tech advances are needed to truly merge our digital and physical realities together, creating interconnected hubs of next-gen apps, platforms, and marketplaces? What does the metaverse really mean to the media and entertainment industry?

HIGH RISK, HIGH REWARD

What the goldrush for the metaverse is hiding

Tech
Mahindra



By Jay Chauhan, Group Practice Head, M&E, Tech Mahindra

ABSTRACT: Out there in the metaverse is a fortune waiting to be grabbed, a gold rush among tech companies. However, there are guardrails that need installing to ensure we get to responsibly realize this through trust and safety measures, blockchain-based content IP protection and audits.

When 71-year-old Bob Iger jumps on the bandwagon and joins a virtual avatar company, it's a sign the metaverse has morphed into the next big thing in tech.

Maybe it doesn't take much to get us excited anymore, or perhaps it's Facebook's extensive rebrand as Meta. Either way, the metaverse is the proverbial pot of gold at the end of the rainbow, with every tech company worth its salt cashing in and announcing a new offering. But first, a word of caution.

HIGH REWARD, HIGH RISK

It's easy to forget that within the metaverse exist many of the same problems on the internet today: trolls, harassment, data security and privacy issues.

In 2021, research by the Center for Countering Digital Hate, a UK/U.S. nonprofit, found that Facebook's VR Chat — a virtual world platform accessed on Meta's Oculus headset — featured abundant instances of racism, misogyny, pornography, harassment, and abuse, often in the presence of minors. In another example that illustrates the safety and privacy concerns with the metaverse, earlier this year, Jelly, China's viral metaverse app, was taken offline on suspicion of data malpractice



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after users reported a glut of spam and marketing calls post-sign-up.

Evidently, building a multi-user 3D world where people can safely ‘exist’ means building safety guardrails to ensure everyone has a good experience. The fact that activities can take place virtually doesn’t mean the rules are any different. But abusers and rotten eggs will need reminding of this fact.

Women have taken to Reddit and other forums to discuss the alarming lack of boundaries in the metaverse. They recount experiences of being stalked, assaulted, touched inappropriately, and even issued rape threats. Frighteningly, this affects minors too.

Just because it’s online doesn’t make it less traumatic, as mental health practitioners have attested. Abuse, albeit virtual, also has real, damaging psychological consequences. Today, as with almost any online property worth its salt, many nefarious avatars walking the metaverse, giving grief to others. They give new users irrelevant or misleading instructions in attempts to take them off course and even steal their hard-earned crypto tokens.

The physical user interface of the metaverse, such as VR headsets, is a critical piece of the puzzle and needs to be secured against unauthorized access to prevent theft of sensitive data. IPR and copyright matter too, especially when individuals and organizations exist as virtual avatars.

“Black Mirror” may have sounded far-fetched at the time, but a dystopian future where the spread of fake news, misinformation and surveillance takes on more teeth in a virtual environment, is very much a possibility. Within VR worlds, propaganda, conspiracy theories and distortion can spread with speed and impunity, aided by the immersive quality of these technologies.

Privacy — already a chimera of Web 2.0 — is also a big concern in the metaverse, now that we know the risks of technologies such as AI and facial recognition, which have been deployed with malicious intent.

MAKE IT SAFE

Protecting metaverse users against these types of behaviors and dangers requires both technological solutions as well as social ones. There is some recognition of this need. China has set up the Metaverse Industry Committee, an entity to regulate the development of metaverse and related technologies.

After receiving multiple reports of groping on

THE METAVERSE IS UNCHARTED territory. It is being figured out as we chug along, and AI may not present all the right solutions.

its social VR platform Horizon Worlds, Meta ne ‘e Facebook introduced the ‘Personal Boundary’ feature. It allows avatars to place a four-foot barrier — a bubble — around themselves to prevent groping. In Horizon Worlds, users can block, mute harassers, and report them.

But a lot more needs to be done. While the highway to Web 2.0 is littered with grim reminders of the inability of tech platforms to effectively self-regulate and instead of succumbing to the lure of monetizing our attention, there are still important lessons worth learning.

Data storage and access policies need to become more stringent. Organizations need to conduct rigorous verification of the third parties they exchange data with. Sensitive data generated within these virtual worlds must be protected and continually monitored at every level, beyond mere authentication and authorization.

Until metaverse creators get around to implementing robust self-regulation and self-moderation, the least we can do is to have tech-enabled solutions. Possible safety measures could include smart storage solutions like Video Storage and Processing Platforms (VSPP) that can record and identify offenders close to real-time. AI-driven speech analysis that can identify hate speech and harassment could be one way of identifying misuse and eliminating grievers on these platforms. AI-driven metadata extraction from metaverse video can help weed out offenders when needed.

The metaverse is uncharted territory. It is being figured out as we chug along, and AI may not present all the right solutions. Till tech catches up, there’s always the good old “send more people to fix the problem” approach to augment technology shortcomings. ■



Jay Chauhan is group practice head of media and entertainment at Tech Mahindra. With more two decades spent in leadership positions at news networks, his interests lie in blockchain and NFTs. jay.chauhan@techmahindra.com @jaychauhan

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LET'S GET READY FOR THE METAVERSE

And be prepared for all the ways to monetize it



ABSTRACT: The ambitious concept of the metaverse promises to merge our digital and physical realities together with an interconnected hub of next-gen apps, platforms, and marketplaces — buoyed by massively large amounts of data. While the data complexities involved in building, collaborating and exploring these new worlds seem unfathomable today, serving up a unified virtual experience at scale is the next wave of transformation for media organizations.

**By Richard Whittington, General Manager, Media, and
Jonathan Chen, Senior Director, Media Solutions, SAP**

Most of what we think we know about the metaverse today remains wild conjecture and elaborate hypothesizing — still largely the stuff of science fiction: holograms hanging out with flesh and blood friends at rock concerts, virtual mortgages to finance virtual houses, and “being within the computer rather than accessing the computer,” in the words of VC and metaverse enthusiast Matthew Ball. Meanwhile, tech giants like the company formerly known as Facebook are betting big on this meta-future.

While the crucial what, when, where, and how of the metaverse remain hazy, certain components of this ambitious new model for human existence are already very much a reality. There are abundant examples in the world of video games, where avatars have been roaming virtual landscapes, using digital currency to purchase

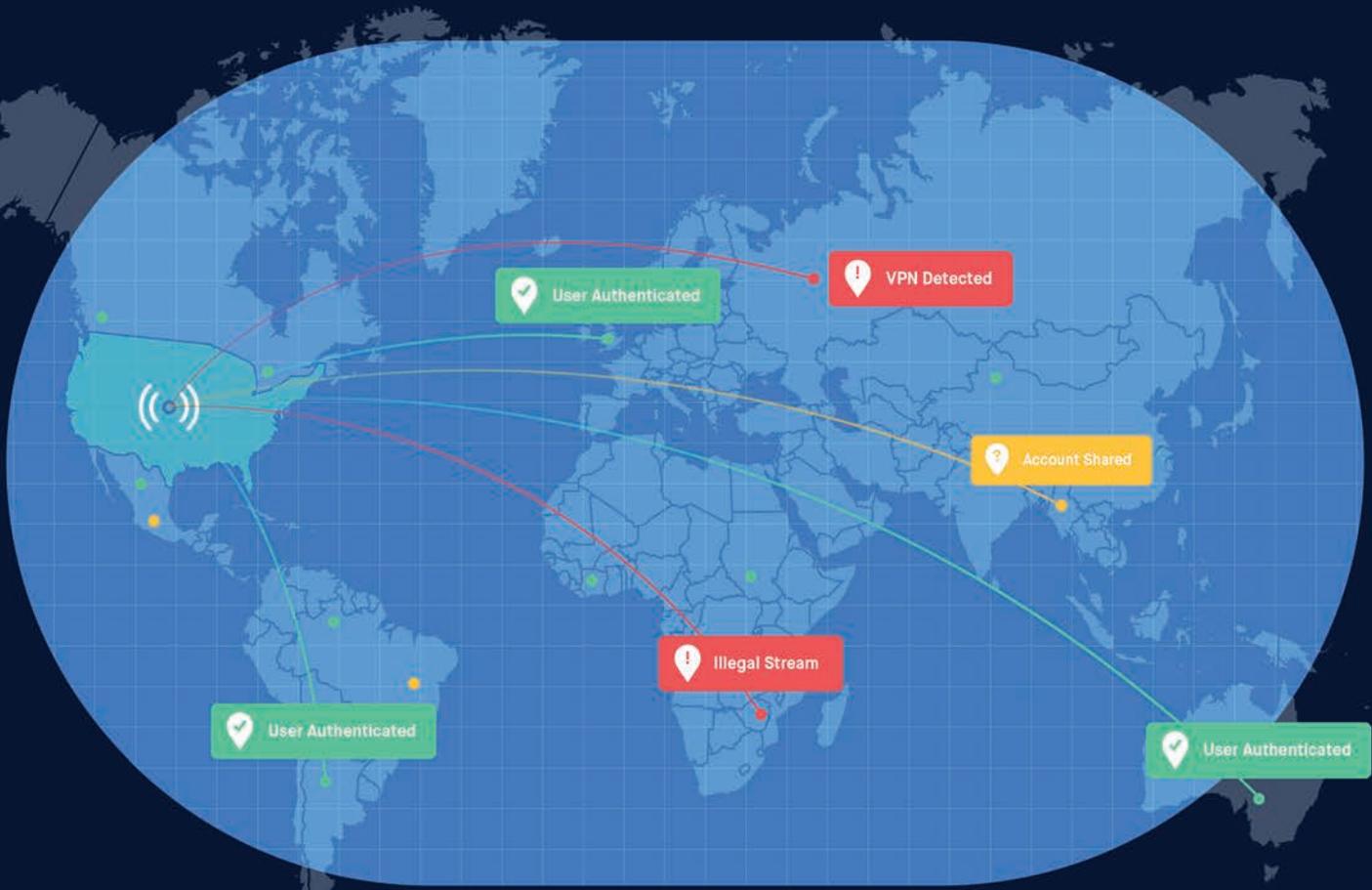
virtual goods, and engaging in virtual relationships with other avatars for years, even decades.

The booming business in NFTs demonstrates that there is plenty of physical appetite for spending serious dollars and bitcoins on digital art and other virtual collectibles. Virtual reality and augmented reality technology, if still clunky, has gained greater adoption not only in gaming but also, increasingly, in business applications, as the COVID-19 pandemic has forced companies to think outside of the physical office box. And, for the last two years, many of us, from toddlers on up, have been living in hybrid worlds, with significant chunks of our days unfolding in digital spheres.

What is the metaverse if not a merging of our digital and physical realities with an interconnected hub of next-gen apps, platforms,

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WHAT IS THE METAVERSE if not a merging of our digital and physical realities with an interconnected hub of next-gen apps, platforms, and marketplaces — all running on and siphoning off massive amounts of data?

and marketplaces — all running on and siphoning off massive amounts of data? And when you put it like that, the metaverse doesn't seem so fantastical or futuristic after all. Serving up a unified virtual-physical experience at scale is the next wave of evolution for media organizations, but that needn't feel like a great sci-fi leap. Think of the metaverse as the next step after the streaming revolution — simply a new channel for media content. And much of the technology that will make the metaverse possible — think blockchain, not holograms—is already alive and well here in 2022.

With the explosion of new customer engagement points presented by the metaverse comes another crucial question — how will media companies monetize the virtual entertainment landscape? The possible answers, of course, are manifold, but regardless of what forms the metaverse ultimately takes and how the entertainment industry fits into those potential virtual spaces, one thing is certain: media companies will need to have their revenue processes and systems fully modernized for a digital world. From frictionless cloud-based business processes to powerful analytics technologies, media companies must move now to create, recognize, and seize new monetization opportunities even as the metaverse is still taking shape.

Collecting and analyzing user engagement data is essential to continue to provide the personalized content experiences that consumers increasingly expect and demand. Savvy entertainment enterprises are already deploying cloud-based solutions to collect and analyze data from every digital interaction. This creates and maintains rich customer profiles that facilitate the individualized entertainment experiences that have become a hallmark of all streaming platforms. With cloud-based data man-

agement and analytics solutions already in place, many media companies will be well prepared to decipher and optimize the deluge of data to come and better adapt to an overwhelmingly digital world of entertainment.

In addition to managing monetization and user experiences, another area of complexity that will continue into the metaverse is tracking content rights and paying royalties. Managing rights and royalties is already an enormous undertaking for media companies and given that consumers demand an infinite supply of new, compelling, ultra-targeted content, the metaverse presents many complications to this already intricate task. Just one of countless questions that the metaverse will raise for rights and royalties departments: How will artists and content creators be compensated across these new engagement points — a song playing in a digital bar, a movie showing in a digital theater, a concert being watched by a digital avatar?

Media companies that are shifting their legacy rights and royalties operations to cloud-based solutions that automate, streamline, and optimize content acquisition and management, will be poised to seamlessly accommodate many of the new challenges presented by operating in the metaverse.

However inseparable we already are from our many devices, most of us are still accessing the computer rather than “being within the computer.” We don't know exactly when that relationship will flip, but we know that the flip is coming, one way or another. The future is arriving faster than we can grapple with it. Our children live in a world that was still unimaginable just two decades ago. We can expect the pace of change to accelerate exponentially in the months and years to come. ▣



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MANY METAVERSES

For guidance on navigating the metaverse concept, follow the lead of younger generations



ABSTRACT: In the past year, companies within the media and entertainment industry have been forced to evaluate their own aspirations and policies related to the concepts of the metaverse, spurred partially by tech giants like Meta (Facebook) and Microsoft making highly publicized metaverse investments. But more importantly, there are clear trends toward widespread metaverse adoption, especially among the young consumer communities with whom media companies wish to establish lifelong brand loyalty.

By Jeremy Tipton, Senior Product Strategist, Rightsline

On proto-metaverse gaming platforms like Fortnite and Roblox, members of Gen Z and Gen Alpha have proven their comfort with and excitement for the next generation of social media technologies. So M&E organizations need strategies in place to engage with these digital native consumers where they socialize, shop, learn, consume media, and even date. Ultimately, metaverse concepts could impact every facet of the media business, thanks to emerging Web3 technologies and potential shifts in how rights are interpreted and exploited.

While the collective understanding of the metaverse may still be nascent and its precise definitions highly disputed, the exploding public interest in the topic is undeniable. Immersive experiences making use of augmented reality and virtual reality are key to the dream for some innovators, but in practice many current iterations of the metaverse are designed to be accessed via basic browsers or mobile devices.

The common understanding of the metaverse involves people's digital avatars gathering in a virtual space at the same time from different physical locations to participate in shared experiences such as games, musical performances, and general socializing. Though commonly referred to as "the metaverse," there is no sign yet of how a single, unified metaverse could take shape. Instead, corporate sponsorship of the entire concept and the obvious value of exclusive control make a single, unified



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metaverse even more difficult to imagine, like how the four or five dominant public cloud offerings today compete and are difficult to integrate with each other.

For the foreseeable future, we can count on many separate metaverses, each vying for dominant influence. Due to the inherent scarcity of each finite metaverse, speculators are fueling an intense land grab of virtual real estate, with CNET reporting millions of dollars changing hands this past year for properties in spaces like Worldwide Webb Land, Decentraland, and Sandbox. Celebrities from Snoop Dogg to Dolly Parton are making their meta presence known across these types of platforms, as well as a host of consumer brands like Coca-Cola, Lego, and Gucci. Enter, M&E players.

BUSINESS INNOVATIONS IN THE METAVERSE

The technologies underlying the metaverse encourage experimentation within financing, production, distribution, and exploitation of branded content. Starting with the construction of meta locations themselves, we can imagine a next generation of theme parks within the metaverse, leveraging existing IP in new ways — or even recreating entire amusement parks faithfully to invite global visitors who cannot or prefer not to travel to the geographic location of the original park (Baudrillard scholars take note in case we start visiting a simulation of Disneyland).

Yes, the metaverse will feature many analogs to the physical world but will also make innovative uses of virtual productions with talent avatars and will present an entirely novel medium for content. Paid talent can log in concurrently alongside their fellow avatars for live performances and events, following examples of high-profile musicians Travis Scott's and Ariana Grande's concerts within the Fortnite platform.

A compelling metaverse setting itself could also serve as the filming location for recorded productions, in lieu of shooting at physical locations or building green-screened worlds from scratch. Fortnite has even demonstrated meta-exhibition, with Warner Bros. showing several Christopher Nolan films from their catalog in virtual theaters there. Expect to see new film premiers at least enhanced by corresponding metaverse experiences, if not launched fully day-and-date alongside premiers in physical theaters.

On the marketing side of the business, the massive potential for immersive advertising experiences through-

THE TECHNOLOGIES UNDERLYING the metaverse encourage experimentation within financing, production, distribution, and exploitation of branded content.

out each world is baked into the current prices for virtual real estate, and media purchasing departments will need to consider how to allocate parts of their ad budgets across totally novel, immersive ad experiences. And don't forget that everyone's avatars need to be stylized and accessorized, presenting endless opportunities for consumer products departments to license out beloved characters, wardrobe, props, and moments as limited edition NFTs or as virtual previews of purchasable physical goods—all depending on the company's level of comfort ceding control of branding, once pieces of IP have been commoditized and inevitably recontextualized within the metaverse.

EMBRACING NEW FINTECH

The economy within the metaverse is built upon blockchain/Web3, an even hotter topic within the M&E space right now. Blockchain smart contracts powered by crypto payments promise to democratize access and streamline distribution inside and outside of the metaverse space, in several ways.

Crowd-sourced financing for production and distribution is a natural successor to the Kickstarter/GoFundMe model, this time with blockchain being used to reward contributors programmatically with some predetermined compensation such as advanced access to the content or exclusive bonus content, and even fractional ownership of an NFT to participate in some share of profits.

Similarly, NFTs can be purchased as proof of membership in fan clubs and entrance to VIP events with celebrities. NFT add-ons could be engineered to coincide with traditional subscription services, enticing customers to keep paying for a streaming service to retain those

Continued on page 107



Jeremy Tipton is Rightsline's senior product strategist. For the past seven years he's contributed his background in media studies and his love of building impactful software toward Rightsline's mission to build the most comprehensive, intuitive, and technology-forward platform with the goal of maximizing the value of intellectual property. jtipton@rightsline.com @Rightsline

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HOW PREPARED ARE YOU FOR THE METAVERSE?

First, keep in mind:
the metaverse isn't a
single channel

ABSTRACT: The metaverse has everyone's attention with major brands making headlines as they double down on their investment. While some companies have entered the metaverse or have plans to build digital experiences, many in the media and entertainment space are wondering what the metaverse really means to their business.

By Drew Hilles, SVP, GM, Veritone

When you hear people talking about the metaverse, it seems very conceptual and as a result, it can be difficult to understand tangible use cases. Really, the best way to think of it is another channel to engage consumers with content. But like every new technology, there are challenges that media and entertainment companies will have to overcome to achieve success.

Every conversation on the metaverse typically talks about it as a single, new platform that'll be the next evolution of the internet. As it stands today, the metaverse is completely decentralized, which for individual content creators and businesses is a good thing. Decentralization enables these groups to have greater control over content and their revenue generating opportunities which has always involved some sort of third-party middleman in the past to achieve.

However, for larger media and entertainment brands, it presents a problem. Decentralization means that there's multiple metaverse worlds they can potentially enter and build digital experiences. And given that the environments are not interoperable, managing these experiences across different platforms only adds to the complexity of operating in the metaverse.

While creating metaverse-ready content, managing its associated data, and reaching the right audiences highlight part of the challenge, the other issues

The Content Lifecycle

CREATE

MANAGE

ANALYZE

DISTRIBUTE

MONETIZE

The content lifecycle does not change with the addition of the metaverse as a channel. What does change is the type of content you'll be creating and its associated data.

involve content protection. Decentralization means that there's no single body of oversight that guarantees protection across these worlds and raises concerns around how content is monitored to prevent inappropriate use — especially with the advent of deepfakes.

Many of these challenges stand in the way of companies who have not fully reached critical mass in their digital transformation. Companies that have completed this stage unlock the full potential of artificial intelligence (AI), a key technology component that will make the metaverse a viable channel.

HOW ARTIFICIAL INTELLIGENCE WILL FULFILL THE PROMISE OF THE METAVERSE

The use of AI in the metaverse will become pervasive. AIOps will enable metaverse providers to efficiently allocate resources and monitor metaverse infrastructure components at scale. For companies that are using these platforms to deliver digital experiences, AI will be critical in managing what we call at Veritone the content lifecycle.

Given the 3D nature of the metaverse, the need for synthetic media, AI created content, both voice and avatars, will play a role in building truly immersive experiences. Leveraging machine and deep learning techniques, synthetic voice technology enables a variety of new use cases for content creation.

For example, a retailer could build a virtual store in the metaverse and have a synthetically created brand ambassador or character that users can engage with while they shop or preview products. Brands could also offer virtual experience where users can test new products that exist in the physical world or buy and trade NFTs based on a brand's IP such as productized sport or TV moments.

In addition to these exciting experiences, marketing by and large will not change all that much. Many of the ways companies place their message in front of consumers will shift to more 3D, in-game, and audio interactions. Companies could advertise their brand to users through virtual billboards or audio advertisements that play during a digital experience.

But as you can imagine, making sense of all this engagement will yield record levels of interaction data that only AI will make possible to manage. From user-generated content to vendor creative, these environments will

produce a massive amount of new information and data that can quickly become unmanageable.

For example, a multi-user augmented reality experience might track user movements, body language, and voice inflection to influence personalized experiences. These insights will need AI processing data to help the humans behind the scenes understand user intent. Then, aligning it with user interests and desires will ensure the best experience possible in their prescribed virtual world.

PREPARING FOR THE METAVERSE

The examples that I have shared might seem far-fetched but are based on actual use cases companies have applied. Names such as Hyundai, Disney, and Nike have all set their sights on the metaverse. But for media and entertainment, it is all centered on content.

AI has already proven how it can automate the management and creation of data related to content, which is critical in understanding what assets you have available for use. It also has opened new opportunities in content creation, from maintaining authentic sounding voices in multiple languages and accurately dubbing video content to bringing to life brand ambassadors and mascots.

Media and entertainment companies should understand that the metaverse isn't a trend. Now is the time to actively map how you plan to utilize the channel. Start by figuring out how people engage with your brand today and how you can reimagine it in a 3D space.

Next, determine if you are ready for advanced technologies and AI and what it will take to move beyond digital transformation. Then it really comes down to the things media and entertainment companies do better than anyone else—creating immersive, engaging, and user-experience focused content. ■



Drew Hilles is the SVP and general manager of Veritone. He was one of the key founding senior executives of dMarc Broadcasting, later acquired by Google for \$1.4 billion. For Google, Hilles served as a senior director of sales overseeing content partnerships and advertising sales and operations. Hilles was a key senior executive of Google's North American organization for four years. info@veritone.com @veritoneinc

FULFILLING THE PROMISE OF THE METAVERSE

That first means properly defining it

ABSTRACT: The metaverse holds a lot of promise — the promise of connection, entertainment, and commerce, all in a virtual setting. While the eventual scope of the metaverse may be unknown, one thing is certain: extensive testing by trained eyes will enable users to maximize their experience by limiting frustrations in the user interface.

By Ramón Bretón, Chief Technology Officer, 3rd i Digital

We've all heard plenty about the metaverse. We've heard about how it will change the way we work and play while providing new ways to spend money—on digital clothing, artwork, real estate, and concerts or other virtual events. Despite being unable to predict the timing or extent of metaverse adoption, when some of the largest social media and technology companies invest heavily in new technology, they only do so with expectations of substantial profits.

There is no single “metaverse.” Rather, “the metaverse” has come to describe the sum of all virtual spaces, including the world Meta (formerly known as Facebook) is building, as well as Microsoft's virtual

initiatives for enterprise. There's also Decentraland and the Sandbox, worlds built on blockchain technology where in-world land and goods are non-fungible tokens (NFT) powered by unique cryptocurrencies. These worlds may be strictly separate now, but it is entirely likely that seamless bouncing back and forth between them will not only be possible but will eventually be commonplace.

GAMERS ALREADY AT HOME

Embodying a digital character, collecting items, buying and selling in a digital economy, and interacting in a virtual world have been part of video games for over



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A RIGOROUS TEST PLAN MUST BE CRAFTED and budgeted for as part of the deployment timeline for metaverse applications and experiences.

twenty years. The metaverse expands these concepts with nearly endless possibilities of customization, while offering true ownership of wearables, real estate, and other digital objects as NFTs. When it comes to the metaverse, gamers are already willing participants. However, adoption will need to expand beyond this limited cohort for the metaverse to become a significant area of growth for entertainment and enterprise.

AN UNEXPECTED ROAD TO METAVERSE ADOPTION

Remote meetings became commonplace during the global pandemic. This shift away from in-person meetings toward connecting with others from home has laid the groundwork for even the most tech-reluctant to see themselves participating — willingly or otherwise — in a business meeting using an avatar in a virtual space. Meta has been very forward about shifting most of their eggs into the metaverse basket, with plans to entice enterprise customers via their Horizon Workspaces app. However, Microsoft may be better suited as the entry point for most casual-tech users into the metaverse.

Teams, Microsoft's answer to Zoom and Slack, has exploded in daily use since early 2020, primarily due to the sheer number of Microsoft products already in the workplace when the pandemic hit. Whereas Meta places an emphasis on entry into the metaverse using VR or AR hardware such as their Oculus Quest VR headset or their forthcoming AR glasses currently dubbed "Project Nazaré," many perceive these as cumbersome, expensive, or simply unnecessary. Microsoft's Mesh app, on the other hand, enables even the most casual user to engage in the virtual aspects of Teams via the lowest common denominator: a work computer or cell phone. Although using Mesh via a VR or AR appliance, such as the Microsoft HoloLens, deepens the sense of presence in a virtual setting, allowing participation with items as ubiquitous as a laptop or cell phone removes the

barriers to participation in the metaverse.

FULFILLING PROMISES THROUGH QUALITY CONTROL

Despite its complexity, at its heart the metaverse is simply a collection of user experiences (UX) driven by software applications with user interfaces (UI) exposed to the end user. Regardless of whether the user is a digital novice or digital expert, it is reasonable for them to expect an immersive experience in the virtual world, unspoiled by awkward programming. At best, hiccups in the UI or UX may remind the user that their experience is manufactured, and at worst, they can break the experience altogether. Meta, Microsoft, or any other business such as media and entertainment companies exploring new revenue streams for their IP, must prioritize eliminating frustrations arising from problematic code to keep consumers spending both time and money in the metaverse.

A UI or UX can fail in as many ways as its underlying code is complex. While lessons are learned from consumer complaints, end users cannot be expected to be the primary bug testers. All users have a low threshold of tolerance for bad programming. Novices are easily frustrated as they lack the ability or willingness to think around problems. The digital generation has higher expectations based on their previous experience with similar technology and easily recognizes even the smallest cracks in the code.

Fortunately, lessons can be learned from the robust consumer UI and UX testing that is commonplace in other home entertainment technologies. A rigorous test plan must be crafted and budgeted for as part of the deployment timeline for metaverse applications and experiences. Exhaustive testing cannot be an afterthought, as is unfortunately often the case. The consumer experience must be prioritized with the necessary resources

Continued on page 98



Ramón Bretón serves as chief technology officer for 3rd i Digital, a pioneering company in the field of quality assurance for the media and entertainment industry. Prior to his 20 years at 3rd i Digital, Ramón spent 10 years in the music business as an audio mastering engineer, giving him thirty years of experience contributing to quality entertainment for consumers.
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**What's ahead for media companies in the metaverse?
Content, community and commerce are about to converge.**

ABSTRACT: We examine the role media companies might play in the immersive, interactive environment where viewers consume content—and seamlessly purchase digital or physical goods connected to it. We look at the changes ahead as media companies evolve from content creators and distributors to active liaisons that bring content together with brands. How will they join forces with broadcast and cable companies, communications providers, advertisers, and social media platforms to make content available in virtual worlds? Here are three challenges for media companies and real-world ways to tackle them.

**By Joseph Dervin D’Cunha,
Head, Communications,
Media Industry Strategy,
Solution Offering, Partner Strategy, and
Laurie Hutto-Hill, Vice President, Consulting
Services, Cognizant**

The potential of virtual worlds dazzles us, and rightly so. The metaverse offers new ways to create, distribute and consume content.

For media and entertainment leaders, the key is a balanced approach that’s grounded in reality: It’s their job to explore and experiment with content in virtual worlds — and still run profitable businesses.

That is, media companies need to keep it real.

As metaverse strategies evolve, here are three challenges M&E leaders will encounter with steps for addressing them.

VIRTUAL WORLDS NEED THEIR OWN BUSINESS MODELS.

Exploring how the subscription economy will flourish in the metaverse is a key question for media companies. Virtual content

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complicates business models in several areas. For one thing, their real-time nature requires the ability to flex quickly to recommend and deliver the content consumers want in each moment, perhaps based on what they're looking at or what's in their peripheral vision.

For another, virtual content raises intriguing questions about exactly how media companies will generate revenue there in addition to their physical and digital channels. Content in the virtual world can be sold in pieces. For example, creating games, short-form content and memes from long-form movies and shows. Shaping a business model for selling content within content is a new opportunity that media companies will need to plan for.

How to address the challenge: all signs are that consumers are willing to open their wallets in virtual worlds: A Gucci bag from the luxury retailer's pop-up store on Roblox sold for the equivalent of \$6, and then resold on another virtual platform for the equivalent of \$4,100 — \$800 more than its real-world counterpart. Despite consumers' willingness to spend, we expect to see the "freemium" model proliferate early on for virtual content, gaining traction for the sector as it has in gaming, where publishers distribute the content for free and generate revenue from in-app purchases or advertising.

Those concierge-level, add-on purchases are likely to be essential for attracting and retaining paying subscribers and creating long-term customer value in the metaverse. For example, subscribers might purchase one-of-a-kind experiences such as exclusive Discords or attending a virtual red-carpet movie premiere, paying for the experience with cryptocurrency or virtual

AS WE EXPLORE VIRTUAL WORLDS' potential for content creation, distribution, and consumption, it's critical to view it through the lens of business implications. To keep it real means keeping an eye on the bottom line.

currencies.

Also needed will be a media supply chain that works in any marketplace. Virtual worlds require innovative changes in the way content is served up and what is being served up. Media companies will need to be able to sell on any virtual platform with the same set of tools and supply chain that they use to support physical and digital channels. That flexibility requires repeatable, scalable processes that can ingest large amounts of real-time data and recommend next best actions.

Rights management looms large. Media companies have made great strides advancing rights management from studios to artists and internationalizing it. Entering the metaverse requires rethinking that strategy. How will media companies distribute royalties in virtual worlds that trade in virtual currencies and NFTs? For example, could royalties be paid in Robux? And how will media companies track rights in virtual worlds where they may have no control over how and where content is going to be shown?

Still to be worked out are thorny authentication issues such as how and whether subscribers who purchase content on digital platforms have access to it in on virtual platforms. How will authentication be managed? Who can watch and where?

Continued on page 104



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INNOVATING SMARTER, FASTER IN A VIRTUAL WORLD

How game engines are revolutionizing media and entertainment



Prismax creates visuals for virtual music festivals using Unreal Engine.

ABSTRACT: With teams working remote due to the pandemic, studios like Final Pixel and Prismax had to look for ways to develop assets virtually. These studios leveraged game engines and other virtual production tools to produce commercials, music festivals, and more.

**By Katie Cole, Gaming Evangelist,
Director of Product Marketing, Helix Core, Perforce**

Fifteen million: that's how many years' worth of content was streamed in 2021 in America alone, according to Nielsen. The demand for content has been a boon for the media & entertainment industry, but it's also requiring teams to work harder than ever. Across the industry, everyone is trying to do more, faster.

Virtual production studios like Final Pixel and Prismax are making it happen with a smart combination of equipment and software. On the equipment side, they're using things like LED walls and motion-tracking cameras. On the software side,

there are two tools in particular that enable them to push the limit on innovation and production turnaround: game engines and version control. The former lets them bring impossible worlds to life before their eyes, and the latter is an essential tool that allows them to do that faster and more efficiently.

GAME ENGINES ARE REVOLUTIONIZING MEDIA AND ENTERTAINMENT

Game engines like Unreal Engine allow studios to do some pretty amazing things. Outside of the video games industry,



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IN THIS TIME OF RAPID CHANGE, media and entertainment teams are searching for ways to work as quickly and efficiently as possible.

they're used to create and render 3D models and photorealistic worlds in real-time. They're involved in creating all kinds of stunning and immersive experiences.

Final Pixel, a studio founded by industry veterans in 2020, uses Unreal Engine and motion-tracking cameras to render virtual backdrops onto an LED wall. Real-time rendering of these scenes lets actors move in tandem with the backdrop, giving them the context to act more authentically. What results is a scene that you would never know was filmed in front of what is basically a gigantic TV.

Prismax uses Unreal to make and render visuals for live virtual events. They used it for the first ever paid, international virtual music festival. They've also used it help Disneyland bring their architectural plans to life and give stakeholders a virtual walkthrough.

GAME ENGINES PAIRED WITH VERSION CONTROL

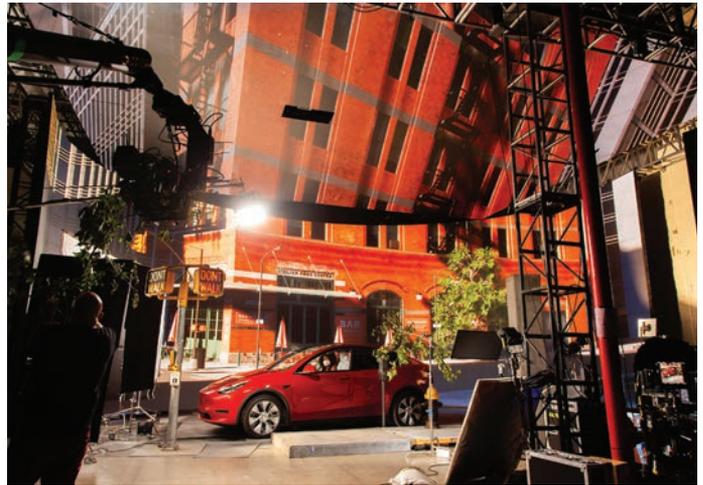
There's a downside to all the awesome content game engines make possible: a huge number of very large, complex binary files. You can't merge them, so collaborating on them is a hassle. Without a reliable version control tool, storing, managing, and keeping track of these binaries can become unmanageable.

Final Pixel was struggling to speed up production. At first, they were using an online file transfer service to move creative assets between teammates. The massive files they were transferring took a long time for the artists to upload and for the set staff to download. Sharing files this way made it extremely difficult to make quick changes to the digital art used on set. It also made it difficult to keep track of which file was which.

At Prismax, the team ran into issues with their artists unknowingly working on the same thing at the same time, resulting in corrupted files and a lot of wasted time. This was not ideal when they were trying to collaborate quickly to make content for live events.

Both studios needed better way to manage and collaborate on game engine files.

Version control is an essential virtual production



On one of Final Pixel's sets, a car is posed in front of an LED wall displaying a city street.

pipeline tool

To store and manage all the assets made with their game engines, the teams at Final Pixel and Prismax turned to Perforce Helix Core. It's the version control system trusted by 19/20 top AAA game development studios because of its seamless integration with leading game engines and its ability to manage the large, complex files with the speed teams need.

Helix Core allows Prismax to customize their setup and workflow for each project. All their assets can be versioned and used with the performance required to make real-time, real-life decisions. This makes it easy for Prismax to spin up new projects for clients and design for the future.

Final Pixel has sped up production significantly with Helix Core, which was recommended to them by one of their CG supervisors. The whole team now stores their digital assets in Helix Core, making the most recent iteration instantly available to the rest of the team. They now also have a detailed history of every asset, making it quick and easy to revert changes and find what they need if they must reshoot.

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Katie Cole is a gaming evangelist and director of product marketing for Helix Core at Perforce. She is a product marketing strategist who helps high-tech companies find solutions to their biggest development challenges. For Perforce, she's a video game and virtual production evangelist, working with teams in these highly creative and competitive industries to streamline their pipeline and workflows. She is a pioneer of Perforce U College of Virtual Production, a free online program that teaches filmmakers of every skill level how to innovate in this rapidly evolving space. kcole@perforce.com @perforce

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WORKFLOWS & THE CLOUD



The world of entertainment has changed. And so too has the way we're making that entertainment. Audience borders are blurred, our talent is spread across the globe, and cloud-based production techniques are creating a virtual production revolution. It's an uncharted landscape, requiring new ways of doing the work, and new tools to make it all possible.

STORYTELLING WITHOUT BOUNDARIES

How globalization is confronting borderless entertainment

ABSTRACT: The world of entertainment has changed. With the boom of streaming, audience borders are blurred, and content is taking on new life in previously unreachable territories. As the biggest names in entertainment shift this focus and plan the latest viral hit, how have the demands of globalization evolved?

By Chris Oakley, CTO, ZOO Digital

As more studios invest in streaming, the battle for attention is more demanding than ever. And the key to winning is content. “Dark,” “Money Heist,” “Lupin,” “Squid Game.” Storytelling that draws in fans all around the world, where the next viral hit can come from anywhere.

With this boom of streaming and an insatiable audience appetite, the biggest names in entertainment are facing relentless pace and unprecedented scale. More content to localize than ever before — across more languages, more platforms, more audiences.

The rapid growth of original content in a plurality of languages has compelled our globalization industry to react and adapt. Adapt to market demands and the needs of modern audiences — increasingly eager to consume content from further afield, providing the localization quality is right.

BUT WITH THE GROWTH of demand for global content combined with the accessibility brought through streaming, how can the globalization industry possibly keep up?

As these audience borders are blending, storytelling now exists without boundaries. But what does that mean for us? What challenges do we face? As ever, it's our job in globalization to be prepared with solutions up our sleeves.

BUILT TO GO GLOBAL

Back in 2015, the pre-release of Disney Pixar's animated hit *Inside Out* was tested around the world to ensure that story elements were correctly reflected for local audiences. Director Pete Docter explained how it was crucial that a complex film about emotions didn't just work domestically, but also for international audiences as well.

"We learned that some of our content wouldn't make sense in other countries," Docter said. "For example, in Japan, broccoli is not considered gross. Kids love it. So, we asked them, 'What's gross to you?' They said green bell peppers, so we remodeled and reanimated three separate scenes replacing our broccoli with green peppers."

Factoring in the painstaking task of producing alternative animated scenes, the dedication to a global audience was clear.

Today, this borderless audience is considered from conception. Each content studio looks at globalization not as an add-on or time-drain necessity, but central to success. The international audience is just as important as the domestic.

But with the growth of demand for global content combined with the accessibility brought through streaming, how can the globalization industry possibly keep up? For ZOO Digital and others leading the way, the challenge is getting ahead of the curve.

ADAPTING TO DEMANDS: SCALE, PACE AND SECURITY

Over time, audiences have demanded more. Korean thrillers, Scandinavian dramas, Turkish telenovelas that see respective shifts in demand as cultures and popularities eb and flow. As an industry, globalization has always been asked to react to these shifting needs.

However, the pandemic accelerated these trends and the growing demand for localized content can be seen

in cultural shifts towards foreign-language content, diversified Academy success, and — with the expansion of streaming platforms into new territories — the two-way exporting of content that this brings.

With new territories to reach, tighter deadlines to hit and non-stop demand for more content, the entertainment industry has been calling out for clarity. Clarity that localization and media services are where they need to be — with the reassurance that nothing ever gets missed. It's our job in globalization to make it all a little easier.

So, how do we do that? How are the issues on the horizon being tackled today?

SCALE

Challenge: The unprecedented scale (and opportunity) of global entertainment today means more content to localize than ever before. But how do we ensure unwavering quality across localized content while also making operations streamlined and easier to manage? How can the globalization industry scale up alongside entertainment? And how do we deliver the capacity required of such demanding scale?

Solution: Today's world of globalization should eliminate the inefficiencies of siloed workflows across multiple vendors.

Globalization vendors must see each localized asset as part of something greater. In doing so, and by providing everything in one place, efficiencies come naturally. It's our job as service providers to always ask "Is this the best way? How would this be done if we were starting from scratch today?"

With this technology-first approach, globalization

Continued on page 100



Chris Oakley is the CTO of ZOO Digital. He has been with ZOO since the early start-up days. First working as a QA engineer, the software specialist is now an expert at juggling project priorities, keeping an eye on new opportunities for innovation and managing ZOO Digital Labs. chris.oakley@zoodigital.com @zoodigitalgroup

VIRTUAL PRODUCTION: CLOUD TO SET AND BACK

Cloud-based production techniques are liberating creatives in today's virtual production revolution



The cloud will enable artists to bring a more immersive creative experience with easier access to tool sets.

ABSTRACT: Cloud-based production techniques are liberating creatives in a virtual production revolution to produce content where they want and when they want by leveraging a global talent pool of artists.

By Provanshu Dey, Solutions Architect Leader, Virtual Production, and Matt Herson, Solution Architect Leader, Content Production, Amazon Web Services

We are in the middle of a virtual production phenomenon that accelerates the creation of digital content for theatrical and streaming productions. In a way, this is not all new. Creators have employed clever techniques such as front and rear projections to manipulate what's being seen by the camera for the better part of the last century. One thing that is common to these tricks is that the principal photography from set resembles what's going to be seen by the audience.

However, in the last couple of decades, visual effects have moved the creative center of gravity away from the set in the post-production process where what's going to be on the screen isn't available until final compositing. It works great, but creative spontaneity suffers. Virtual production moves the creative energy back to the set! What the directors and photographers see through the monitors on-set is close to what's going to be on an audience

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screen. The flexibility of “fixing it in the post” remains available as a toolkit if need be. Cloud-based production techniques are liberating creatives in a virtual production revolution to produce content where they want and when they want by leveraging a global talent pool of artists.

DESIGNED TO BE SECURE

Virtual production puts a new point of view for the creatives on set and remote streaming. A more immersive environment is brought to your stage, with the ability to create instance changes with the visualizations. It also leading to a pattern where medium to large productions use several different independent entities in the workflow during pre-production, principal photography, and postproduction. In a globally connected production, independent companies find their creative talent all over the world. These truly global productions create a truly global attack surface for production assets, original camera files (OCFs), dailies, and other inflight materials for production. Creative members of a virtual art department located in Manila need to be confident in their ability to collaborate securely with their counterparts in Toronto while building the 3D scene for a production in L.A. Regardless of their location, they are participating in a workflow controlled by a pipeline that spans continents. Securing the pipeline from the start ensures a studio’s ability to have full control and visibility of where assets are, who has permissions to them, and how those specific assets are used in the production. The same security constructs are applicable for post-production, media supply chain and distribution workflows.

Using Amazon Web Services (AWS), you gain control and confidence to securely run your production pipeline with the most flexible and secure cloud computing environment available today. You can prevent



In virtual productions, a creative professional who is likely thousands of miles away will make changes in real time by working with a supervisor on set.

unauthorized access to production assets by assigning fine-grained permissions to roles and dynamically assign users to roles depending on their participation in the production process at any given point in time. You can gain detailed visibility into users and system actions by using logging and monitoring services including Amazon CloudWatch and incorporating other industry partner integrations. You can automate your incident response in case of a potential breach that preemptively isolates a rogue actor in the system to prevent further damage. AWS resources for cloud-native patterns and best practices for securing a virtual production pipeline is available on the AWS website. AWS professional services or partners with specialized competencies can help you implement these patterns for your studio.

EFFICIENT DATA FLOW TO AND FROM THE SET

A production opts to use virtual production for greater flexibility and creative control over what’s on the LED volume, VP stage, and other facilities. If you were to choose one metric that determines a truly positive experience for the director and producer, it would be the ability to move assets and content effortlessly and



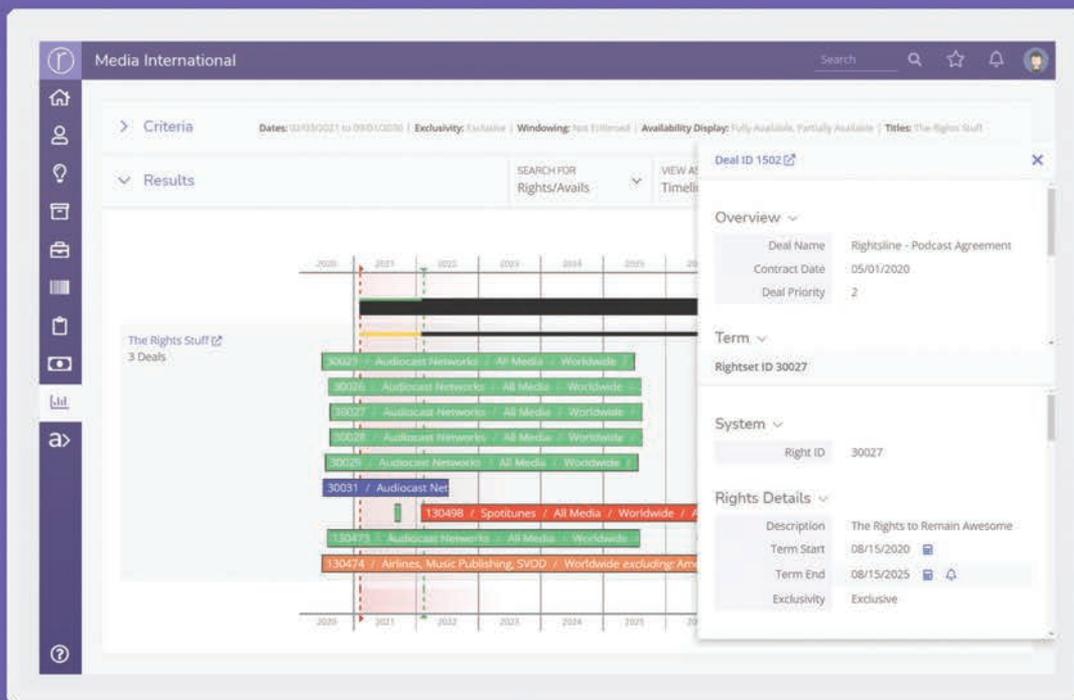
Provanshu Dey is the solutions architect leader of virtual production for Amazon Web Services. He has been building media applications for almost two decades, starting with media distribution and more recently in the areas of content production pipelines. prodey@amazon.com @awscloud



Matt Herson is the solution architect leader of content production for Amazon Web Services. With more than 10 years of experience, he has a passion of innovation in the postproduction and virtual production space. mherson@amazon.com @awscloud

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TOMORROW'S LANDSCAPE IS UNCHARTED, but there are hints of technology that will help push the boundaries of what is seen on the silver screen. The cloud will enable artists to bring a more immersive creative experience with easier access to tool sets.

securely between the set and the cloud. In an ideal world, a virtual art department comes ready to the set with a perfect blueprint and 3D assets for the scene(s) on the day of the shoot.

All they have to do is to sync the local perforce edge server with the latest from the cloud, load that into Unreal Engine (UE), if that is their choice of game engine, light up the LED walls, and go on with their day. The reality is multiple last-minute edits to the scene by the director of photography and/or the creative director. Therefore, a creative professional who is likely thousands of miles away will make changes in real time by working with a supervisor on set. The success of this process depends on hyper-fast remote syncing of production assets. Perforce-enhanced studio pack, when deployed with best practice guidance on AWS, offers advanced collaboration to enable this workflow.

The moment the OCFs are made available to editors, creative iterations can start. A shortened dailies cycle could shave hours from a day's schedule. This, when combined with editors working in another time zone, could make production a 24/7 operation. This ultimately puts invaluable time back into the schedule and saves production budget from overages. A direct and timely ingestion of camera originals to a cloud storage endpoint creates the possibility that the dailies can pick up the take soon after "print" is called on set. AWS DataSync is a secure, online service that accelerates moving OCNs between set and AWS storage services. It can copy OCFs from a digital imaging technician's (DIT) machine to Amazon Simple Storage Service (Amazon S3) buckets, Amazon FSx for Windows File Server file systems, and Amazon FSx for Lustre file systems. AWS Direct Connect partners can help ensure that cloud-bound traffic remains efficient, highly available, and resilient.

A virtual production requires multiple collaborators to work closely in real time during pre-production, production, and in post-production. AWS Partners including Epic Games offer native capabilities through

collaboration plugins in the case of Unreal Engine. AWS offers the ability to make transport secure, resilient, and reliable with a cloud-native VPN. More importantly, the creative work, when supported by a virtual workstation in the cloud, enables the ability to remotely share pixel streaming session by more than one individual thousands of miles apart. AWS offers virtual workstation solutions like Amazon Nimble Studio, which is a purpose-built service for content production workloads. If you want to build your own, AWS offers a broad selection of graphics-capable virtual machines in the cloud including recent generation NVIDIA GPUs. Moreover, several AWS partners offer purpose-built solutions for cloud-native virtual workstations on Amazon Elastic Compute Cloud (Amazon EC2) for Digital Content Creation (DCC) applications.

FUTURE OF VIRTUAL PRODUCTION WITH THE CLOUD

Tomorrow's landscape is uncharted, but there are hints of technology that will help push the boundaries of what is seen on the silver screen. LED panels will become denser and offer more lifelike depth. The supporting technology to display pixels will become more performant and bridge the gap between new digital techniques.

Many of these pieces are already in place, including having a Wacom Tablet at your desk connected to an Amazon EC2 GPU-enhanced instance running Autodesk Maya. AWS Local Zones create a low-latency connection between the artist and the machine, building towards a seamless experience. The possibility of having an internet connection and working anywhere is a reality. Now, adding in remote panels with onboard caches, you can move a virtual art department into your living room. One thing is certain, tomorrow will bring new and exciting technology to build visual delight. ■

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"We saw how stable Helix Core was for the art team to manage changes and the Unreal Engine environments... It was so effective in building worlds and virtual environments quickly across multiple people in different locations."

Michael McKenna

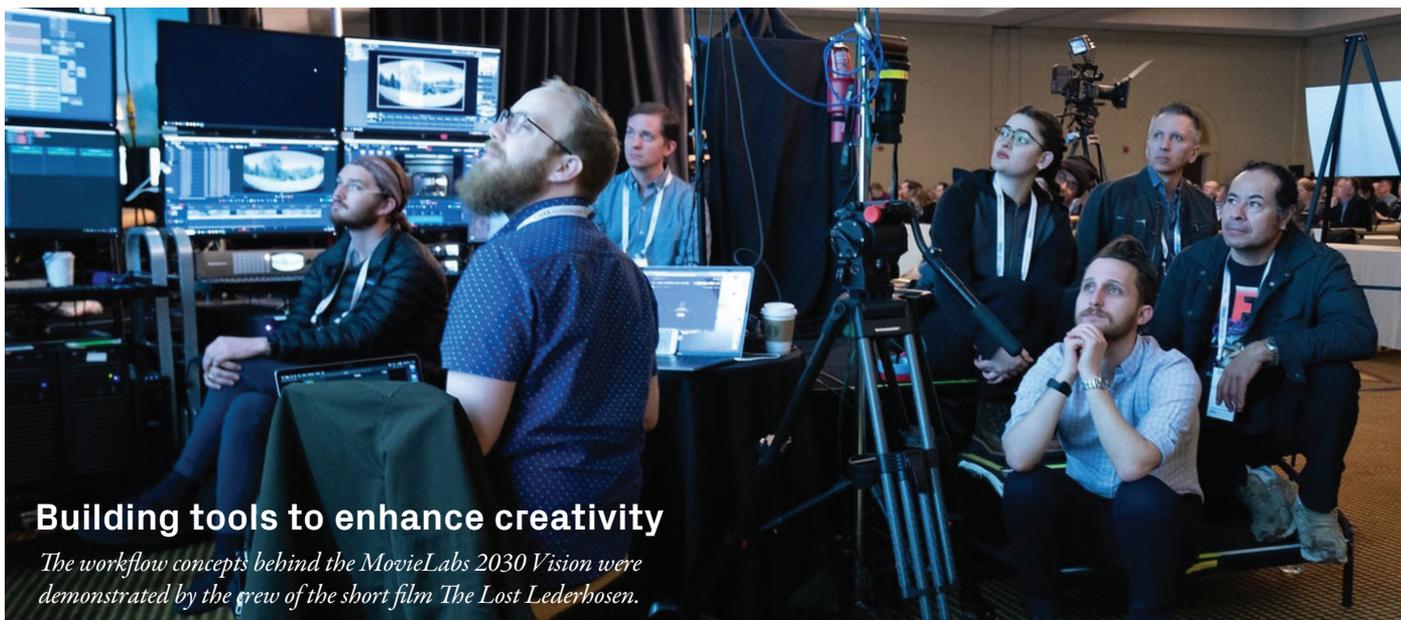
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MOVIELABS 2030 VISION: A TOOL-BUILDERS' PERSPECTIVE



Building tools to enhance creativity

*The workflow concepts behind the MovieLabs 2030 Vision were demonstrated by the crew of the short film *The Lost Lederhosen*.*

ABSTRACT: The major studios are aligned to a framework called MovieLabs 2030 Vision, whose goal is to empower storytellers to tell more amazing stories while delivering at a speed and efficiency not possible today.

**By Steven B. Cohen, Industry Principal,
M&E-North America, HCL Technologies**

I've had a very fortunate career in Hollywood over the last 40 years. I've seen the industry transition from photo-mechanical to electronic-tape, from electronic-tape to data-file and now from data-file to data-cloud.

I enjoy building tools to enhance creativity. Over the years, these have included non-linear sound and picture editorial systems, remote collaboration tools, digital dailies with calibrated displays, digitally recruited screenings, and global media networks for production and digital cinema distribution.

I'm looking at an event horizon that will drastically and dynamically change content creation and distribution. It has the potential of democratizing content creation, streamlining workflows, reducing production and postproduction inefficiencies, and providing enhanced creative time.

Michael Wise, SVP & CTO of NBC Universal Studios stated: "We've got a moment in time to make our systems interoperable and interoperability is the key not just for asset reusing but also asset creation and distribution."

The major studios are aligned to a framework called MovieLabs 2030 Vision, whose goal is to empower storytellers to tell more amazing stories while delivering at a speed and efficiency not possible today. The MovieLabs 2030 Vision is a collection of three whitepapers

THANKS TO ITS RESILIENT NATURE, our industry adopted cloud infrastructure, SaaS offerings, remote desktop applications, and remote collaboration tools such as Zoom and Microsoft Teams in new ways.

and ancillary docs initially released in 2019 and then in 2020 which describe 10 key principles:

- 1. All assets are created or ingested straight into the Cloud; they don't need to be moved**
- 2. Applications come to media**
- 3. Propagation and distribution of assets is a publish function**
- 4. Archives are deep libraries with access policies matching speed, availability to the economics of the cloud**
- 5. Preservation of digital assets includes the future means to accessing and editing them**
- 6. Every individual on a project is identified and verified and their access permissions are efficiently and consistently managed**
- 7. All media creation happens in a highly secure environment that adapts rapidly to changing threats**
- 8. Individual media elements are referenced, accessed, tracked, and interrelated using a universal linking system**
- 9. Media workflows are non-destructive and dynamically created using common interfaces, underlying data formats, and metadata**
- 10. Workflows are designed around real-time iteration and feedback**

REMOTE COLLABORATION

In February 2020, the HPA Tech Retreat highlighted many of these concepts and demonstrated a production and postproduction workflow for a short film *The Lost Lederhosen*. Two months later, we had to deal with the



“Urgent Memo to the C-Suite” was targeted to chief executives.

COVID-19 pandemic, and the production, postproduction, and distribution industries turned on their head. I remember going to editors' homes in PPE and setting them up for remote editorial and collaboration.

Thanks to its resilient nature, our industry adopted cloud infrastructure, SaaS offerings, remote desktop applications, and remote collaboration tools such as Zoom and Microsoft Teams in new ways. This situation was like the challenge we faced in 2011; after the Fukushima tsunami and the destruction of the Sony videotape factory, we had to learn to work with data instead of tape.

In February 2022, MovieLabs released an “Urgent Memo to the C-Suite.” It was a call to action. MovieLabs refrained from their original intent, “to collaborate by appropriate means to achieve shared goals and continue to empower future storytellers and the creative community.”

The memo's target audience was chief executives, chief financial officers, chief people officers and board members, production executives, and production companies.

The memo's authors went on to say, “And we have a simple message — companies that want to not just survive but thrive in the modern content ecosystem need to invest in production technology now.”

The memo went on to say, “Our industry is at a criti-



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The audience at the February 2022 HPA Tech Retreat.

cal inflection point as emerging technologies (cloud, automation, AI, real-time engines) approach mass adoption, and we re-emerge from the pandemic that has both crippled and then enlivened our industry. We cannot waste this opportunity to reinvent our 100-year-old production processes and create a more dynamic content creation ecosystem that is optimized for the likes of content consumers, who are demanding now and will do in the future.”

THIS IS QUITE DIFFERENT FROM THE ORIGINAL MOVIELABS WHITEPAPERS.

We debated over the target audience but concluded that it should be aimed at production technologists (CTOs, CIOs, cloud companies, SaaS providers, technology companies, and software architects). This means people who would not only recognize the challenges and merits of the principles but also help in designing the technical solutions. However, we also highlighted that enabling the vision would take more than just technologists. The realization of the vision requires alignment and support from senior leadership across finance, marketing, operations, producers, and even board members who provide organizations’ guidance on strategy, governance, and long-term risk.

In February 2022, another HPA Tech Retreat was held, the first major in-person tech event for our industry. MovieLabs presented a panel discussion with CTOs of studios, public cloud executives, and leading software company executives. Richard Berger, the CEO of MovieLabs, provided the context for the discussion and the original vision paper.

“Our goal was to provide storytellers with the

ability to harness new technologies so that the only limits they face are their imaginations and all with speed and efficiency not possible today,” Berger said. These industry gatekeepers voiced their support for MovieLabs and called for the adoption of these principles and a joint effort to incorporate them in workflows, hardware, and software products.

Eddie Drake, head of technology for Marvel Studios, said: “The pandemic accelerated our plans to go from on-prem to a virtualized infrastructure ... and it created a nice environment for change management to get

our users used to working in that sort of way.”

Jeff Rosica, CEO of Avid, summarized this pivotal opportunity as: “If we weren’t aligned, if we were all off in a different direction doing our things, we’d have a mess on our hands because this is a massive transformation. This situation is bigger than anything we’ve done as an industry before.”

Rosica endorsed the MovieLabs 2030 Vision: “The desired state is the outcome we’re looking for, and that allows us to develop roadmap plans, not just for ourselves but all of our partners in the industry, as we all need to interoperate together.”

Michael Wise, SVP and CTO of Universal Pictures said, “As we’ve done that work, we’ve been leaning into the work of MovieLabs and the ETC to make sure what we’re building leverages emerging industry standards including the ontology, VFX interop specs from ETC, and interoperability from MovieLabs.” Wise continued: “A bad outcome would be a ‘lift and shift’ from the on-premises technologies and specs and just putting them in the cloud. We’ve got a moment in time to make our systems interoperable ... and interoperability is the key not just for asset reusing but also asset creation and distribution.”

Hanno Basse, CTO of media and entertainment for Microsoft Azure, added: “You need to rearchitect what you’re doing – why are you going into the cloud? Let the industry come together and define some common data models, common APIs and ways of accessing the data, how that data relates to others and handing it off from one step in the workflow to the next.”

UNIQUE OPPORTUNITY

As a tool builder and technologist, I’m excited to par-

Continued on page 102



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OFF-PREMISE PRODUCTION ENVIRONMENTS:

A DIALOGUE

**Whatever the future,
it's likely to be cloud based**

By Lisa Gerber, Director, Business Development, M&E, and Nelson Frye, Director, Business Development, Data Center Operations, PacketFabric

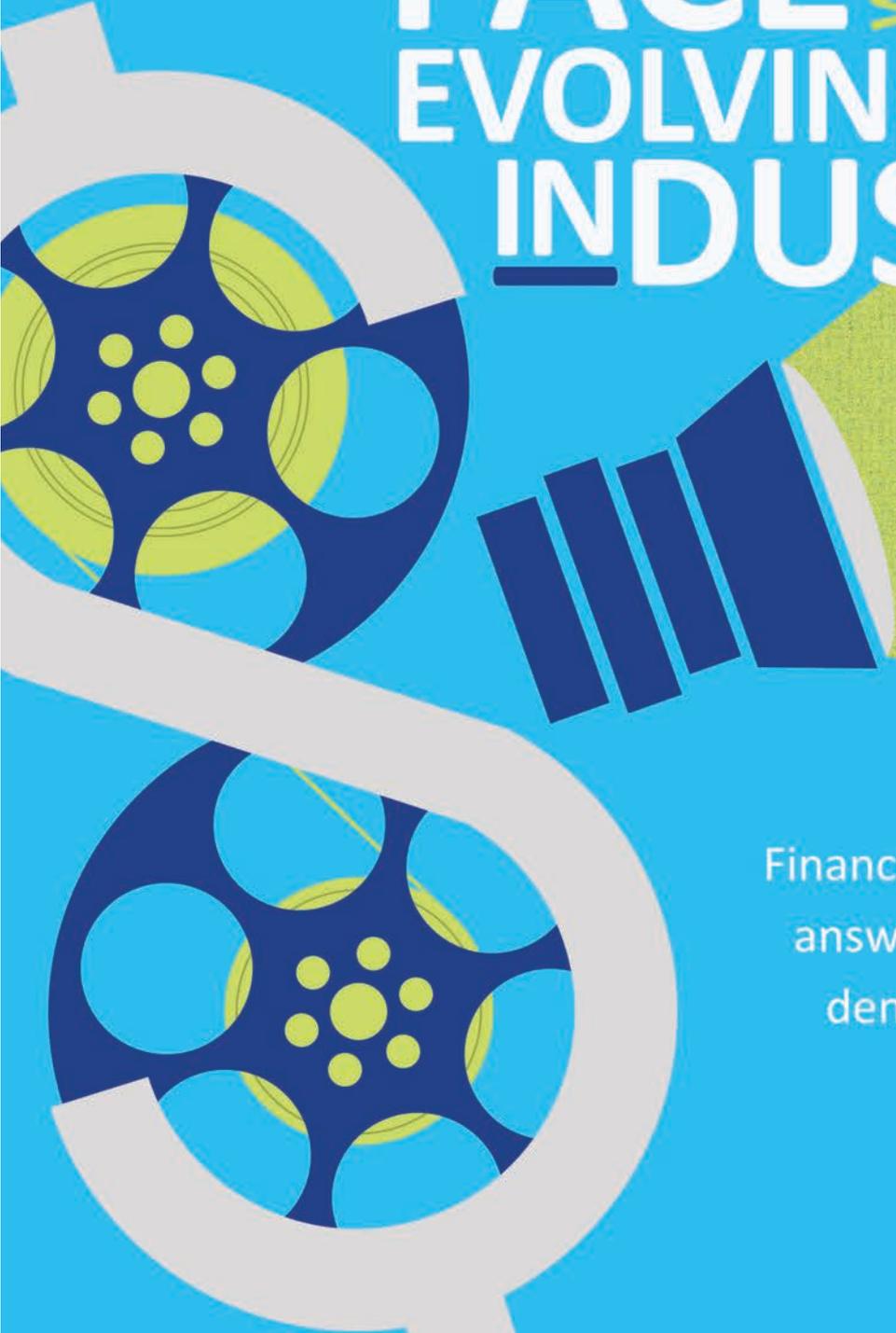
ABSTRACT: When it comes to mission critical workflows in media and entertainment, the number of options for data mobility can be daunting, and terms run the risk of being misconstrued. Here, PacketFabric reviews the options, and sheds light on which approaches work.

In the following exchange, PacketFabric's Lisa Gerber, director of business development for media and entertainment, and Nelson Frye, director of business development for data center operations, review the options, and try to shed light on the various approaches available to companies in M&E.

Nelson: Lisa, if you had to choose which of the following network architecture strategies would prevail in M&E, which would you choose?

- A. Public cloud*
- B. Private cloud*
- C. Off-prem*
- D. Hybrid-cloud*
- E. Multi-cloud*
- F. All of the above*

Lisa: I think the easy answer is to say "everything ends up in the cloud" and drop the mic, which most view as "A." The hyper-scalers like AWS, Azure and GCP build and operate the infrastructure so that productions, studios, and others in M&E buy and use what they need. They have no overhead, no

A stylized graphic featuring two interlocking gears. The top gear is partially visible, and the bottom gear is more prominent, showing a dark blue outer ring and a light blue inner section with a pattern of yellow and white circles. A lightbulb with a blue base and a white glow is positioned to the right of the gears, pointing towards the text.

KEEPING PACE WITH AN EVOLVING INDUSTRY

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racks to manage and life is great. Sort of like: “I don’t want to be a plumber; I just want to call a plumber when I need one.” But while the consensus seems to be that the future is more or less cloud based, the realities of connectivity and economics (and how the cloud is defined, when sometimes companies say this, but mean “off premise”) have limited the speed of industry-wide adoption.

Nelson: Right. One of the main problems here is that CSP data centers need to be reachable by millions of customers. So CSPs either wait for customers to figure out how to connect to them via traditional carriers or they provide better ways to do it and make it easy on them. Customers like “easy.”

And now production-grade connectivity (aka scalable high bandwidth, usage based, agnostic, private connections) can easily and economically interconnect software APIs, public clouds, data centers and on-premise points of presence. This means connections are now “point, click, buy, and use” and that aligns well with the CSP model.

Lisa: And the significant differences in egress fees, the existence of a multi-cloud router, and the capabilities of connections of up to 100 GBs are pretty game changing.

Nelson: Lets go over the various infrastructure strategies, and put them in the context of M&E.

PUBLIC CLOUD

Nelson: Microsoft succinctly describes the public cloud model as “the delivery of computing services — including servers, storage, databases, networking, software, analytics, and intelligence — over the Internet (“the cloud”) to offer faster innovation, flexible resources, and economies of scale. You typically pay only for cloud services you use, helping you lower your operating costs, run your infrastructure more efficiently, and scale as your business needs change.” So public denotes infrastructure that is shared among users, while private clouds use an organization’s own infrastructure.

For you M&E folks, VMWare had a great analogy when they said that private cloud is like watching videos you own and public cloud is like watching streaming video online.

Lisa: And in M&E, Azure, GCP, and AWS and others provide services for editing, rendering and storage tailor made for studios, productions, and post, at every stage of the process. As a networking partner, a service like PacketFabric provides comparably negligible egress fees to these CSPs, bandwidth of up to 100 GB, and scalable, automated access.

HYBRID AND MULTI-CLOUD

Nelson: Hybrid cloud refers to enterprises that use a mix of private cloud and public cloud services and multi-cloud is

BUT WHILE THE CONSENSUS seems to be that the future is cloud based, the realities of connectivity and economics (and how the cloud is defined, when sometimes companies say this, but mean “off premise”) have limited the speed of industry-wide adoption.

when they use services from more than one CSP like AWS, GCP, Azure, Oracle, Digital Ocean, etc.)

Lisa: Because M&E includes various phases of production from pre to post, so many various teams within those phases, and so many various services used by those teams, it’s not your average enterprise scenario. These companies and vendors will often use different softwares, data centers and vendors, all with different infrastructure. An advanced connectivity service can cross connect to all of them within various data centers, and also between data centers, in a seamless and on-demand manner. And a cloud router allows end users to route traffic between them all, whether public clouds or other data centers.

ON-PREMISE

Nelson: On-premise is IT infrastructure that is deployed by an enterprise in its own data center or within a colocation facility. It’s “old school” but sometimes retro is the way to go.

Lisa: Right. This can refer simply to good old hard drives and sneakernet, or to on-premise data centers (aka anywhere carriers originate from). In the case of the latter, connectivity like PacketFabric’s can be provisioned directly from the office,

Continued on page 104



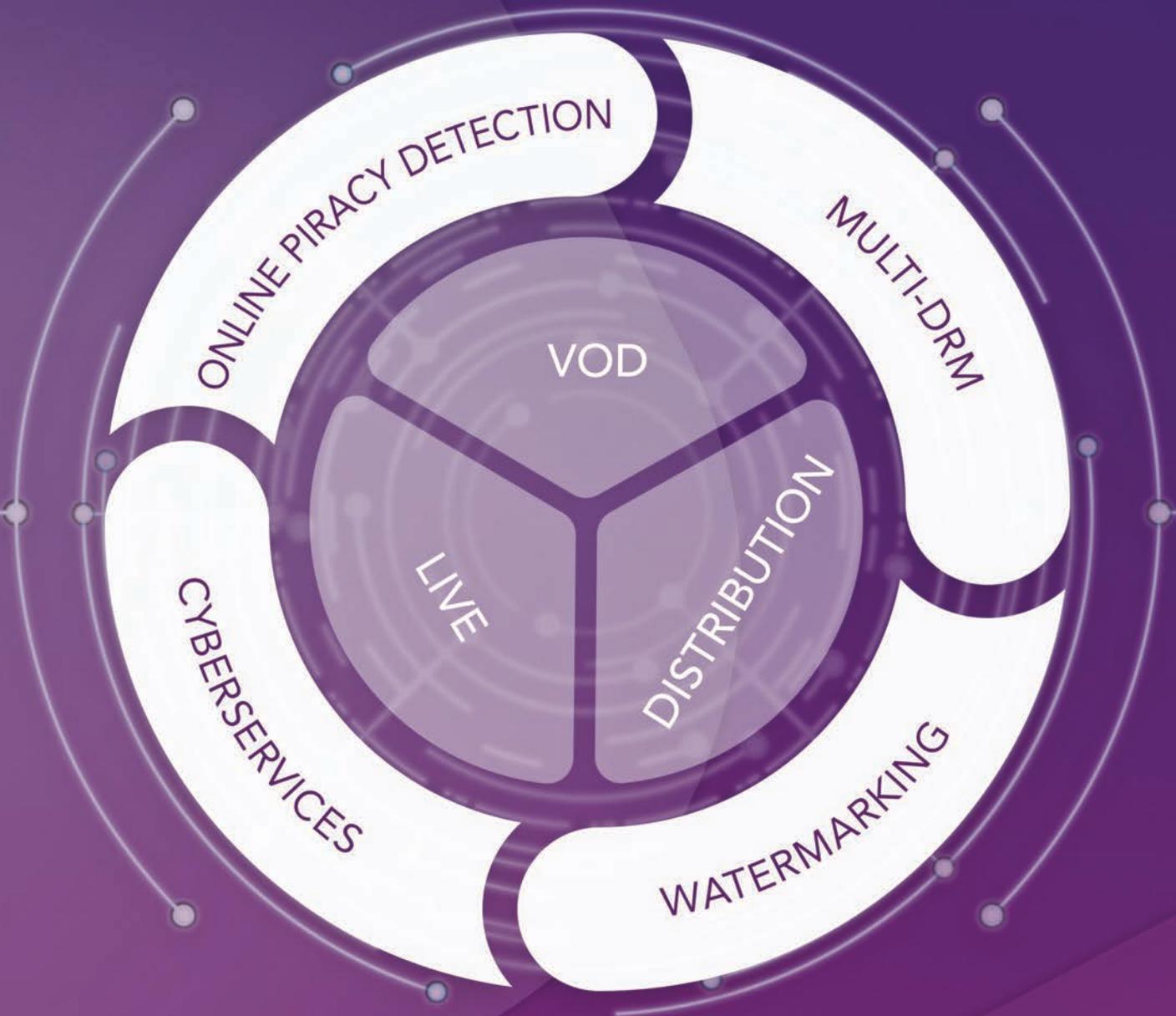
Lisa Gerber is the director of business development for M&E at PacketFabric. She identifies use case-specific needs for an industry largely reliant on legacy processes. Her specialty lies in bringing disruptive solutions to companies seeking to simplify the backend elements of their workflows in order to focus on storytelling and on unifying with their teams. lisa.gerber@packetfabric.com @packetfabric



Nelson Frye is the director of business development of data centers for PacketFabric where he’s responsible for leading partnerships with data center operators that require enhanced network connectivity solutions for their enterprise customers. nelson.frye@packetfabric.com @packetfabric

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SMART CONTENT



From the “what” captured in descriptive metadata, to the “who” in audience profile data, to the “how many” quantified by viewership data, we’ve got more data than we know what to do with today in this industry. But with the use of advanced analytics to help parse it all, the employment of artificial intelligence and machine learning to create accurate transcripts and intelligent metadata in real time, and the knowledge of data experts in non-traditional roles, media and entertainment is making major strides.

ADVANCED ANALYTICS: UNLOCKING DATA'S FULL POTENTIAL



The media and entertainment ecosystem has been working in hyperdrive. Data is keeping it all in order

ABSTRACT: For M&E enterprises today, data abounds. From the “what” captured in descriptive metadata around content to the “who” characterized in audience profile data down to the “how many” quantified by viewership data, this asset is more than plentiful. But data abundance begs a natural question: Are players pulling together data effectively to meet lofty business goals? This piece examines the role of data as fuel for advanced analytics and the next generation of offerings which unlock data’s full potential to help inform decision-making.

By Trent Wheeler, SVP Product, Gracenote

Almost 15 million years. Approximately five billion days. Or 1.3 x 1,011 hours.

That’s the amount of entertainment programming Americans collectively watched on streaming services in 2021, according to Nielsen. Driven by broad interest in drama, reality and kid’s programming, streaming viewing hours extended to the 11th power during our last trip around the sun.

What’s behind this mind-boggling number? For one, an ongoing shift in how people regularly access programming. During the final week of 2021, consumers spent 33 percent of total TV viewing minutes on streaming platforms. Per Nielsen measurement, this was the highest share of viewing to date captured by streaming compared to broadcast and cable TV. And quite possibly, the tipping point at which on-demand streaming started to overtake linear TV viewing as consumers’ preferred entertainment consumption method. In February 2022 alone, for example, Americans streamed 169.4 billion minutes of video content.

The massive time spent viewing streaming content has been

fueled by the ongoing proliferation of new streaming services. New entrants from one-stop entertainment content storefronts to more niche-driven players launched to compete with incumbent streaming stalwarts. As the number of available services has expanded, individual players are finding themselves in an ongoing quest to deliver compelling content to attract new viewers while retaining existing ones.

Adding, pausing, or dropping a streaming service is a relatively frictionless experience for the user, and the increasing number of service options is now overwhelming for audiences, which makes content a key differentiator. What programming to develop, whom to cast, where to place it and how to make it available to viewers all become top questions that studios and distributors need to answer. As streaming-first strategies become the norm, content metrics and the advanced analytics they fuel become critical.

To help inform content strategies and tactics, enterprises throughout the media and entertainment ecosystem are leveraging a wealth of data from different sources to achieve success in the face of competition. This holds especially true for content creators and distributors who are trying to move past reliance on tentpole content releases in favor of engaging in continuous optimization designed to bring resonant programming to market on a regular basis. For these players, data-driven content analytics play a critical role in the iterative process behind smart programming creation and distribution.

Truth can be found in content data and analytics. But several factors tend to blur the picture. For one, data available to the entertainment ecosystem can run the gamut in terms of sources and nature. What's more, it's often inconsistent in terms of coverage and scale. Data can run from first-party owned to third-party licensed metadata, from very raw to highly normalized, from editorially curated to AI-created.

The abundance and variety of data raises an important question for the industry: Are media and entertainment enterprises considering the best data?

Players need a lens of clarity and consistency on the content ecosystem, the programming landscape, distribution patterns and content popularity. Normalized and editorially curated program metadata is the primary component providing executives and analysts visibility into everything from macro-level industry

TO HELP INFORM CONTENT STRATEGIES AND TACTICS, enterprises throughout the media and entertainment ecosystem are leveraging a wealth of data from different sources to achieve success in the face of competition.

trends down to micro-level characteristics of individual programs. Audience data provides another critical component, adding an important signal on content consumption that helps to illuminate how broadly programming is capturing viewers and who they actually are.

By looking through a content analytics lens, creators and owners can make informed decisions about what to create and where to place it to maximize monetization through licensing. On the distribution side, streaming services, networks, and platforms can make data-informed decisions on how to put that programming in front of the right audiences in order to optimize engagement and loyalty for their services.

GIMME A SUBHEAD

Gracenote, the content solutions pillar of Nielsen, is uniquely positioned to provide the lens to the industry's content analytics. Based on the breadth and depth of Gracenote metadata on entertainment content and the connectivity between programming assets provided by the Gracenote ID, the company already helps the biggest and most innovative TV providers deliver advanced content search and discovery capabilities. By combining industry-standard metadata and IDs with trusted Nielsen audience measurement data and long-running data expertise, Gracenote is powering a new generation of content analytics offerings.

Because Gracenote already tracks programming distribution across all platforms, both streaming and linear, the company has unparalleled insight into the content marketplace and the 26,847 unique TV shows

Continued on page 102



Trent Wheeler is the SVP of video product for Gracenote. He leads teams that turn the company's industry-leading entertainment metadata and connected IDs into cutting-edge content search, discovery, and navigation solutions. trent.wheeler@nielsen.com @GracenoteTweets



AI IN BROADCAST NEWS

ABSTRACT: The typical large broadcast news operation ingests an avalanche of content every day. All of it must be filtered and evaluated to determine which news items, illustrated by which video clips, will be presented to viewers. It's a costly and time-consuming job performed by large and dedicated teams who spend their days manually reviewing entire video clips and describing the content, which producers and editors must access later to cut into finished news segments. Here we examine the challenges and describe the role of leading-edge solutions that use AI and machine learning to automatically create accurate transcripts and intelligent metadata in real time.

Automated transcription and metadata generation can transform the operation

By Ed Hauber,
Business Development,
Digital Nirvana

In today's fast-paced media landscape, broadcasters are always looking for tools to help them get content to air faster and with less effort. A news workflow is the perfect example.

In a large and busy broadcast news operation, content never stops coming in. Much of it lacks context and needs metadata to make it accessible and actionable. So, teams of staffers have the tedious, and time-consuming task of trying to manually review, describe, and log the continuous flow of incoming content. The goal

is to tease out which sound bites and video are relevant and important assets, and which are not. Once content is logged, it is commonly stored in a production asset management system (PAM), for producers and editors to access to create finished news content.

Transcribing the content would be an ideal way to generate the much-needed metadata. Unlike manual tagging, which only captures a few keywords, transcriptions offer a record of every spoken word within a piece of content, giving producers infinitely more detail to search against. But in a fast-paced news environment, broadcasters do not possess the staff or the time necessary to do the tagging, let alone transcription. And then correlating it all in the content management system? It's all just too much.

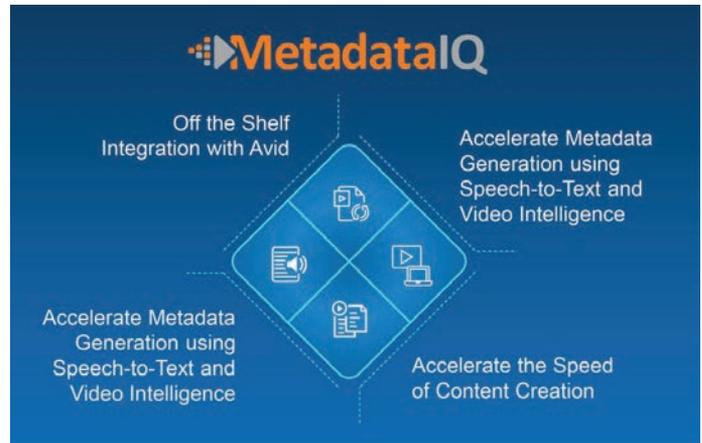
Artificial intelligence was born to solve such problems. Let's dive deeper.

How can AI and machine learning make things faster and easier?

Applying AI and ML technologies to news workflows yields automatically generated, highly accurate metadata of video content more quickly and less expensively than traditional methods. That translates to major money, effort, and time savings. It also means better-structured, more detailed, and more accurate metadata and shorter content delivery cycles.

What does an AI-driven metadata automation tool look like?

Today's cloud-based architecture for AI and ML components offers broadcasters easy access to these technologies with the promise of accuracy, scalability, and trainability. Certain AI-driven metadata



MetadataIQ automates the generation of speech-to-text and video intelligence metadata.

solutions combine high-performance AI capabilities in the cloud (speech-to-text, facial recognition, object identification, content classification, etc.) with powerful knowledge management orchestration tools.

The ideal tool also integrates the metadata into the production environment. In other words, it not only generates speech-to-text transcripts of incoming feeds (or of stored content) in real time, but it then takes the transcript, parses it by time, and indexes it back to the media in the Avid environment, where producers and editors create the content.

The results: actionable intelligence for media operators and faster search, retrieval, production, and delivery of news content.

What results are news broadcasters seeing?

One U.S. news and entertainment network has put this solution into action, transforming its news production workflow.

With upwards of 100 live news feeds continually coming in, all with little to no context or perspective, even this news powerhouse couldn't employ enough people to log all these feeds around the clock, day after day. The cost is too great, and a human workforce could never scale appropriately. This news organization understood



Ed Hauber is the director of business development for Digital Nirvana. As a three-time Emmy Award-winning producer, Hauber has more than 30 years of experience in media and broadcast technology. As a former broadcaster himself, he has a deep understanding of customer requirements spanning all aspects of the media enterprise. In prior years, Hauber led the sales organization for Volicon and held sales and marketing roles with Pinnacle Systems and Truevision.
edhauber@digital-nirvana.com @Digital_Nirvana

PRIOR TO THE ADVENT OF AI AND MACHINE LEARNING, the benefits of automated transcript generation were not available to the broadcast and M&E marketplace.

that automated, real-time transcripts would accelerate awareness and accessibility of its content, so it turned to the AI-driven solution described above.

The solution uses a variety of AI and ML technologies to process all live news feeds simultaneously from a wide array of sources (24x7x365 basis). No human team, no matter how large, could ever hope to perform concurrent, real-time processing of this quantity of media.

In the current implementation, the solution leverages multiple AI engines and language models, which include the following capabilities:

- *Automatic speech recognition (ASR)*
- *Natural language processing (NLP)*
- *Language Model Adaptation (LMA)*
- *Automated transcript generation*
- *Frame accurate time indexing of metadata to media*

Planned expansion of the core solution in phases two and beyond will include various video intelligence capabilities, including:

- *Facial/name recognition*
- *Emotion detection*
- *Location detection*
- *Program segmentation*
- *Logo detection*
- *Object identification*
- *Optical character recognition (OCR)*

SOLUTION BENEFITS

1. Automated transcript generation of live feeds greatly accelerates postproduction within the Avid PAM environment. This functionality not only delivers real-time, searchable transcript metadata, it empowers producers and editors to locate, retrieve and create finished news content faster than ever before.

2. Integrated, SaaS-based transcript editing tools, which allows operators to refine and perfect machine transcripts of high-value content that will live on indefinitely

ly in the MAM and long-term archive.

3. Increased awareness and visibility of all assets, including legacy media archives for optimized utilization and monetization.

4. Transcribed media that can be further refined as needed to generate closed caption files and/or subtitles for applications requiring media localization in up to 108 alternate languages.

5. Fully automated transcription generation, which eliminates human resource limitations and allows all content to benefit from metadata-rich enhancement.

How does it work?

As media content is ingested, it is routed via an API to cloud-based AI engines for speech to text processing. The resulting transcript metadata is then returned and processed through a series of real-time orchestration software layers in which markers are generated and the media and transcript metadata are frame accurately time indexed within the Avid Interplay PAM environment.

Prior to the advent of AI and machine learning, the benefits of automated transcript generation were not available to the broadcast and M&E marketplace. Today, this technology opens new doors of efficiency, accessibility, cost savings and opportunity for expanded monetization for the broadcaster and media operators across the industry. ■



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Will streaming's future be saved by using AI to reinvent a forgotten technique?

LOOKING TO OLD WAYS TO UNLOCK NEW VALUE

ABSTRACT: Cost-plus streaming deals seemed to render ultimates models obsolete. But for streaming to match legacy distribution's profitability, studios may again rely on ancillary revenues. And in today's hyper-paced digital merch world of the metaverse and NFTs, it will take machine learning to unlock the full potential of what studios own.

By Nihaar Sinha, Business Development, RSG Media

The rapid proliferation of streaming — there seems to be a new service every week — is obfuscating an unpleasant reality: many do not make money. No doubt, there will be a great sort-out, much as there was in the early days of the internet, with some streaming services making it and others ending up acquired and/or shut down as casualties in the grand paradigm shift of how audio-visual entertainment is distributed, consumed, and monetized.

The studios creating the content to feed the streaming beast, often owned by the same companies that own and operate the streaming services themselves, will need to navigate a complex, multi-dimensional alchemy of content needs, pricing power, sales strategy, timing, and more as their buyer composition transforms from primarily legacy cable and theatrical to streaming. Yet to effectively manage these rapidly shifting factors, studios will have to once again rely on an old-fashioned financial accounting method that once appeared headed for obsolescence: the ultimates model.

Streaming disrupted more than just the way audiences around the world consume content; it changed the way revenues are generated by film and TV assets. In the era before streaming, deficit-financed movies and TV would use an ultimates model to calculate the value of an asset by forecasting revenue from the first run in theaters or the linear television premiere, re-runs, international sales, syndication, home entertainment, and derivative rights. Then Netflix began its foray into original streaming with a business model that seemed to make ultimates obsolete.

TO EFFECTIVELY MANAGE these rapidly shifting factors, studios will have to once again rely on an old-fashioned financial accounting method that once appeared headed for obsolescence: the ultimates model.

Netflix, looking to grow its subscriber base regardless of cost, famously burned through mountains of cash to acquire content. As with many early-stage subscription-based startups, CAC and LTV were not the focus, but rather something that would only be of concern once they had scaled-up their subscription base. In such an environment, acquiring all rights in perpetuity at high prices and high studio premiums made sense. For studios, the selling environment was irresistible.

Their “one-shot” cost-plus acquisition model spread through streaming, replacing the complex web of revenues and associated cash waterfalls. This worked quite well for a long time, especially when Netflix launched their service worldwide in 2016. Now, a decade later, increased streaming competition and Wall Street scrutiny are forcing the large media incumbents to reexamine this approach and the conditions under which they invest in content.

Indeed, the underlying conditions have fundamentally changed. The new reality is a world of decelerated growth and tightened budgets. Profitability and margin expansion, once again, drive a fundamentals-based investment thesis on Wall Street. CAC and LTV are reasserting their importance. This undermines the “one-shot” acquisition model in two important ways. Firstly, as content budgets narrow amid a greater focus on CAC and margins, streamers no longer have the same insatiable appetite at higher price points. Secondly, studios are therefore no longer generating the same amount of cash from these sales and are left wondering whether streaming can match the revenues from legacy cable, theatrical, and home entertainment sales.

The newspaper and music industries are grave reminders of the risks that streaming and digital disruption can pose to major incumbents if the transition is not managed effectively. Taking on losses to support a strong push into streaming,

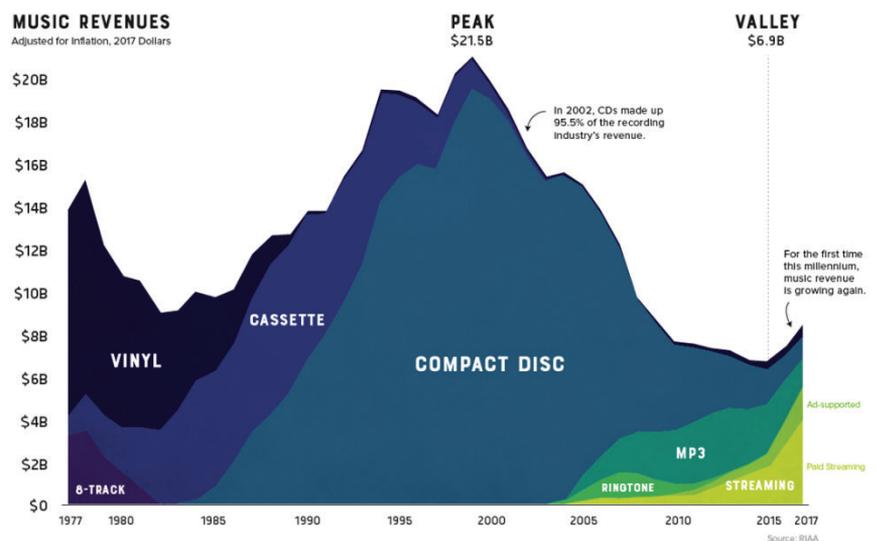
all just to build a less profitable business, is the nightmare scenario facing management teams at all the large media companies. For a while, rapid subscriber growth quelled any fears. For some time longer, the M&A consolidation frenzy will dominate industry coverage and investment theses. Eventually, however, the fundamentals will reassert themselves. They always do.

When multiples are once again based on EBITDA versus subscribers, studios and content owners will need a different approach to monetization — or rather, an older and more familiar approach. No longer able to maximize profitability by funneling content to in-house streaming services to drive subscriber acquisition, they will need to turn, once again, to ancillary revenues.

The ancillary revenues themselves, however, have also changed; the old model and its legacy businesses are all but dead. Home entertainment (DVDs and VHS), once the golden goose of film monetization, has declined steadily since its peak 15 years ago.

MUSIC REVENUES

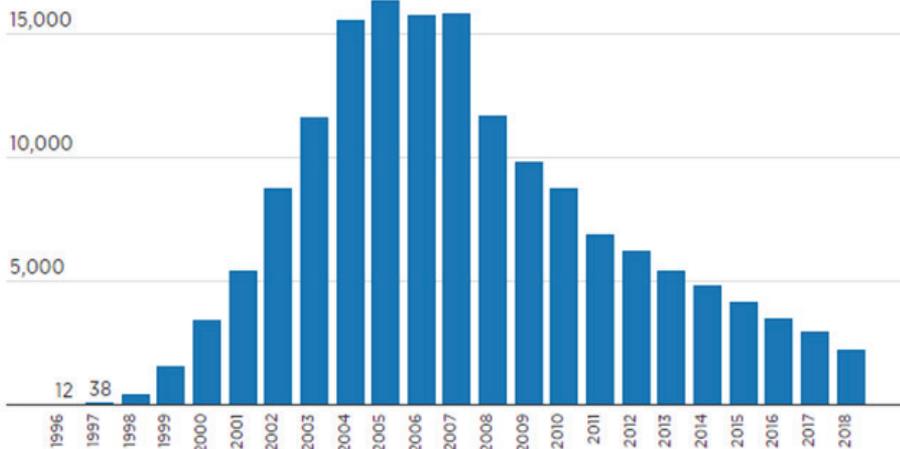
The impact of streaming on the music industry serves as a warning to movies and TV.



Nihaa Sinha handles business development for RSG Media. He has spent his entire career in media and entertainment, including in the TV Lit Department at Paradigm Talent Agency, TMT investment banking, the content strategy and analysis team at Netflix, and running new business development for Sean 'Diddy' Combs. He is also a professional screenwriter.
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DVD Sales in the U.S. from 1983 through 2018

The decline in physical media sales won't be reversed.



Source: Data from Nash Information Services & Digital Entertainment Group

On the television side, the domestic syndication market has declined substantially from its peak last decade.

These trends are not going to reverse. Global OTT video revenues nearly tripled from 2016 to 2020 and are continuing to grow; the streaming genie will not be put back in the bottle.

The ancillary revenues of the streaming era will be different. Rights will be sliced ever finer: SVOD, linear, AVOD, EST, TVOD, and other derivative rights will all be separated, requiring rights owners to make independent decisions along each dimension. Exclusiv-

ity will no longer be a foregone conclusion, especially as territories are once again increasingly separated to align with the evolving strategic objectives of both buyers and sellers. Studios will even need to reconsider output deals, which have long trended towards the largest volume and therefore largest aggregate dollar amounts.

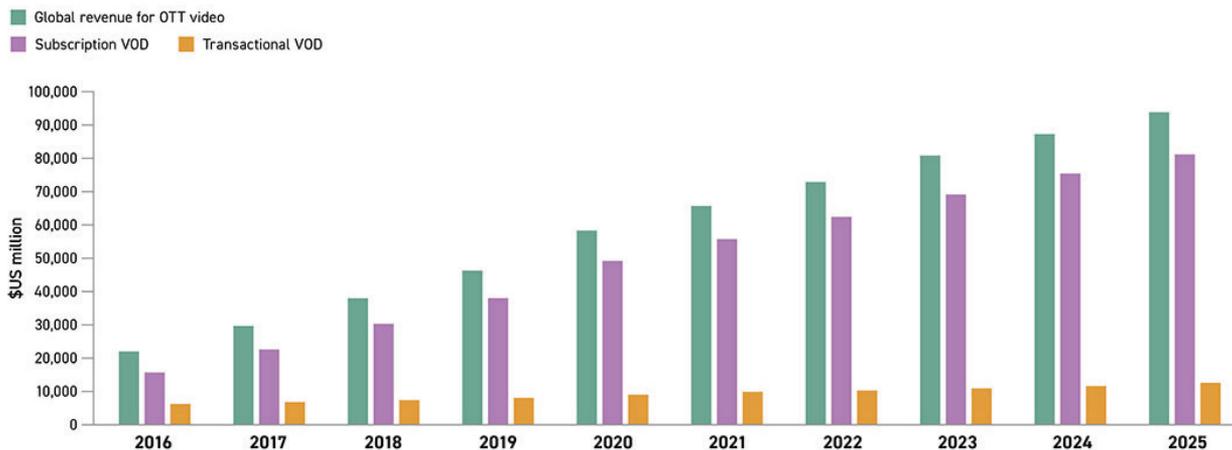
Furthermore, new revenue streams will emerge. Already we are seeing nascent markets in media based NFTs, as well as

digital goods and avatars sold in the metaverse. These and other licensing opportunities will dominate in the way home entertainment and broadcast syndication did previously. Shows, in many ways, will become vehicles for promoting these ancillary goods, as we can see from the merchandizing haul that Disney is making on its Star Wars branded Disney+ shows. Ultimates will, again, rule.

The difficulty will be in maximizing and accurately forecasting these ultimates. With so many decision-points and permutations, managing the ultimates of a new era will require tools of a new era. We have already seen how AI and machine learning (ML) provide predictive and prescriptive guidance, helping owners discern how best to distribute and monetize content

Continued on page 98

The Streaming Boom



Note: 2020 is the latest available data. 2021–2025 are forecasts.
Source: PwC, Global Entertainment & Media Outlook 2021–2025; Omdia; Bundesverband Audiovisuelle Medien; ANCOM

The ancillary revenues of the streaming era will be different. OTT video on demand is on a historic growth trajectory, but that competition is making content valuation more important than ever.

The Future of Rights Management in M&E

How rights was leveraged through the pandemic and where it is going next.

An interview with Kavita Anand, SVP, Practice Lead – Rights and Contract Lifecycle Management.

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THE ONLY CONSTANT IN THE CONTENT INDUSTRY IS CHANGE

How do we manage the impact change will have on the human effort?

ABSTRACT: “No data system will ever be perfect with human behavior presenting the biggest security risk,” said Dr. Eric Haseltine, chairman of the board for the U.S. Technology Leadership Council. This comment has a deeper meaning when you look across the technology landscape at any film studio, production house, or streamer. Between all the AI, technology engineering, and ERPs it is the human involvement that will make or break a company’s ability to transform, innovate, and scale. Implementing, upgrading, or enhancing an ERP system all starts with Organizational Change management assessment if you want adoption.

By James Maysonet, Vice President, Global Media, Entertainment, and Alli Onni, MSC, Organizational Change Management Practice Director, invenioLSI

Here is an immutable fact: the media and entertainment industry is purely driven by humans.

Humans create content, bring it to market, consume it and profit from it. What surprises us to no end is, why are people a secondary consideration when it comes to new technology, mergers and acquisitions, and corporate realignments?

As Dr. Eric Haseltine, chairman of the board for the U.S. Technology Leadership Council said, in a lecture to the Content Delivery and Security Association (CDSA) on Dec. 4, 2019, “No data system will ever be perfect with human behavior presenting the biggest security risk.” This comment has a deeper meaning when you look at any film studio, production house, or streamer across the technology landscape. At the core of all AI, technology engineering, and ERPs is the human involvement that will make or break a company’s ability to transform, innovate, and scale. If one wants to achieve adoption of any implementation, upgrade, or enhancement of an ERP system it must deal with human users and



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Recognize that all mergers and all people employees in a merger or are not the same.

human groups and organizations. A systematic approach to dealing with the human element of every technology project or initiative is what practitioners call Organizational Change Management.

Every major media conglomerate, streamer, and studio has undergone changes in technology, processes, or mergers and acquisitions, and each has had a significant impact on their business. Organizational Change Management is often not top of mind at the C-level of companies but, time and time again, it has proven to be at the foundation of a company's success or failure to adapt and grow.

In the last decade, there have been many mergers and acquisitions; most recently, Amazon Studios is merging with MGM, and Warner Bros. with Discovery. We once wrote "M&A no longer means 'mergers and acquisition.' To many in the rank and file it means, 'more anxiety.'" More than 20 years later, we still believe this statement holds true, and we have had our fair share of both being acquired and working within the acquiring company. What is common across most companies we've worked with, is that they do not have technology issues; most companies suffer from culture clashes and psychological change management challenges. These are then followed by technology adoption issues. It is the people in any organization that will make or break the commitment to the investor's goals of advancement. Smooth integration starts with alignment

across the organization's impending change.

Alignment within an organization does not automatically follow when marching orders from company leadership are received. It is something that requires attention at every level in the organization and must permeate company culture. Employees should know where they stand, how the changes impact them, how their work affects the rest of the organization (upstream and downstream), and where the company is headed with the changes. As a bonus, this knowledge, when provided openly and sincerely, improves employee morale. People want to feel good about what they do for a living — they need a sense of purpose and want to make a positive contribution to the overall goals of the company. When company goals are being communicated and executed at all levels of the organization, especially during changes to structure, technologies, and processes, employees can demonstrate overall job satisfaction.

When planning for organizational change, a recipe for success is required, of which there are three main ingredients:

1. *People-centered approach*
2. *Leadership*
3. *Communication*



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Alli Onni, is the organizational change management practice director for invenioLSI and has extensive experience in management consulting, providing insight to how organizations work. Her consulting career includes work in change management, organizational development, information technology and business operations. aonni@inveniolssi.com @invenioLSI

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CRMs?

Cobbled together systems?

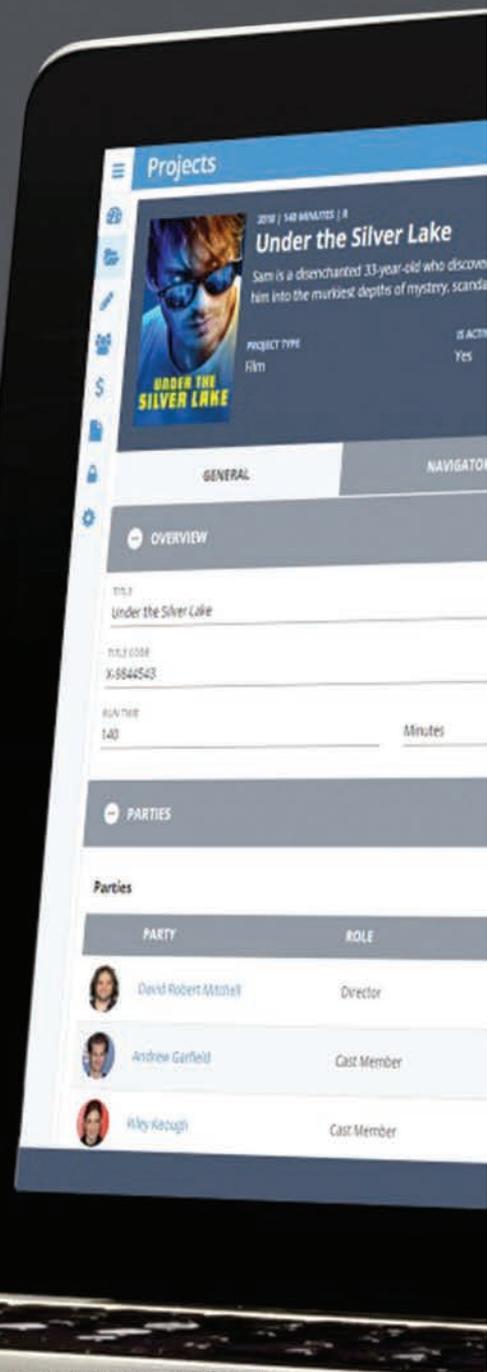
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Leadership points to consider

Change management is not a HR set of activities or a PM set of activities

Include dedicated CM roles on that M&A team/integration team

Set up an integration management office

PEOPLE-CENTERED APPROACH

The methodology used for delivering on M&A deals or implementing large information technology projects, has a significant impact on the outcomes generated and ultimately the value delivered. The more people focused on the approach, the more likely the deal is to fulfill its potential and, more specifically, its obligations to shareholders. It is time to be ruthlessly people-focused and transform the approach from a series of transactions and milestones to a transition with markers and signposts.

Here are some of the key considerations for a people-centric approach in M&A. It all starts with leadership and making some crucial decisions: First, in this deal are we going to actively co-create a new organization that is complete and whole or are we going to co-manage separate organizations that are loosely integrated outside of key operations and financial reporting?

With that decision made, the focal point for change management is to identify the stakeholders, understand their motivations and attitudes, determine what changes they will be impacted by, identify what will help them adapt, and deploy an interactive communications and involvement campaign to ensure that both organizations understand the value they generate. As Aristotle said, “the whole is greater than the sum of its parts.” Both organizations need to “get to know each other” for the vision of the new “whole” to take root and make sense from the perspective of personal investment.

LEADERSHIP

Leading change in the merger and acquisition space means driving to a foundational operating model that is defined in enough detail to be translated into culture and communication. People need more than a vision. They need a high-level road map to understand the journey they are on. The context that leadership fails to provide is fair game for employees to invent for themselves. Being people-focused in your approach means recognizing that change management starts before the deal is announced and continues long after closing.

COMMUNICATION

Communication is the most crucial part of the integration process and needs to transition quickly away from the language of the M&A world. M&A language is not easily compatible with the language of culture or relationships. M&A uses words like target, absorb, and optimize. We hit targets and we shoot at targets. People do not want to be absorbed. They want to know how they fit into the new model. The importance of using a people-friendly dialect in early messaging is a common oversight that quickly sets an organizational tone of suspicion at best, or resistance at the lower end of the continuum. Peter Drucker said it best; “Culture eats strategy for breakfast.” Taking a people-centered approach and deploying organizational change management early in the deal-making process is your best mitigation to stop culture from chewing on your value proposition. Remember, communication is key.

Any organization looking to upgrade to new technology like an ERP, to merge with another company, or to realign the structure of the entire company, should pay heed to what those humans offer as it relates to success of adoption and impending translation to ROI. We have observed failures to adopt new technologies and processes that stem from a lack of a true change management approach. Many organizations have suffered financially because the human effort was not considered as an impact of the changes. Our advice: engage with an organization that is certified across multiple disciplines, has a dedicated team, and has great experiences in organization change management; invenioLSI is one of these.

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Continued on page 108



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SECURITY SOLUTIONS



As if media and entertainment didn't have enough to worry about with content protection and cybersecurity measures, now our constant vigilance will entail everything included in the metaverse. These virtual worlds will need a new tact when it comes to security, with the block-chain, NFTs and cryptocurrencies all being involved.

HEY, FILM AND TV INDUSTRY: ARE YOU PAYING ATTENTION TO THE METAVERSE?

You better start with the security

Image by Julien Tromeur

ABSTRACT: The metaverse. What is it? It's hard to say, but what is unequivocal is that if you are in the media and entertainment industry, you can't afford to ignore it. What's the big deal, you ask? Pre-teens, teens, and college/post college-age kids are spending more time in these virtual worlds, playing games, socializing, and spending their money. And if they stop coming to your video services, maybe you should think about taking your service to them.

By Shane McCarthy, Chief Operating Officer, Video Entertainment, Irdeto

Facebook announced that its parent company changed its name to Meta at the end of October. A few minutes after the announcement by Mark Zuckerberg, Google searches for the term metaverse took off. And today there's daily news on someone doing something in the metaverse.

But the idea of the metaverse is not something new. It's a term that emerged in the 1980s with the book "Snow Crash," a classic of cyber-punk literature that envisions a virtual reality-based successor to the internet. In the novel, people use digital avatars of themselves to explore the online world, often as a way of escaping a dystopian reality.

Do you remember a game called "Second Life," launched in 2003? You could buy digital property and clothes with real money and hang out with other blocky avatars. It was early days. Naysayers in Silicon Valley liked to say "Second Life" was for those who didn't have a first one. Maybe it was too early to talk about avatars, but perhaps they were visionaries. Guess what? It's still alive! As of 2021, the game has reported around 64.7 million active users on its platform and an economy worth \$500 million.

The metaverse implies the creation of virtual worlds on a human scale in which users can interact naturally and even carry out “physical” activities, such as attending a concert, playing tennis, or flying on a plane. People can interact with avatars that benefit from the latest technologies associated with virtual reality goggles and control devices by connecting to the metaverse. It gives people a new communication experience where, on this occasion, the audience is not a mere spectator but the protagonist of the content.

Contrary to a YouTube video or Instagram content where the user only watches passively, the user community will create the product in the metaverse, and all creators will own a part of the content and benefit from its creation. To be sustainable in a virtual environment, the product must be regulated in a decentralized way through smart contracts based on blockchain. Telcos will need a robust 5G infrastructure to support the amount of data that will be transferred in this world.

THE METAVERSE IS HERE NOW

If you think all this metaverse talk is too futuristic, think again. These virtual spaces already exist, and many are not even that new. Have you heard of Decentraland? It is a three-dimensional virtual reality platform built on the Ethereum blockchain that stands at the forefront of this growing metaverse trend. It is decentralized and run by the community, providing full ownership to the users of their virtual assets. In Decentraland, users can buy and sell goods and real estate, play games, get entertained, interact, and trade with other users.

Another great success is The Sandbox. An Ethereum-based decentralized NFT gaming metaverse that enables non-tech savvy users to create sell, use, and monetize their virtual reality NFTs. The crypto metaverse uses its native token SAND to underpin the entirety of

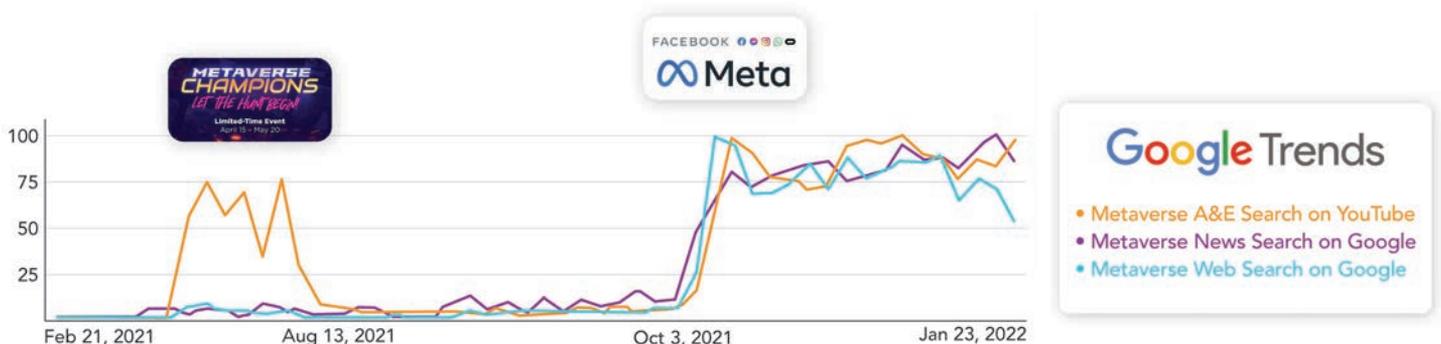
SURE, BLOCKCHAIN AND NFT will be used as guarantees of authenticity in the metaverse. Still, there will also be a need for more conventional security solutions, e.g., protecting against hacking or tampering. Otherwise, all other security measures will collapse.

the in-game economy. Recently, virtual land adjacent to Snoop Dogg’s Sandbox estate sold for \$450,000 in ETH (cryptocurrency ether).

Another company jumping on the metaverse train is Nike. The company acquired RTFKT, an NFT Fashion and Collectibles startup that “leverages cutting edge innovation to deliver next-generation collectibles which merge culture and gaming.” Founded in 2020 by Benoit Pagotto, Chris Le, and Steven Vasilev, RTFKT has made a name for itself by designing and creating sneakers and collectibles that redefine the boundaries of physical and digital value among the community of creators. Earlier this year, the creative studio teamed up with digital artist Fewocious to release three NFT sneakers, raising US\$3.1 million in seven minutes.

And if you haven’t been living under a rock, you probably have heard of Fortnite. It is the most popular online game globally, with around 350 million users, predominantly men (72.4 percent) aged between 18-24 years (62.7 percent). With several “game modes” and up to 100 players in the same battle, each player has his “skin” (avatar). The platform is actually a social network given the diversity of interaction possibilities, including communication between players by voice and message.

Observing the Trend



Facebook rebranding as Meta kicked off a massive interest in the metaverse.

FOLLOW YOUR FANS

Today's consumers are connected, fast-acting, and not afraid to adopt new technologies quickly. We seem to be spending more time online, and we could expect this tie to transition to the metaverse. A Pew Research study from March 2021 found that 31 percent of Americans were almost always online, while 79 percent were online several times a day. And the time spent on these virtual social platforms will only increase. According to a not-so-new report done pre-COVID-19 by game retailer GAME, gamers have spent the equivalent of over 10.4 million years playing Fortnite.

But it's not just gaming. People can collaborate, build things together, or simply hang out, watch concerts, etc. Welcome to Brookhaven (200,000 players daily), allows you to develop and design your own amazing house, own cool vehicles, get a job, and hang out with friends. Fortnite has expanded its concerts from season-ending ones with artists such as Ariana Grande, Marshmello (attended by 10.7 million players), Travis Scott (attended by 27.7 million unique users and 12.3 million concurrent access players) to launching a virtual concert series (Soundwave Series).

Fortnite competes with Facebook, Instagram, and YouTube directly as a social network. Still, given the competition for user attention, Fortnite competes with a much larger set of entertainment offerings, such as streaming platforms Netflix, Amazon Prime, HBO Max, Disney+, Paramount+.

People are already spending much of their time on the metaverse, particularly the younger generations. Research by Gartner suggests that by 2026, 25 percent of people will spend at least one hour a day in the metaverse for work, shopping, education, social, or entertainment. You need to be where your fans are. And if they will be in the metaverse, you will also need to be there.

WILL VIRTUAL CINEMAS AND LIVING ROOMS BE NEXT?

There is no doubt the metaverse will enable enterprises to expand and enhance their business models in unprecedented ways. They can provide deeper franchise immersions and new merchandise opportunities. By 2026, Gartner expects 30 percent of the organizations in the world to have products and services ready for the metaverse.

Therefore, all organizations should begin developing digital business strategies that leverage the built-in infrastructure and participants of the metaverse.

ITV, Britain's oldest commercial TV network, is trying something new. It has developed an extension of its flagship reality show *The Voice* into the metaverse. The partnership with Avakin Live and TikTok will allow users of the platform to perform as an act, a coach, or be the audience in a replica of *The Voice's* format. Anyone can be in with a chance of performing on the show's iconic stage by recording and uploading their singing videos from the metaverse app to TikTok. It has also re-created its Saturday night game show "The Void in Fortnite Creative." With it, Fortnite players can take on their own in-game version of the action-packed challenges in the program.

ViacomCBS is testing the waters into the metaverse and NFTs (more later). The first experiments can be considered basic (AR that was overlaid on the January 2021 Bears vs. Saints NFL game. That it was targeted at a younger crowd should not be unexpected from the company that raised Gen X on a 24-hour music channel (MTV was a Viacom innovation). And ViacomCBS is not stopping there. They are exploring how all its intellectual property — from *Star Trek* to *Nickelodeon* — can be reimaged in the metaverse.

More recently, the NBA also jumped into the metaverse bandwagon in a move that highlights some of the opportunities the metaverse is offering to sports streaming. The Netaverse is a VR simulcast of Brooklyn Nets games. But it's not just a big screen in VR. They're literally scanning and rendering the actions of all ten players on the court. In other words, it's like a real version of an NBA 2k video game. The Netaverse proves that the tech is ready for live, concurrent digital and physical experiences. If an NBA game can be rendered live with a slight lag in VR, then so can fashion shows, conferences, car auctions, concerts. Both studios and independent producers are also taking steps into this world.

THE POWER OF THE NFT

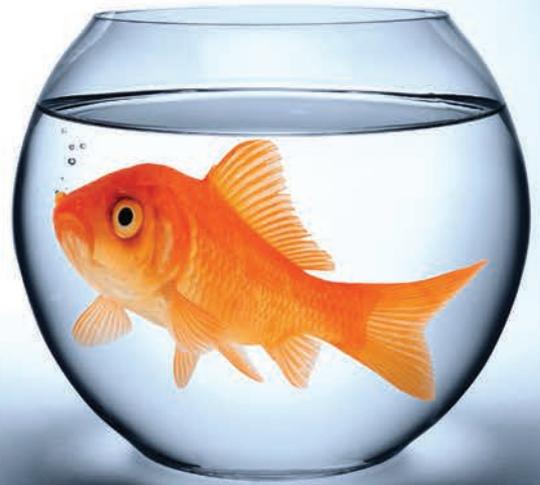
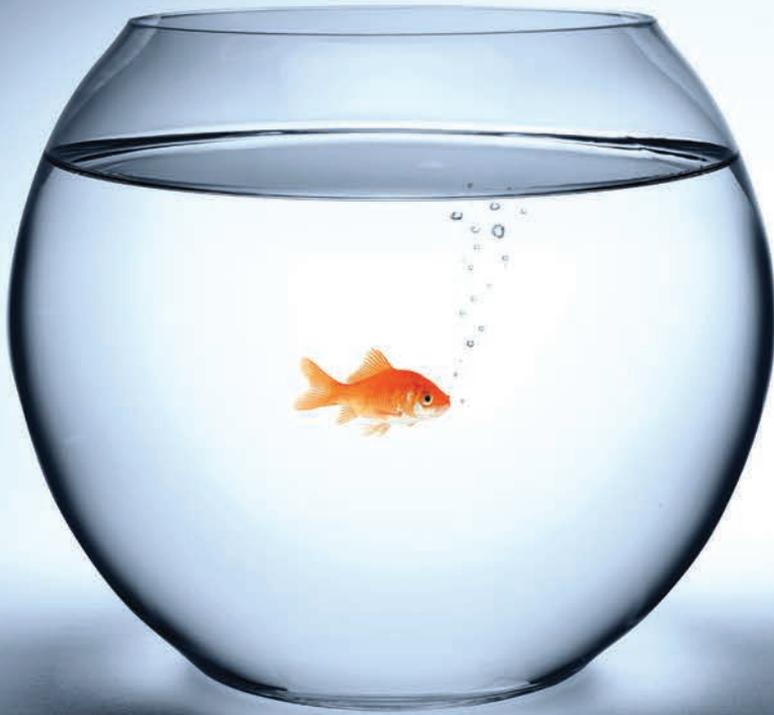
The metaverse allows franchises to gamify and monetize through non-fungible tokens, known as NFTs. An NFT is a non-interchangeable unit of data stored on a blockchain, a form of digital ledger, that can be sold and traded. Types

Continued on page 107



Shane McCarthy is the chief operating officer for video entertainment at Irdeto. He is a seasoned industry executive with more than 20 years of experience within the media and technology industries. media@irdeto.com @Irdeto

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IS SECURITY ANY DIFFERENT FOR THE METAVERSE?

Whatever form it takes for M&E, bad actors will be there

ABSTRACT: The metaverse is underpinned by blockchain, cryptocurrencies and NFTs. And where there is money to be made there will also be bad actors, with fake identities, false promises, and scams. If media and entertainment is going to play in the metaverse, it needs to be prepared.

By Mathew Gilliat-Smith, EVP,
Convergent Risks

MESA Platinum Member

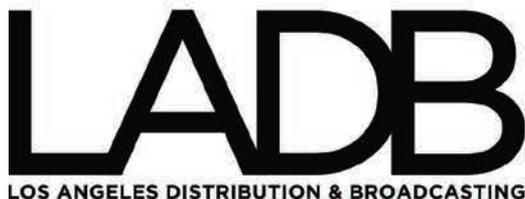
A metaverse opinion poll from Ipsos stated: “Thirty-eight percent of Americans report familiarity with the metaverse, but less than one in five (16 percent) can correctly define the term.” In general discussions with colleagues, there are wide-ranging views from “It’s the next big thing” to “I just don’t get it.”

In 2000 did you believe you would watch movies on your mobile phone? Did you predict that Google Glass and second screen would fail? Probably not. No one knows for sure but when Disney,

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Facebook and others invest large sums into Web3 technology, it's probably time to sit up and take note. The metaverse brings about a new dimension, creating the most immersive consumer experience to date.

What does it mean for M&E? Disney has made a big investment in a business that allows customers to create digital avatars and virtual fashion lines. Other studios will likely follow this lead. For many, it means live-action and postproduction can become a combined process. An entire scene can be visualized using backdrops rendered in real-time enabling producers to create productions with live-action and 3D characters all in-camera reducing the need for VFX - saving money and the environment from travelling to different locations across the globe. At this year's HPA Tech Retreat there was a notable mutual appreciation between the game and film sectors as there are major benefits of working more closely together.

The metaverse is underpinned by blockchain, cryptocurrencies and NFTs. In the game Minecraft, you live a character's life in a metaverse, experience adventures, do jobs and make money (or at least feel like you do). Hypervers and Sandbox are two of many popular sites based on blockchain where you buy experiences using cryptocurrencies. The metaverse will be about making money. Paying for valuable experiences, like watching a movie, is not a new concept.

WHERE THERE IS MONEY TO BE MADE THERE WILL ALSO BE BAD ACTORS.

Fake identities, false promises and scams will be present in the metaverse just as they are everywhere else. Imagine a metaverse where the character you are communicating with is not actually what or who you think they are. Borrowed brands, characters and voices are easy to create as seen with Fake News. The risk of parting with money because you were fooled into a transaction rings major alarm bells.

THE METAVERSE BRINGS about a new dimension, creating the most immersive consumer experience to date.

When it comes to security the same principles of security apply. Protecting personal data, including your voice, is often overlooked and breaches GDPR as was discussed on Convergent's panel at CDSA's recent Content Protection Summit. There are many moving parts in video production, especially with multiple cloud accounts, third party applications, and different sets of vendors working on the same productions.

Ensuring the correct configuration for your workflow is challenging. To be secure by design is the best approach when creating a new cloud environment. If you're already past that stage, then following security best practices is the next best thing as it is derived from those who have learnt the hard way. When conducting cloud security assessments, the Convergent team find common themes including the absence of centralized identity management, and a lack of vulnerability scanning tools.

Other problems extend to missing anti-malware on virtual machines; logging being disabled from cloud services; and non-existent staff security training. However, the biggest issue is the lack of threat assessment testing. Making sure you are the only one who has control of access to your system is crucial. ▣



Mathew Gilliat-Smith is the EVP of Convergent Risks and has 20 years' experience in the media and entertainment sector, with strong relationships at many levels with studios, broadcasters, and vendors. He co-founded three digital security start-ups and has held senior roles in major media corporations. mathew.gilliat-smith@convergentrisks.com @ConvergentRisks



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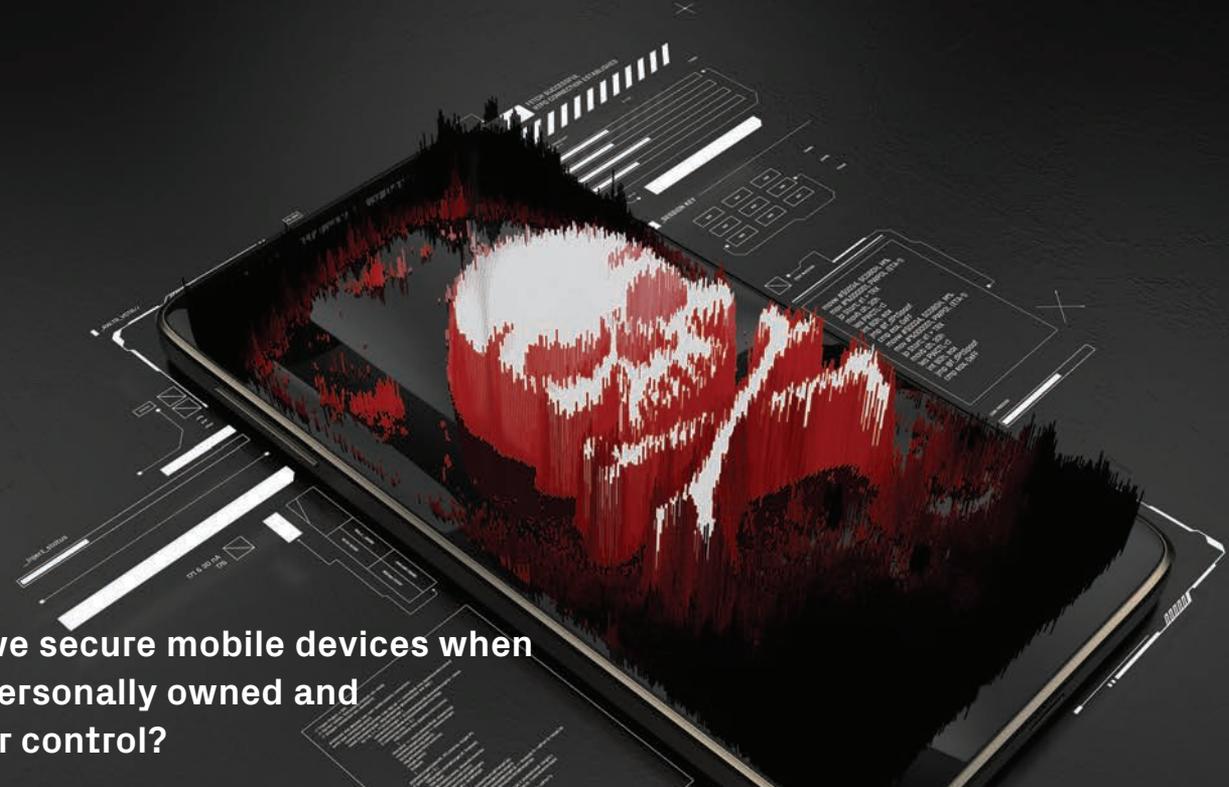
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MOBILE DEVICE EVOLUTION BRINGS EVOLVED THREATS



How do we secure mobile devices when they're personally owned and out of our control?

ABSTRACT: Even putting aside social networking, games, and other common features of even the lowest cost phones, we use them for communication, voice, and text, as our personal organizer, mobile productivity, even to monitor and maintain fitness and health. They are invaluable tools. But with these evolved features come new threats. We look at how to confront them.

By Sean Kalinich, Cybersecurity Architect, Richey May Advisory

■ MESA Platinum Member

Although not the first smartphone to be launched or mainstream, the iPhone arguably was the first one to capture the consumer, as well as the enterprise, imagination. Looking back at the launch, I still do not believe that anyone really envisioned the widespread adoption, power, and features of today's modern mobile device. Even giants such as Blackberry and Windows Mobile were eclipsed by the potential that the iPhone, and later Android, showed. Now for many, the thought of going through work and personal life without your phone is unimaginable.

Where would most of us be without our phones? Mobile carriers have moved to provide data plans to meet the massive consumption of content that the average user

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YOU MIGHT NOT BE ABLE TO PROTECT OR CONTROL the endpoints, yet, but you can protect your environments and data by implementing stricter controls against the evolving attack styles.

needs daily. Bring back gaming and social media and the usage goes through the roof. It would not be an exaggeration to say that most people do not leave their homes without their phone safely in hand. It is a part of their life in an unconscious way.

Although more and more people are gobbling up data and the latest and greatest phones the market can throw out, businesses simply cannot keep up. The days of just issuing a mobile phone and maintaining the plan are pretty much gone. The costs associated with having company issued phones is not truly financially sound for most companies.

This has ushered in the days of the dual-use device. It is personally owned and maintained but is also used to access business accounts and information. It made sense, most people will have a phone that can access this data and they often already have a data plan that will support it as well. Now the problem is not how do you support mobile communication in a business organization; it has become how do you support and secure it?

THE SUPPORT AND SECURITY

In large organizations, the support is little more than a monthly stipend that helps offset the end user cost. It helps, makes the people now using their own personal equipment feel a little better, and all is well. On the security side you have few options. Although you can control the device and perhaps limit the exposure of corporate data with things like AirWatch, Intune, Knox, Apple MDM etc., there is not much that can be done to truly protect the device. The mobile anti-malware space is simply not mature enough to protect endpoints at this stage while mobile malware is evolving by leaps and bounds. Mobile malware is outpacing protection in a way we have not seen since the introduction of ransomware for the PC.

Currently there are roughly three anti-malware apps for mobile devices that can actually provide good protection. McAfee has one, SentinelOne has another, and

Microsoft has the third. Of these three, one is generally available to consumers (McAfee). Yes, there are other vendors on the market, but they are lacking in certain areas in terms of protection features.

Looking over the list of options, most mobile anti-malware apps do not do more than scan files and compare them to a signature file to see if they are overtly malicious. There are no checks for pivots in memory, few checks for calls to command-and-control sites or pivots by downloaders, and none of them have options to check on an applications permission's requests. Of the three that are out there with more advanced protections; Sentinel One's offering is in the early stages having just been released this year and is relatively untested, Microsoft's Mobile offering is tied to their MS365 licensing and is not the simplest thing to set up or even deploy. McAfee's offering tends to be a bit buggy, and we keep seeing features being removed while costs go up.

THE THREATS

Now compare this to the list of malware that security researchers have seen for the mobile device. There are already over 60 identified apps in the Google Play Store and Apple App Store that leverage innocuous looking apps to get by the gate keeper processes. These apps are disguised as everything from games to fitness/workout apps to mobile security and privacy apps. Once an unsuspecting user downloads and installs the app, there is a trigger to alert the user that the app needs some permissions. The permission request often references access to system controlling features like the Accessibility Services inside Android devices. And since users have become desensitized to permission request dialogs, they often just click past the screen and their device is now owned regardless of the anti-malware type in place on the device.

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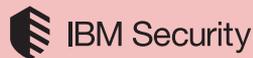


Sean Kalinich is cybersecurity architect for Richey May Advisory and is a strategic and technical security professional focused building and supporting organizations through refining the security culture, identifying changes in the threat landscape, and assisting in building a secure infrastructure (including secure distributed infrastructures). skalinich@richemay.com @decryptedtech

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Veritone ■ Vision Media ■ Vistex ■ Visual Data Media ■ Vobile ■ Vody ■ VSI Dubbing & Subtitling ■ Vubiquity ■ Wasabi ■ WaveSeven ■ Widevine
XL8 ■ ZDF Studios ■ Zendesk ■ Zixi ■ ZOO Digital



assets to maximize profitability. In this new era, with every deal bespoke, determining both what one can do and what one should do will require an ML boost.

But, while the tools will be new, the model is an old and familiar one: ultimates. Different revenue streams generate cash flows in different windows, totaling up to replace, and grow, the revenues generated by the legacy business. In an industry as dynamic as media and entertainment, it seems the more things change, the more they stay the same — ultimately. ■

PERFORCE *Continued from page 44*

FAST, REMOTE COLLABORATION IS MORE IMPORTANT THAN EVER

In this time of rapid change, media and entertainment teams are searching for ways to work as quickly and efficiently as possible. Without a reliable version control system, studios like Final Pixel and PrismaX struggled to scale their production. Helix Core has enabled industry-leading studios like them to maintain tight file management and a single source of truth. It empowers them to communicate, collaborate, and iterate better and faster.

A version control tool like Perforce Helix Core offers virtual production teams an opportunity to take control of their digital assets and accelerate production turnaround. And, in the case of Final Pixel and PrismaX, it lets them expand into new areas of virtual production, shaping the future of this industry. ■

allocated at the earliest stages of planning and development.

Part of the process of bringing an application to life involves figuring out how best to write and structure the code so the program behaves as the designers intended. However, when the person responsible for coding also performs the testing, their solutions may not be intuitive for the average person unfamiliar with software programming. Third-party testers—experts in consumer tolerance — act in service of the application without needing to understand what is under the hood. The complexity or simplicity of the underlying code is irrelevant — professional testers approach every UI and UX with the end user in mind. Each application must pass through the same filter, answering the question, “Is this easy to understand for the average person?” When an application fails to meet that simple yet firm expectation, the tester pulls from their wealth of experience to suggest ways to improve the experience.

VISION FULFILLED

If companies investing in new virtual spaces are to see their endeavors prove fruitful, consumers must be able to spend time seamlessly immersed in an experience with little to no awareness of the programming involved. As with previous home entertainment technologies, experts trained in the art of consumer technology testing must be entrusted with the task of identifying and refining any problematic interfaces or awkward elements of an experience before deployment. This will lead to deeper engagement on the part of the end user.

To ensure that the vision of the metaverse comes to fruition, third party testing is key so that the promise of the metaverse—to the end user as well as to those investing in it—is met. ■



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vendors can deliver workflows that are cloud-based and interconnected, subsequently increasing production efficiencies and reducing process duplication — allowing one service line, operational workflow, and data set to flow into the next.

Management systems should make it easier to take control of operations; delivering clarity from start to finish. With such insurmountable scale, we should do everything in our powers to keep things simple — to give content owners complete transparency.

By looking at the bigger picture of how services, projects and territories overlap and intertwine, we can identify where processes can work smarter, easier and better.

In other words, we need to deliver efficiency that scales — so that the more complex the job, the easier it can be made.

PACE

Challenge: To get content from post-production to the right streaming platform demands a whirlwind of steps. Managing licensed content partners, controlling the creation and delivery of compliant packages, and maintaining consistency from start to finish.

Adding to this, with the growth of day-and-date delivery, each global release means managing a world of moving parts ready for a simultaneous deadline. Content owners and streamers must meet relentless multi-language delivery while maintaining the highest quality standards.

All this with less time to manage a worldwide roster of vendors. Less time to accommodate inefficiencies, duplication, or errors in the workflow.

Solution: When it comes to localization and media services, vendors should be there to take the pressure away, not add to it.

Much like dealing with scale, efficiencies in pace come from interconnected services; ensuring translations and data flow seamlessly between workflows for dubs, subtitling, metadata and artwork to ensure nothing is duplicated. No time goes to waste.

The right vendor should remove the challenge and time-drain of working with a host of content partners around the world. Working collaboratively to get content from post-production to platform.

By utilizing streamlined technical and creative quality control stages, projects can be done right first time, every time. For example, in dubbing, creative artistry must be balanced with streamlined workflows, facilitated by platforms that offer operational efficiencies to deliver on time, on a global scale.

Assistive tools and automations should be there to give the creative team time to breathe. Time to understand the audience and live the characters. The craft of globalization can be respected while pushing the limits of pace through modern efficiencies.

SECURITY

Challenge: With greater demand for content and a move away from the distribution of physical assets, cloud security is the new norm.

Globalization now consists of an ever-expanding ecosystem of third-party vendors, collaborating from countless locations. This has increased the security threat to the entertainment industry's most prized asset, it's content.

Preventing leaks, breaches and hacks across so many global facilities and content partners is always the priority. But how can we ensure highly sought-after shows and movies always remain in the right hands?

Solution: Today, security needs to be built into the tools, workflows and projects of the wider process. While facility security is still a crucial element, it's vital that we move content security outside of the physical restrictions of bricks-and-mortar.

Security features that are built directly into cloud-based platforms minimize the risk of costly leaks through piracy, or the distribution of physical assets. These security features and processes must pass the most stringent content protection requirements from industry authorities, as well as the individual requirements of the biggest names in entertainment.

When globalization requires a fluid, scalable servicing capacity, working in one global technology ecosystem safeguards risk. No matter where in the world a project takes place, security will remain stringent.

In this world, all regional hubs, dubbing studios, partners and freelancers work together with the same set of rules. Rules that guarantee consistent security, process efficiency and rapid scalability across the world.

Technology therefore enables us to deal with the ever-expanding challenges of distributing content to the world, securely. The good news is that the technology is out there — and everything else, we build.

WHAT CHALLENGES REMAIN?

Content spending is rising and with today's world of borderless content streaming, shows and movies can reach audiences in 40 or 50 different languages. For content owners, the biggest challenge therefore remains the same — how do they get content on these platforms as quickly as they can, while competing for global capacity?

However, by taking a technology-first approach, we can look at ways to do things differently. By understanding what technology is available to us and how we can deploy that to solve our customers' problems, we're supporting the future of borderless entertainment.

THERE IS NO BOX

The world of entertainment has changed. With the boom of streaming, audience borders are blurred, and content is taking on new life in previously unreachable territories.

As the biggest names in entertainment shift this focus and plan their next global sensation, the demands of globalization have also evolved.

To make our clients' lives easier, we have to look at things differently, finding new and creative ways to take on any challenge.

Because when you look at things differently, there is no box. And there are no borders. ■

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and 620,896 individual episodes available now to U.S. viewers across all major streaming services. Analysis of the data reveals that the predominant drop strategy used by these services last year was releasing all the show's episodes on the same day as opposed to rolling out individual episodes on a weekly basis. This same day release approach was used for nine times more episodes than the weekly release approach.

Looking even closer, the average streaming program engaged viewers for 1.85 episodes per viewing day. In comparison, among the top 10% of binge-worthy shows, viewers were engaged for 2.45 episodes. Honing in on the top 5 percent, the number went up to 2.89 episodes, one additional episode per day compared to the average program.

So, what's the key take-away here? For equivalent hour-long programs, a show in the top 5% in terms of binge-worthiness can bring an incremental hour of watch time per day to a streaming platform compared to a show that's more average in terms of its binge-ability. In the heated competition to maximize engagement and time spent, this is invaluable insight that can move the needle on a critical business KPI.

With content analytics, a creator can identify where to focus content acquisition and awareness in large, siloed catalogs. They can see what opportunities there are to promote or recommend content

to certain audiences. Programmers can determine the likelihood of viewers to binge watch a certain show to help decide on the optimal drop strategy. And they can look ahead into the next six months to see what the competitive content pipeline looks like to help drive release planning.

The media and entertainment ecosystem has undoubtedly been working in hyperdrive of late. It all starts with creating compelling programming that captures the attention of viewers and reflects their diverse identities and interests. Efforts extend to developing the user experiences that present that programming to the audiences who crave it. All of this is in service of maximizing return on investment for developing and delivering consistently outstanding entertainment.

Data and analytics are key to success for the M&E industry players engaged in the ongoing process of assessing the marketplace, identifying opportunities, making decisions, and analyzing results. And then doing it all over again. Based on the trusted nature of its data and the powerful analytics capabilities this data enables, Gracenote is uniquely positioned to deliver the solutions that enable content creators, owners, and distributors to maximize viewer engagement – and push total streaming hours up to yet a higher power. ■

HCL *Continued from page 58*

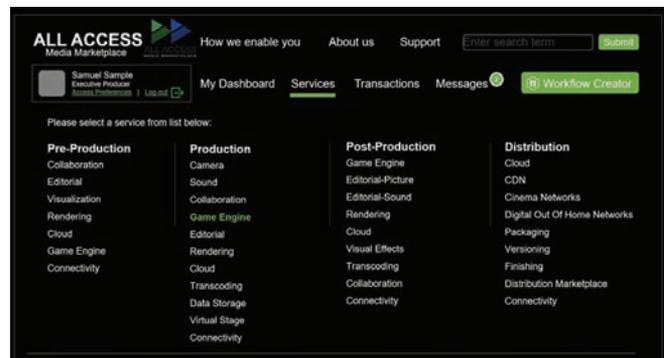
ticipate in this once-in-a-lifetime opportunity to reinvigorate this more-than-100-year-old business with technology that could offer a new creative palate and inspire new forms of immersive creative experiences.

My organization, HCL Technologies, works with major studios on their technology initiatives. Through our acquisitions, we have a software and platform business that enables us to offer commerce, security, and DevOps solutions to our customers. I am building a technology CoE that brings the services and platform skills of HCL Technologies together to achieve the MovieLabs 2030 Vision.

HCL Technologies embraced the 2030 Vision in the spring of 2020, and today we're focused on building an open platform to integrate these 2030 Vision principles. We strive to achieve this integration by developing a sandbox for studios, independent production companies, and technology vendors in the short term.

During the long term, we intend to provide an end-to-end cloud-agnostic platform and an experiential journey with the producers' experience at the heart of the platform. This approach brings two distinct advantages aligned to MovieLabs 2030 Vision. First, it enables simplification of the workflows with a focus on the end-result SLAs. Second, it provides studios with a platform to compare the services of their production services partners on an equalized platform across performance, SLAs, cost, and service functionalities.

Starting with the HCL Technologies Workflow Creator (modeled on the MovieLabs Visual Language) content creators and media servicers can build workflows that use standardized components such as shapes, lines, and icons. Through AI (as a human-to-ma-



HCL Technologies' platform All Access Media Marketplace will help to develop the tools, APIs, and workflows that can bring this 2030 Vision to market much sooner.

chine interface), these workflows will be aligned to digital storefronts of media service providers for B2B discovery, quotes, and contracting talent and services.

In the future, this platform will facilitate the automation of data movement and media processing with a Universal Linking System over a zero-trust security framework. It will take all of us to work together to bring this vision to reality.

I welcome all interested parties to join HCL Technologies in this endeavor aligned with MovieLabs.

Let's reinvent the content creation ecosystem to realize the scale and opportunities this new era in entertainment can deliver. But this time, let's plan for it thoughtfully, collaboratively, and with a deep alignment focused on mitigating complexity, ensuring security, and enabling content at an unprecedented quality, creativity, and scale." ■



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PACKETFABRIC *Continued from page 62*

facility, or stage where their gear is located, as in a traditional data center. The benefits include high bandwidth access to multiple services or the cloud, and also the ability to instantly mitigate any network issues with redundant and diverse connections.

Nelson: One last one for the road. Is it possible to take advanced connectivity to artists?? What would it look like for animators, directors and editors to have these types of PoP's and connections from their homes? Could that become a reality?

Lisa: Not today but possibly, yes. And if we got better networks in place, connecting the best talent in the world with this type of infrastructure would look like a very different world indeed. ■

COGNIZANT *Continued from page 40*

How to address the challenge: Establishing a winning strategy for control over content will be paramount. Rights management in virtual worlds requires a way to account for new types of currency and monetization models even as media companies compete against user-generated content from boutique firms and individuals. And the strategy needs to balance media companies' own interests: A subscriber spending time in the metaverse is taking time away from consuming physical and digital media. What's more, the issue of piracy is never far away and hovers over the metaverse. Content security and authentication will be critical.

Rights management in the metaverse also raises the related issue of authenticity, a subject that media companies already struggle as they seek to define and protect their brands amid the tsunami of content. Success in the metaverse will require a strategy for how brands are both represented and offer meaningful experiences.

Data ownership gets complicated. Among streaming services today, media companies have two partners in data ownership: the communications service providers that have a high-level view of where traffic is going, and, often, streaming intelligence or data-analytics companies. The metaverse adds virtual platform providers such as Decentraland and Sandbox to the roster of data owners.

Less clear and perhaps even more important is who will own the customer relationship. Determining who owns — and secures — the experience remains a critical step in extracting value from virtual platforms. Complicating the task is the fluid omnichannel experience that's at the heart of the metaverse: Web3's decentralization means media companies need to create a connected experience for consumers as they move from, say, watching streaming content over an OTT service, to a virtual platform, and then back again.

WITH *Continued from page 16*

industry.

■ **STEAM:CODERS**, which inspires underrepresented and underserved students and their families through science, technology, engineering, art, and math (STEAM), in preparation for academic and career opportunities.

As a 501c charitable organization, one that delivers year after

EIDR *Continued from page 8*

systems, automation does not make sense. Why would you want to proliferate bad data? Excellent automation cannot prevent bad data from showing up in front of the consumer if there is no fence or warning sign upstream!

What we need is a source of truth. One that is curated by the best data people in the industry. It should have a single, persistent, unique identifier and a defined set of core metadata so that we can identify all our content. Then we could use that to automate the digital supply chain of the entire industry. Then we need to make the registry available to anyone and any system that needs it.

That exists, and it's called EIDR. ■

As media companies navigate the new terrain of data, the ramifications for privacy and analytics are significant. The focus will be to determine what new types of data will be gathered and how companies will use the data to create better CX.

How to address the challenge: Take steps now to own your data. In addition to your companies' content, it's your most valuable asset. How you'll use the additional data from virtual platforms to create more insight requires careful planning that needs to begin ASAP, regardless of where your company's strategy stands in the move to the metaverse.

In addition to using the data to create a better, more competitive CX, more media companies are exploring separate businesses for their data. These new units act as clearinghouses to sell and monetize first-party data. As more companies look to create a separately branded "dataco," key issues related to data ownership include ensuring your media company establishes monetization and retains control among a network of partners.

The efforts are a business opportunity, yet they also speak to the fragmentation within the media industry, in which multiple entities develop and protect their own data. Again, we see the issue of brand and authenticity coming into play here as it's incumbent on companies to wisely manage the voluminous data that's so central to their brands. It's a tough problem that virtual worlds make even tougher for media companies as they evaluate how best to structure themselves to sell the data and adhere to privacy laws that remain in flux.

As we explore virtual worlds' potential for content creation, distribution, and consumption, it's critical to view it through the lens of business implications. To keep it real means keeping an eye on the bottom line. ■

year on its goals and promises, WiTH has, in good times and bad, benefited the charities we've chosen. And these groups not only have ties with the media and entertainment industry, but also create a sense of belonging, foster curiosity and innovation, and share our values of bringing people together to do things that make a difference.

For this second half of 2022, we ask the industry to join us in helping WiTH continue doing what it does best. ■



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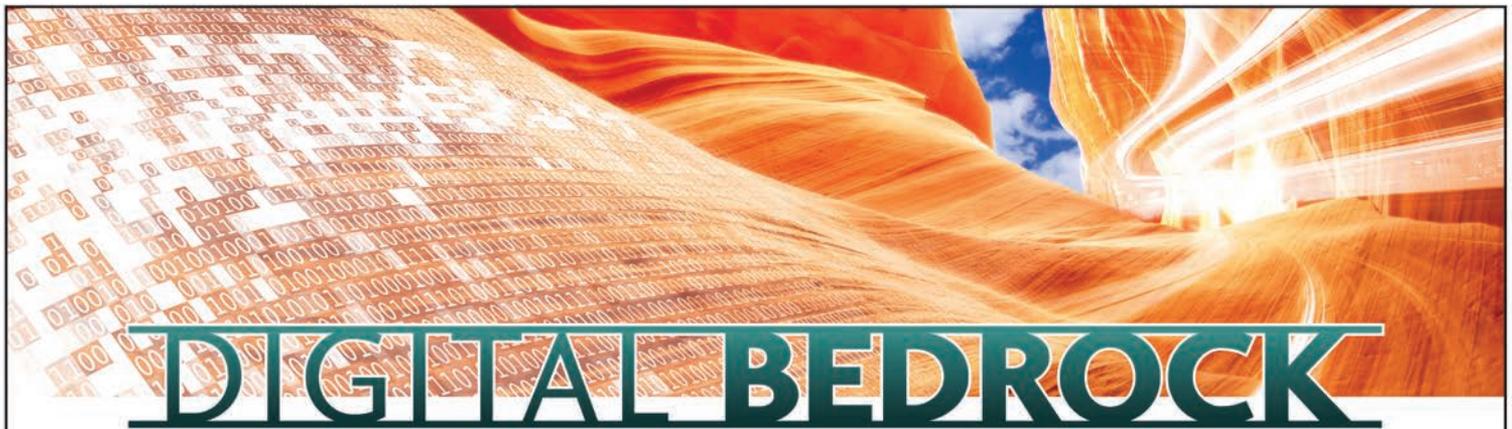
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8 JUNE	GLOBAL MEDIA + ENTERTAINMENT DAY	■	■	■	■	
9-12 SEPTEMBER 	MESAMSTERDAM MEMBER PARTY (9)	■	■	■	■	■
	CDSA SECURITY & DEVICES TOUR @IBC (10)		■	■		
	SMART CONTENT SUMMIT: EUROPE (11)				■	
	EIDR APM (EU) (11)	■				
21 SEPTEMBER	ENTERTAINMENT EVOLUTION SYMPOSIUM		■	■		■
20 OCTOBER 	MEDIA + ENTERTAINMENT DAY	■	■	■	■	
	MESA NYC MEMBER PARTY	■	■	■	■	■
4 NOVEMBER	SOCAL WOMEN'S LEADERSHIP SUMMIT		■			■
	WITH LEADERSHIP AWARDS	■	■	■	■	■
16 NOVEMBER	HITS : EUROPE		■	■		■
8 DECEMBER	CONTENT PROTECTION SUMMIT	■				
	MESA HOLIDAY MEMBER PARTY	■	■	■	■	■

OUR TECHNOLOGY COMMUNITIES



NFTs. Distribution strategies can be modified to allow individuals to purchase NFTs of a piece of media directly from the content producer instead of via the currently prevailing walled gardens, where the purchased NFT does not confer any copyright permissions to the underlying IP, but the NFT owner will be able to play back that media indefinitely until they transfer the NFT to someone else.

RIGHTS BEYOND THE KNOWN UNIVERSE

Of course, crypto adoption won't be an overnight transformation for the media industry. Shifting finances toward crypto currencies, which are notorious for fluctuating in value, is clearly risky for media companies. Also, the legal industry is not about to be disintermediated from the complex and psychological efforts of negotiating and interpreting media deals. While smart contracts coded atop a blockchain are highly useful for impartially executing universally accepted accounting rules in some industries, the intricacies of media contracts are far from the point of standardization needed to ensure that all systems agree on the meaning of the terms.

IRDETO *Continued from page 88*

of NFT data units may be associated with digital files such as photos, videos, and audio.

Fans of films ranging from James Bond blockbuster *No Time To Die* to independent releases such as pandemic production *Zero Contact* can buy digital merchandise as producers experiment with digital mechanisms like blockchain to fund and distribute content. Hundreds of thousands of fans lined up a few months ago to buy digital collectibles tied to Warner Bros.'s *The Matrix Resurrections* movie at \$50 apiece. The NFT marketplace hosting the sale, Nifty's, had their system swamped and crashed by users, prompting the company to pause the sale.

But the NFT space has gotten very saturated over just the last few months. It's a space evolving daily, so no one knows where it's headed. The saturation has also led to many scammers being present in that environment, looking for quick cash opportunities.

SECURITY CONCERNS ON THE METAVERSE

Content companies and studios must actively explore ways to engage with the metaverse. It may be minting NFTs, planning virtual events, or collaborating with VR/AR companies to create unique experiences.

As film studios move into the metaverse, their attack surface will grow exponentially. Security strategies will need to be better aligned across all verticals. The overarching consideration here is content control. When granting any content licenses for the metaverse, it will be essential to consider who should be able to use or manipulate your content and how they are allowed to do so.

Reinhard Blaukovitsch, the managing director of Denuvo by Irdeto, the global No. 1 application protection and anti-piracy technology platform, recently wrote a blog post about the safety of the metaverse through a gaming lens. He brilliantly covers the issue of tampering with the metaverse components, piracy and what could happen to game cheaters once they are caught.

He mentioned the interconnection between the metaverse and offline economies will increase the number of attempts at theft and fraud. Blaukovitsch says that stakes will be much higher than they are now, so

Even without a full-scale adoption of crypto or smart contracts, the evolution of the metaverse portends major interpretation disputes on the horizon between content creators, distributors, and audiences. Stars will likely argue that they need to be paid extra when their previous performances are somehow repurposed within the metaverse. Music clearances and royalties will need to be reevaluated as content is played across new virtual spaces.

The metaverse is not supposed to be tethered to physical geography — although some geo-fencing could certainly occur as a technology choice or due to government regulations—so going forward, newly produced content will need to be licensed for new “media” and/or new “territories” to cover this new meta space. Meanwhile, there will be a land grab over the existing, standard territorial rights that were heretofore rarely spelled out beyond “worldwide” or “the known universe.”

In the era of the metaverse, the media industry has wide-ranging opportunities to expand its reach and to augment all parts of the business, limited only by the capacity to implement relevant technologies effectively and the ability to reimagine rights. ■

for people to be willing to participate in the metaverse, they'll need to be 100 percent sure it is safe, and companies will have to work together to keep the user's account information secure.

This will be our entire digital life, not only with your unique online (and offline) identity but also with your money and sensitive data. Protecting it against theft will be critical for the entire metaverse endeavor's success. And so will be ensuring that the metaverse users cannot fake their identity.

As a result, companies will not only be metaverse's enablers, participants, or celebrants, but they will also have to assume the role of authenticators. They will have to find a way of stopping cheating and fraud in the metaverse so that its users are happy. There are real trade-offs between making an experience safe, balancing privacy, and keeping it fun for everybody. Sure, blockchain and NFT will be used as guarantees of authenticity in the metaverse. Still, there will also be a need for more conventional security solutions, e.g., protecting against hacking or tampering. Otherwise, all other security measures will collapse.

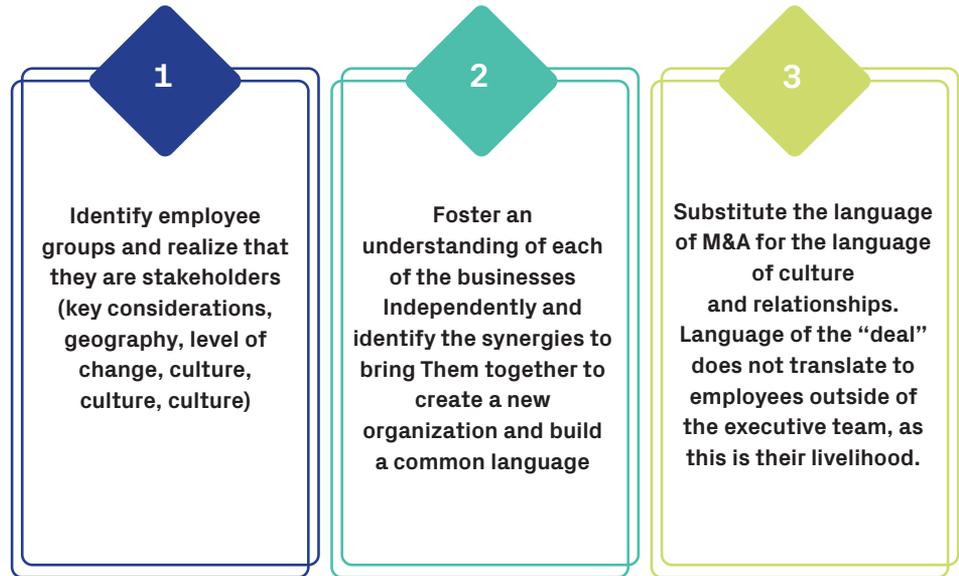
THE DIGITIZATION OF OUR LIVES

Though today there is probably a generational divide between virtual worlds and NFTs, we must acknowledge that younger generations live in these worlds today. Their digital lives are a big part of their daily lives. As such, they may not see a difference between their digital personalities and their “real” ones. Will they see a difference between buying a digital sneaker or a real one, watching a real basketball game on the court, or an avatar version of Kevin Durant or LeBron James dunking the ball on the metaverse?

COVID-19 accelerated the digitization of our lives and normalized more persistent and multi-purpose online engagement and communication. This combination of technological, social, and economic drivers results in explosive interest in the metaverse.

The possibilities for this metaverse will be limitless, but what will this change mean for the entertainment industry and life as we know it? Only time will tell. ■

Communication points to consider



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fictional characters to tell a story brought to life through (2D) motion picture, television and then (most importantly) theme parks in real life. We'd had them as separate parts for years, but he built a "land." Similarly, the metaverse is looking to create fictional characters and environments to tell stories cross-media (2D/3D/spatial). Imagineering embodies all the best parts of the "why" because they suspend belief in the physical world based on "make believe" characters. And Walt Disney (and, ultimately, many amazing content creators throughout history) created TIMELESS and AGELESS characters and experiences that appeal to all cultures. Walt went WAY above and beyond in that he started a 360-degree business that allowed creatives to thrive (he was so META)!

But there are real challenges ahead of us in creating this multi-TRILLION-dollar market. For example, how do we integrate our precious assets with millions of polygons and time, blood, sweat, tears and talent? We need to scale these assets down to be operable within the metaverse. Once these assets are inserted into a fluid ecosystem it frees them to be used in ways we don't even understand now. And there are competing visions for the metaverse. One is dominated by closed platforms, huge investments, and big tech. The other built on open protocols and other emerging tech (blockchain) that can be driven by the creator/influencer economy. There will be different regulatory considerations for each as they are being built out and along with existing rules and regulations, the emerging regulatory environment will have to be considered by both sides.

DON'T FORGET ABOUT THE MONEY ... AND AUDIENCE!

Content will drive users into worlds, but transactions will ultimately drive growth of the metaverse (just like the internet, and we should look to the early days of the world wide web to avoid some of the pit-

falls). We are already seeing this economy being built through vendors utilizing traditional and emerging currency technologies but once we determine who owns what, and who gets what cut of what transaction, we will truly be able to scale the metaverse for the global economy.

How do we create experiences that don't lean too heavily on the media model of how we've traditionally created experiences and grown a fanbase for a universe or world and the surrounding IP? The young, videogame-native userbase will not accept a traditional media approach to the metaverse. They don't want any gimmicks, false promises, or "Hollywood" glitz. They want an effortless experience where they can participate (or watch) at their comfort level. And companies need to keep a finger on the pulse of their precious consumer to understand how/what they can deliver and in what timeframe. I mentioned we're early, but the clock is moving exponentially faster than when the internet was born.

Which brings us back to the magazine you're holding in your hands. This isn't our first discussion of metaverse, and it certainly won't be the last. This collection of articles explores the potential and offer insights into how your company, business unit, or team, can begin embracing the undeniable future where the conversation continues for many years to come.

YOU UNLOCK THIS DOOR WITH THE KEY OF IMAGINATION.

These iconic words from Rod Serling (incidentally my grandfather's cousin, so we share DNA) echo in my mind in just about every creative conversation I have about the metaverse. Even as I approved the cover of this magazine, I thought the same and chuckled to myself. Beyond it is another dimension ... this rings true, more than ever, as we "unlock" the metaverse economy. ☐

Q&A. The guest then either offers a full presentation or might just simply chat with attendees. There's always a bit of dialog between the host and guest (that's the "Actors Studio" part), and hopefully gets us to experience the guest in a way where they get a chance to explain things more deeply or clarify that the ways that they usually cover such topics.

Where do you find Lunch & Learn? Just visit mesaonline.org/lunch-and-learn/ and you can register for upcoming sessions and also watch recordings of all the sessions that we have had to-date.

So, grab your lunch (or dinner if in Europe; breakfast if in Asia) and join us! Like a TED Talk, I am pretty sure that you will coming away with an appreciation for the topic and the leader. ☐

4. Promote communication

Proper communication during organizational change is one of the critical factors which determine the success or failure of a transition or transformation. Excellent communication keeps everyone on the same page and assures the people who will feel the brunt of these changes that they're not in any danger. Talking about change candidly and openly is one of the most powerful things you can do to help your company embrace change.

5. Recognize that change is the norm, not the exception

Are you treating change as a project with a defined beginning and ending? You may run into difficulties. Because change is not a project but rather an ongoing process. Today's world moves exceptionally fast,

with technology, markets, consumer preferences, even environmental conditions, all rising and dissipating in the blink of an eye. Businesses not only need to transform their operations to be able to keep pace with their customers. They need to anticipate change and be ready for it when it occurs. Sound familiar? That's nothing less than the goals of change assurance. You can only be change ready if you recognize that change is the norm, not the exception to the rule.

THE CLIFF NOTES VERSION

Successful change requires a committed, active leadership, a culture of learning, and a clear vision of what that change entails. Change is inevitable, and by embracing change readiness, businesses can turn change into an opportunity rather than a challenge. ☐



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Once the correct permission level is achieved, the app does an inventory, looks for anti-malware and then calls out to its command-and-control servers to execute phase two, the downloading and installation of the actual malware payload. This payload varies between different threat groups, but usually consists of a persistence mechanism, backdoor or remote-control tools as well as keyloggers, or other credential capture tools.

What is clear is that antim malware developers are either not tracking these developments or ignoring them while malware development teams are doing their research, identifying mobile user behavior, and exploiting it. The numbers tell a very clear story, banking malware, with the capabilities listed above, more than 60 apps identified in 2022 alone and with total installations north of one million. One information collection app, at the time of its removal from the Google Play store, had over 46 million installations.

NEW THREAT TACTICS

The stage is set, the tools are built, and the props are ready. Threat group tactics, including initial brokers, are moving away from pounding on the front door. They have identified that in many industries, like the content creation industry, there simply is no front door to pound on. They must look for the people holding the keys to an environment that is not easy to find. In simple terms, they want user accounts and credentials. The best way to do this is target services like MS365 and endpoints (including mobile devices). The tactics here are simple, it is typically going to be via drive-by and phishing (spear or cast net), including vishing and smishing. Identifying a target is exceptionally simple with available tools like Facebook, Instagram, Twitter, LinkedIn, and corporate websites. Spend an hour combing those sites or using Google Dorking and you have a laundry list of targets for your efforts. Craft your phishing email and off you go.

In your typical corporate environment, heavy anti-phishing tools and training can make the effect of this limited, but as we know from incident tracking it still happens repeatedly hundreds of times each year. So, to protect user accounts, corporations implement multi-factor authentication and/or utilize services like Okta, PingOne, Duo etc. Sounds like problem solved right? Well not really, and there is a giant glaring hole in the invisible fence here, it is the mobile device. We know from recent threat intelligence that threat groups are going after personal accounts and devices (Lapsus\$ is an example). We have seen evidence of attempts to thwart and compromise MFA and access brokers like Okta through MFA spamming or simply through users not paying attention when a request comes in. These tactics are effective, but what happens when we combine everything we have talked about?

The APT/threat group targets the individual(s) they have identified via OSINT, they target them with a phishing campaign including smishing to get to the mobile device. The capture of credentials is completed, but they have an MFA barrier to deal with. So, they pivot to malware, like the banking and financial malware we talked about earlier, that abuses core systems like the accessibility services on the mobile device. Now they have the credentials and via the new permissions they can capture and respond to MFA queries

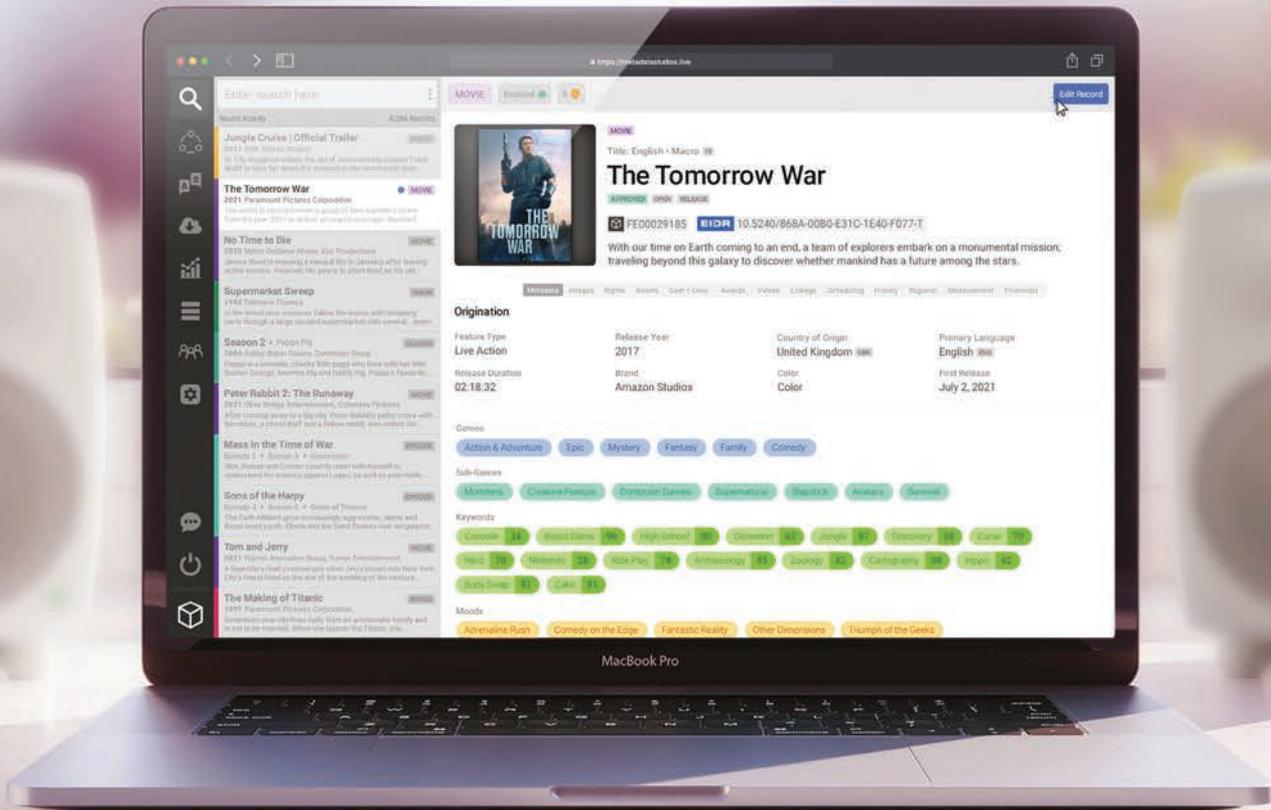
as the accessibility services allow them to capture and respond via internal systems including the potential to replay biometric data stored on the device like a fingerprint. The circle of life is complete. By compromising the mobile device, you can bypass many conditional access policies. If you compromise both the mobile device (phone) and a laptop that is a BYOD device, you are golden. This tactic is not farfetched as we have seen indications that groups are moving in this direction already based on existing and past successful campaigns. The effectiveness of this type of attack is insane, it has massive potential to work against even hardened targets where awareness and tools sets are very capable. In highly distributed environments, like the content creation industry and many small and medium sized businesses, it is a massive threat. One creation partner compromise using the tactics listed above and you have not only put your content at risk, but also have a potential supply chain attack depending on the type of content being delivered.

SHIFTING BATTLEFIELDS

The security battle has shifted from the old siege tactics where attackers throw themselves at the walls. It was always going to do so, but the pandemic pushed up the timeline significantly. Now the fight is to secure the endpoint and the user account. This fight is not just a laptop or home use desktop though. It is also the most exposed device and one with the largest BYOD footprint, the phone and tablet. Until a proper way is found to secure these exposed devices all industries are at risk, right now the targets are banks and fintech, but the content creation industry may also be at an even more elevated risk due to its highly distributed nature and exposure.

This is not to say abandon all hope ye who enter, there are still steps that can and should be taken to offset the risk. Organizations that leverage third parties should always limit any outside access to content/data storage. Malware scans of consumption content (video, audio, and static images) as well as vulnerability and malware scans of any code-based content should be performed during and after transfer of the content. Additionally, implementing least privilege style access and controls are always a good option. Requiring the use of trusted IP ranges and/or a VPN connection to storage and/or tools can help as well. Lastly enable the monitoring of sign-ins for risk based on time, type of access and what is done in the environment. Then you can combine these efforts with policies that block user access if there is a violation of any of them. It is always better to annoy one person (or company) than risk the impact of an incident. You may also need to change current partner agreements to include having protection for mobile devices like phones and tablets.

In a highly distributed work environments, like the content creation industry, you will need to communicate these changes in advance so that your partners are aware, but do not shy away from enforcing them. You might not be able to protect or control the endpoints, yet, but you can protect your environments and data by implementing stricter controls against the evolving attack styles. ■



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Workspace
Tuesday 1:33 PM
Ci Marketing
Words and pictures
Selected files

00:00:30

snowboard.mp4
7.6 MB • Colin H.

diner.jpg
4.7 MB • Leah S.

00:00:55

equestrian.mp4
106.1 MB • Colin H.

00:02:10

saltflat.mp4
1.2 GB • Colin H.

00:03:46

XAVC-I_QFHD_HLG_Live_...
14.8 GB • Leah S.

bedroom.jpg
1.6 MB • Leah S.

TECHNICAL METADATA

General

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Runtime 00:00:30.37
Total audio channel count 1
Width x Height 1280 x 720px

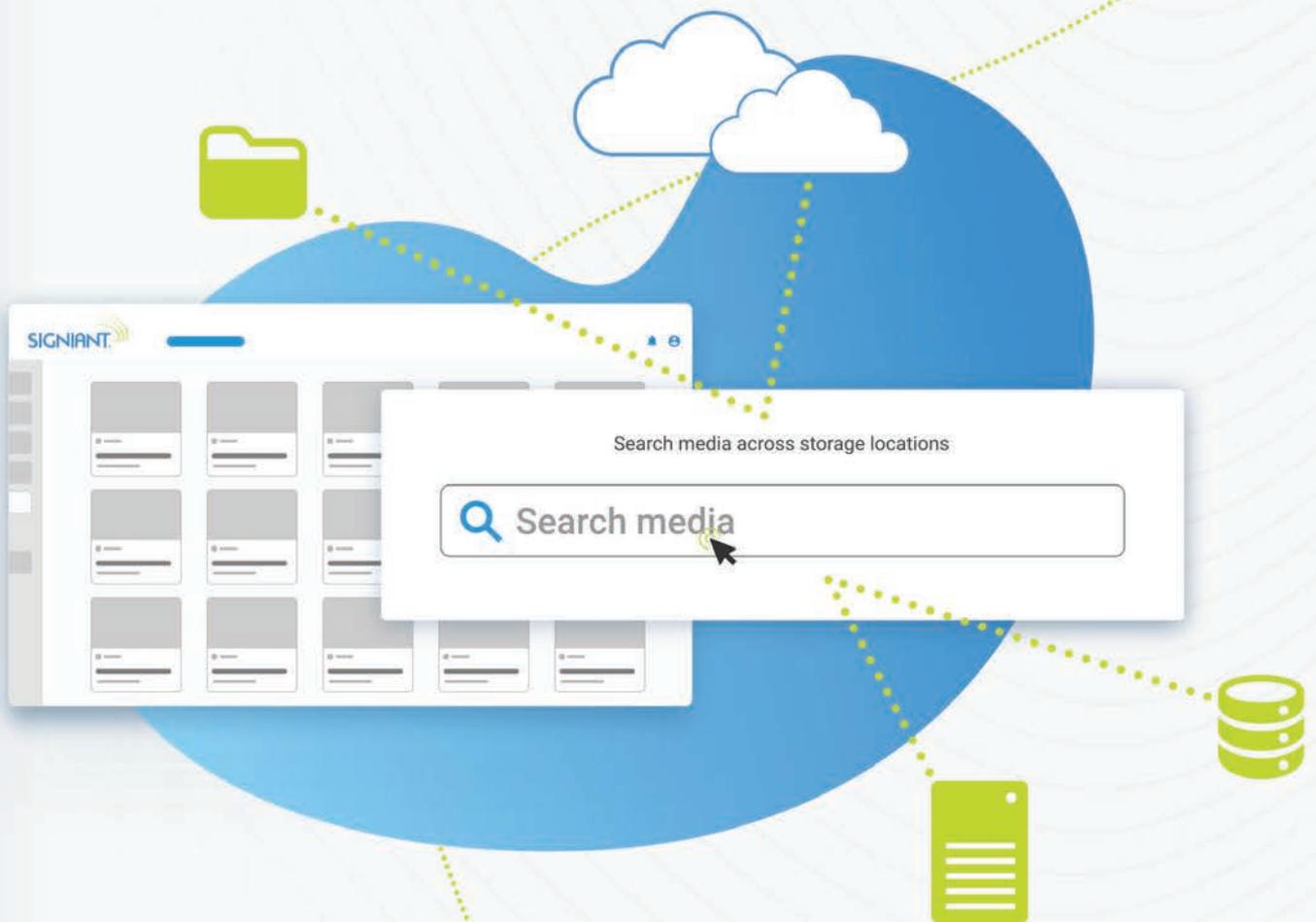
Video

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Frame rate 29.97 fps
Codec name AVC
Codec profile High@L3.1
Codec settings CABAC / 3 Ref Frames
Presentation aspect ratio 16:9
Bit rate 2.00 Mbps
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