



# CES2018



The 2018 CES Report presented by the Entertainment Technology Center at the University of Southern California (ETC), a research center and think tank organized within the School of Cinematic Arts. More Information at [etcenter.org](http://etcenter.org), read the latest industry technology news at [etcentric.org](http://etcentric.org), and subscribe to free our [Daily News Brief](#).

## INTRODUCTION

### A Window to the Future

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*Technology advances and new vision, not so much new products, made CES 2018 a year for futurists. It is a tale of two shows: one of products fulfilling visions articulated a few years ago, and the other of ideas, inspiring dreams and not just goods and services but the lifestyles of tomorrow.*

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## 5 Observations to Consider

- Technology introduced a few years ago is now evolved through the development cycle to produce affordable mass market products on one end and matured enough to reach the technical limit on the other.
- Everything is talking, connected and interconnected. More Open APIs and standards bring products, companies, and people together for increasingly seamless and reliable interactions. Companies that traditionally operated or dominated one vertical, now crossover.
- Smart is still kind of dumb but wisdom comes with age and experience.
- Quantum computing, shown by Intel and IBM, replaces the binary *bits* of 1's or 0's, "on" and "off," of today with *qubits*, based on 2 key principles of quantum physics where 1's and 0's can be both at once and correlated to each other. Problems unsolvable or impractical on "classical computers" could be answered with this new paradigm now being studied.
- Neuromorphic computing, inspired by how the brain works and built with digital circuits that mimic the brain's basic operation, has the potential to unlock huge gains in performance and efficiency for the future of artificial intelligence.

The following report is the Entertainment Technology Center's post show analysis of the 2018 CES. Over the course of the week of Jan. 7-12, 2018, ETC tracked the most interesting and breaking entertainment technology news coming out of this year's event. More than 3,900 exhibitors showcased technologies across more than 2.75 million net square feet of exhibit space. The ETC team reported on new product announcements, keynote presentations, evolving industry trends and individual demonstrations.

ETC's coverage began with an early pre-show report posted to its ETCentric.org news website. During the weeks prior to and immediately following the year-end holidays, ETCentric, our news site, published a series of stories forecasting anticipated trends and early product announcements. During CES week, two daily editions of the ETCentric Daily News Brief with almost 100 original posts and abstracts of articles published.

The pages that follow highlight the key trends and categories that emerged during CES 2018 as analyzed by our team of journalists and industry experts. With so much to see, we focused on those areas that directly or indirectly impact media and entertainment and the interests of ETC members.

The Entertainment Technology Center at the University of Southern California is a think tank and research center within the USC School of Cinematic Arts that brings together senior executives, innovators, thought leaders, and catalysts from the media and entertainment, consumer electronics, technology, and services industries along with the academic resources of USC to explore and act upon topics and issues related to the creation, distribution and consumption of media and entertainment content.

For more information or to become a member, contact: [emeadows@etcenter.org](mailto:emeadows@etcenter.org)

## AMBIENT EXPERIENCES AND INTELLIGENCE



### Ambient Intelligence

For 20 years the quest and definition of Ambient Intelligence (AmI) has been the purview of think tanks and device manufacturers. Defined in the 1990's by Eli Zelkha and a team at Palo Alto Ventures, the pursuit of pervasive presence for humans and responsive connection with the computed environment has been the goal of multinationals and government entities. Most recently, the concept of creating environments that are responsive to the presence of individuals is making its way into the consumer electronics and personal computing space.

Slowly creeping into the consumer world, connected devices powered by IoT have shown potential, but often suffered from user interface issues or security compromises. In the last two years however, the invasion of smart speakers should be viewed as a state change, the proverbial canary in the coalmine.

While gamers and mobile players have become one with the idea of their presence affecting their virtual state and revealing their mental view of the world, only recently has a larger more general audience found value in this new approach. An increasing number of consumers are now interested in extending their control and influence by using their presence to affect the nature of their experience. This is a profound change in our collective view of how we imagine our daily interactions with external systems.

## Key Areas for Media Companies

Two key areas will be initially important for media players. Straight forward aggregation and recommendation will see a new intimate level of interaction and influence users to resist change in an even more persistent way. However, the potential to imbed ambient intelligence within the entertainment experience should be the focus and ultimately the greater opportunity for the future of media companies.

Inclusion of the mental state and expectations of media consumers will morph into a new state of player, user, and viewer as the next necessary progression of the entertainment experience. It will influence or determine the success of media production and promotion.

Where and how the most successful integration of ambient intelligence and media experiences will emerge is an unknown at the moment, but based on the response to smart speakers and mobile AR games the adoption will be quick and wide ranging across age and demographics.

We look at CES for signs of these new areas and see companies trying to extend the impact and connection of IoT potential, especially as Amazon, Google and Apple activate the ambient expectations across all of society.

We at ETC want to understand all the dimensions of impact and potential as we track the attempts to extend sensors and the ability of computed images to involve and entertain our guests. What will initially appear as a slow burn will be viewed in hindsight as a watershed event when generational acceptance meets new personal power — and traditional interfaces disappear and thought becomes (inter)action. [READ MORE](#)



## Artificial Intelligence

If measured in press impressions, 2017 was most definitely the “Year of AI,” but looking past the hype, a few things are clear from CES 2018:

- 1) progress in actual machine intelligence capability has been slow and fragmented;
- 2) applied AI is still the domain of less than 20 companies; and
- 3) still, machine learning (not AI) is being deployed across enterprise domains of numerous business sectors and creating big value.

Since it will take another year or two for current advances in machine learning to trickle down to the consumer sector, there was little expectation of breakthrough in AI or even machine learning at CES 2018. However, even if limited in the WOW – or "Whoah" as CES posters like to suggest – factor, there are some impressive developments in several areas:

### **Machine Learning: Deep Learning and Nvidia Dominate**



*1 - DEEP LEARNING STILL DOMINATES MACHINE LEARNING, AND NVIDIA STILL DOMINATES DEEP LEARNING (photo: Rochelle Winters)*

As always, NVIDIA CEO Jensen Huang's CES keynote was rich in excitement, especially for machine learning experts. From doubling down on autonomous vehicles to AI-composed music (in partnership with Disney), to a technically impressive foray into intelligent video analytics to power smart cities, the CES darling is still — by far — the biggest AI enthusiast at the show.

It's also the one best positioned to cash in on what it calls "AI" (in reality deep learning, which is a very popular type of machine learning), leveraging the success of its [CUDA platform](#) to underwrite any and all neural net-based AI or machine learning applications.

NVIDIA's end-to-end Deep Learning stack is impressive because it's putting supercomputing-powered Deep Learning in the hands of practically every savvy developer (provided they have millions of data points to train the models). The company's new "GPU Cloud", which has containerized all the main Deep Learning frameworks into a nice "out of the box" stack, is now fully integrated with NVIDIA's new and powerful GPU chip – the Tesla V100 Volta – deployed across every cloud service and data center in the world. It brings Nvidia's vision of "Deep Learning for the masses" closer to reality.

**This containerized approach – one of the hottest areas of tech right now – will considerably simplify the process of building and deploying Deep Learning models** (which still require a lot of fine-tuning and

tinkering by rare and expensive developers). This type of “out of the box” integrated hardware-software architecture could be a substantial development for the media and entertainment industry, which has a lot of data and appetite for experimenting in this area of machine learning, but is lacking in experienced engineers.



*2 - Hey Google!*

## **Hey Google!**

The extension of the assistant domain is a natural step towards the inevitable dominance of “ambient intelligence” delivering timely and personalized services ... as well as expanding the already massive datasets Amazon and Google have amassed about us.

But there is something perhaps even bigger and more substantial in the “embedded smart agents” phenomenon: using extreme technology to remove the technological layer in our lives, and introduce an even more seamless and organic way of cutting through the technological clutter, which at CES felt so stifling. “Invisible intelligence” is definitely the way of the future.

## **AI Progression**

Besides NVIDIA’s doubling down on “Deep Learning for the masses” we didn’t see any of the progress made this past year in AI and machine learning in the lab (GANs, Deep Reinforcement Learning, etc.) trickle down to the consumer sector.

Where AI was in every breath and on every banner in 2017, CES 2018 was much more muted in this domain. Some robot manufacturers we spoke with even went out of their way to describe their software as “absolutely not AI”. “Customers are not buying our products for AI”, seemed to be a refrain of CES 2018.

## It's easy to see why

First, AI is on a 25-year timeline, so breakthroughs won't happen on less than 3-5-year cycles. Researchers are still exploring the possibilities and limitations of the most recent revolution – deep learning – and will be for another few years. And Deep Learning isn't even AI (it's an advanced supervised machine learning method which is becoming a legitimate cornerstone of AI).

Second, even the most advanced AI and machine learning applications currently being developed in labs or large corporations are creating a lot of innovation in enterprise, but are still a poor fit for the consumer space, and for several interlocking reasons. Even cutting-edge machine learning methods like Deep Learning still require an enormous amount of labeled data and computing power to train. Being a supervised learning technique, they also don't generalize very well beyond the domain they've been trained in (they can't handle complex tasks, or high-variance and dynamic domains). Without even fragments of true "machine understanding" capability (which is still in its very early stages), the consumer experience for AI and machine learning applications is still -- and will remain -- poor, because millennia of human interaction and cognition have set the bar so high.

That said, here are a few of the interesting and fun things we saw and a good recap from CNET answering the question "How close are we to the Jetsons?"...



3 - Stephen Colbert on AI



4 - <https://www.us.kohler.com/us/Verdera-Voice-Lighted-Mirror-with-Alexa/content/CNT131300006.htm>



5 - Vuzix AR Glasses

*This extension of the assistant domain is a natural step towards the inevitable dominance of “ambient intelligence” delivering timely and personalized services ... as well as expanding the already massive datasets Amazon and Google have amassed about us.*

## Robots

Robots were one of the stars of CES 2018, although with price points ranging from the upper \$600s to over \$2,000, it's hard to imagine there would be any substantial market for feature-poor (can anthropologists step in, please?) and extremely hackable robot “friends” for our children. Yes, design has gone by leaps and bounds, but consumer robots are still mired in their traditional purgatory of limited functionality and high prices, and parsing the near-infinite landscape of consumer robotics at CES felt a little like Ulysses sailing the Sea of Lameness.

Here are some standouts:



6 - Misty I ([Misty Robotics](#))

Misty I ([Misty Robotics](#)): because it's so damn cute, because it's got all the right features, because the company's founder was one of the Sphero founders, and because it has already developed a decent community of app developers.



7 - Walker ([by Ubtech](#)): because it's a biped ... and a sentry. Walker patrols your home perimeter, detecting motion and recording any suspicious activity. Price wasn't provided, but likely in the upper range.

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*8 - Zib (by ZibKids)*

Zib (by ZibKids): because, while not the most intelligent or mobile, Zib is targeted at the cleverest user segment: toddlers. Its long rubber stem and its many features will make it a perfect (and cheap) digital companion for the only humans who aren't yet so hung up on feature sets.



9 - (New) Aibo

(New) Aibo: because it's a near-real pet, because we missed him, and because it's the best of them. A re-launch of the 1999-2006 phenomenon, the new Aibo is impressive in every way: the animatronics are smooth as silk, and, at least if we believe Sony's claims, its capabilities seem fairly at the edge of the chatbot spectrum. Almost everything about it is on the hard side of AI and machine learning: it recognizes faces, remembers interactions with different family members, even facial expressions (keeping that kind of structured memory is currently one of the hardest challenges in AI), and with its cameras and sensors, can deliver all sorts of tricks. Also, according to Sony, its personality evolves over time, which – if true could propel Sony at the forefront of the consumer AI space. Price TBD, but it's already retailing in Japan for an insane \$1,700.



#### [HOW CLOSE ARE WE TO THE JETSONS?](#)

"With automated homes and consumer-ready robots on the rise, are we ready and able to finally bring the future into the present?" asks CNET's Andrew Gebhart. "I found myself referencing a cartoon from

the 1960s at the world's biggest tech conference in 2018. I hadn't even watched an episode of "[The Jetsons](#)" in years, but the whimsical future imagined by that classic Hanna-Barbera show remains a handy benchmark for our present-day inventions." Read [How close are we to the Jetsons?](#)

## Advanced Computation

### A QUANTUM COMPUTING PRIMER

Quantum computers are different from the digital computing that drives today's data centers, cloud environments, PCs and other devices. Digital computation requires data to be encoded into binary digits (bits), each of which is always in one of two definite states (0 or 1). However, quantum computation uses quantum bits (qubits), which can be in multiple states simultaneously. As a result, operations on qubits can amount to a large number of calculations in parallel. It has been shown that in theory, some specific problems should be solvable in much less time on a quantum computer than using the best known algorithms for a conventional computer. Here are four key concepts that are the foundation of quantum computing.

#### 1 SUPERPOSITION

Think of classical physics as a coin. It can be either heads or tails. If it were a bit, it would be 0 or 1. In quantum physics, this coin is best thought of as a constantly spinning coin. It represents heads and tails simultaneously. As a result, a qubit would be both 0 and 1 and spin simultaneously up and down.

CLASSICAL PHYSICS



Heads OR Tails

QUANTUM PHYSICS



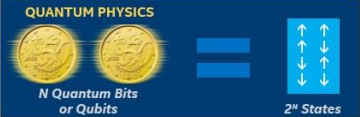
Heads AND Tails

**Quantum state:** a simultaneous representation of multiple classical states.

#### 2 ENTANGLEMENT

Entanglement gives quantum computing the ability to scale exponentially. If one qubit simultaneously represents two states, two qubits represents four states when coupled together. They can no longer be treated independently; they now form a coupled, or entangled, super state. As more qubits link together, the number of states exponentially increase, which could lead to a computer with astronomically large computing power.

QUANTUM PHYSICS



$N$  Quantum Bits or Qubits       $2^N$  States

The two qubits can no longer be treated independently. They form a super state.

#### 3 FRAGILITY

Quantum states are quite fragile. If you measure, observe, touch, or perturb any of these states, they collapse to a classical state. The states don't stick around for very long, which is why quantum computers are currently hard to build.



Observation or noise

A quantum state collapses to a classical state if disturbed by noise or measurement.

#### 4 NO CLONING

A corollary to fragility is the 'No Cloning Theorem.' In classical physics, if two bits are represented by the coins below, one can copy or eavesdrop and recreate the information. In contrast, the information entangled within a set of qubits will be lost if someone tries to observe or copy them. A quantum state cannot be copied without the sender or receiver realizing this. This concept serves as the basis of quantum communications.

DIGITAL COMPUTING



Copy or eavesdrop

QUANTUM COMPUTING

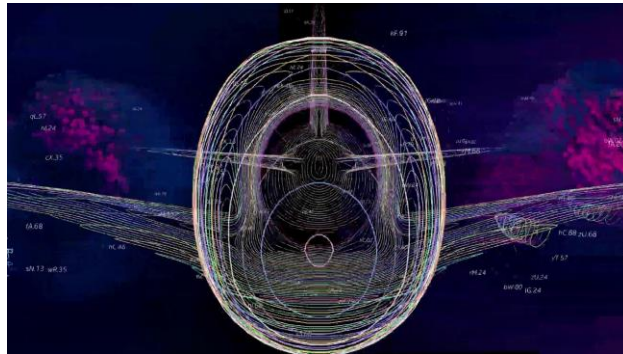


Copy or eavesdrop

One cannot copy, intercept or steal without ruining a quantum state.

Quantum computing holds a credible promise of radically enhanced performance, with the potential to solve specific complex problems that are practically unsolvable by today's computers. Development of actual quantum computers is still in its infancy, but quantum computing has the potential to solve complex simulations such as large-scale financial analysis and more effective drug development.

*10 - Intel announced two major milestones in its efforts to research and develop future computing technologies including quantum and neuromorphic computing, which have the potential to help industries, research institutions, and society solve problems that currently overwhelm today's classical computers.*



Intel chief executive Brian Krzanich gave a keynote address that ranged on topics from cybersecurity to immersive media and both neuromorphic and quantum computing. He also introduced Intel Studios, a site for the production of immersive media.

The rise of data appears to be theme for Intel, as Brian Krzanich transforms the company from a PC-centric chipmaker to a data-centric company. With advances in artificial intelligence, 5G connectivity, autonomous driving and virtual reality, Intel is taking the next steps to reimagine how data will create amazing new experiences that will transform our daily lives.

In [Forbes](#), Moor Insights & Strategy founder Patrick Moorhead reports that Krzanich next focused on “immersive media,” noting both recent use of Intel True VR technology and that “the company would be powering the largest-scale VR event ever, during the 2018 Olympic Winter Games in PyeongChang, South Korea.”

Krzanich announced that, “Intel would be entering into a 3-year partnership with Ferrari to use AI to enhance spectator experience at the Ferrari Challenge, a championship race series,” using drone-captured aerial footage.

Intel explained that its neuromorphic research prototype chip, dubbed Loihi, is “fully functional” and “after only a few weeks is doing basic object recognition in the labs.” Neuromorphic computing is defined as mimicking the way the brain observes, learns and understands. Krzanich also announced Intel’s 49-qubit quantum computing test chip, named Tangle Lake.

Regarding autonomous vehicles, Krzanich brought Intel senior vice president and chief executive of Mobileye Professor Amnon Shashua to discuss Mobileye’s technology. He also announced two new partnerships in the China market, automotive manufacturer SAIC Motor, and digital mapping company NavInfo.



*11 - Intel Keynote*

### **Cities and Cars: The Future of Mobility**

**Look at the cities and cars of the not too distant future to see how many of these advancing technologies will help transform the places and ways we live, work, and play.**

In 2017, Carnival Corporation demonstrated their Ocean Medallion experience. If a cruise ship compares to a small city afloat, Carnival's outfitting of vessels with sensors and equipping of crew with stores of rich information, much of it volunteered in advance by passengers to optimize their cruise, is a hint of what will be possible when the urban landscape becomes aware and responsive to us.

In 2018, Ford positioned the automotive giant as a leader in the transformation of cities from congested work places to dynamic living spaces. Ford CEO Jim Hackett, the former head of Steelcase, a company that transformed the workspace, came out of retirement to become chairman of Ford Smart Mobility, a subsidiary of Ford formed to accelerate the company's plans to design, build, grow and invest in emerging mobility services.

Hackett focused his keynote on the development of mobility solutions as the world progresses toward smarter cities. "Ford's vision," the [CES website](#) notes, "is to become the world's most trusted mobility company, designing smart vehicles for a smart world that help people move more safely, confidently and freely."

Car companies appear to be lining up in two camps: mobility and transportation. The higher end, luxury manufacturers show concept cars that look like living rooms or private jets. Mass-market companies regard the commoditization of cars as reason to regard themselves in the business of mobility.

## Ford Vision



12 - Ford Keynote at CES 2018

As a car company, Ford values its experience in commercial-grade vehicles - high-mileage workhorses such as police cars, cabs, and emergency vehicles - because the company sees a future of autonomous vehicles where fewer people may own their own cars but cars that are on the road will spend far less idle time in parking spaces and garages.

Ford, with Qualcomm, also announced a new cloud-based platform for mobility services, called C-V2X, Cellular to Vehicle to Everything. [ZDNet, among others, explain.](#)

## 5G and Qualcomm

During his presentation at CES 2018 in Las Vegas, Qualcomm president Cristiano Amon discussed the future of 5G, predicting that flagship 5G smartphones will hit shelves in 2019 and overtake the market quickly. The rollout “will occur ‘very fast’ because of 5G’s 30x improvement in latency, which lets phone makers keep the price of phones down by offloading phone memory to the cloud,” reports [TWICE](#). The presentation suggested that “the 5G transition is going to be faster than the 4G transition, and it will create a ‘massive’ Internet of Things, enabling new business models and making autonomous vehicles a reality.”

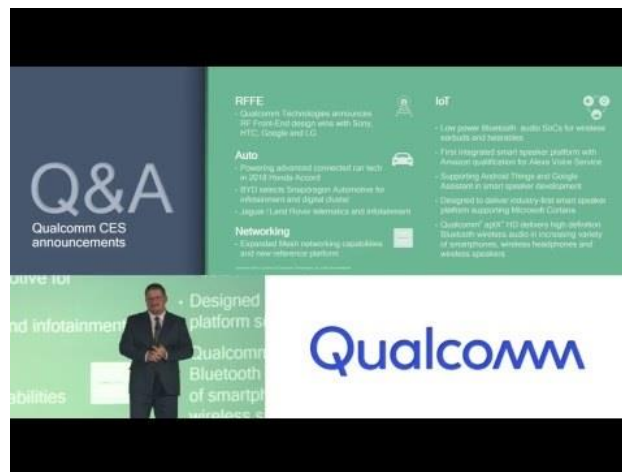
The capabilities of 5G will enable corporations to move IT to the cloud and will make significant changes to sectors including infrastructure, transportation, automotive and medical.

Qualcomm “debuted a new Bluetooth SoC (System on a Chip) aimed at truly wireless headsets during its keynote,” adds [Gadgets 360](#). The company also announced “an expansion of capabilities and product applications for the Qualcomm Mesh Networking Platform and Reference Design, wider support for the Qualcomm Smart Audio Platform, and developments in the automotive space.”

According to [Qualcomm](#), its low-power Bluetooth SoC QCC5100 series “is designed to help manufacturers develop a new generation of compact, feature-rich, wireless earbuds, hearables and headsets.” The “series is engineered to reduce power consumption by up to 65 percent for both voice calls and music streaming, compared to previous single-chip Bluetooth audio solutions.”

In regards to its Mesh Networking Platform and Reference Design, the [company explained](#) that it “is enabling, through the integration of Qualcomm Aqstic and Microsoft’s digital assistant Cortana, leading voice recognition capabilities in the platform to create virtually seamless voice-driven experiences in the home.”

Qualcomm is also expanding the range of products that support the platform “to include smart speakers, smoke detectors, security systems, and smart bulbs where manufacturers are leveraging the mesh networking platform to help create new and better-connected experiences.”



13 - Qualcomm Press Conference

### ATSC 3.0

ATSC 3.0, a new television standard, represents the first Internet Protocol-based broadcast standard, he added, and as such, “paraphrasing Winston Churchill, isn’t the beginning of the end, but the end of the beginning,” said ATSC president Mark Richer. He also reported that ATSC will “work with our colleagues in Korea who are already on the air with ATSC 3.0.”

“Broadcasting has always been free and local, which is a tough thing to be,” NAB President Gordon Smith said. “People count on it everyday. With 3.0, we have the opportunity to take broadcasting into the next generation, that will provide the U.S. viewers new technologies. We’re not just investing in the spectrum but adding mobility, IP, immersive sound and HDR pictures.”

Smith also thanked FCC chair Ajit Pai and the FCC commissioners for “their courage to make this possible.” “In the age of cutting the cord, over-the-air and OTT is a great combination,” he said.

The new standard can be found on the [ATSC website](#)

## SMART CONTRACTS, SECURITY, AND BLOCKCHAIN



14 - Photo: Rochelle Winters



15 - Pindar Wong Chairman, VeriFi, describes how blockchain redefines money during the Digital Money Forum. (Photo:Rochelle Winters)

### Security and Privacy Emerge as Major CES Topics

As connected devices, big data technologies, and artificial intelligence play an increasingly important role across a growing list of business sectors, new approaches to security and privacy will be necessary to safeguard the lifeblood of these systems — data. This manifest itself in a number of different ways at CES 2018. Differential privacy and, to a larger extent, blockchain technologies (and the growing attention paid to virtual currency systems) are the topics that dominated booths in Las Vegas and conference headlines.

The meteoric rise in exchange rates for cryptocurrencies – many of which fell precipitously in January – resulted in fresh attention on blockchain as an enabling technology. These systems are, at their core, distributed databases employing a consensus algorithm to ensure agreement among the ledgers.

Depending on the intended application, these systems can be open and public, guaranteeing anonymity and providing trust in an inherently untrustworthy environment (permissionless blockchains like Bitcoin), or they can be private, allowing known users to interact in an automated fashion according to customized rules with low computational overhead (permissioned blockchains like Hyperledger Fabric).

In both cases, though, these systems attempt to provide indelible records of transactions between two parties, even when some of the system's participants may act maliciously. As a result, the system is robust and resistant to attack, making it an attractive option to enable security and, depending on the system, privacy. In addition to several events within the [Digital Money Forum](#), a number of blockchain technologies were touted on the show floor at CES in various guises.

Some offerings were along the lines of UPS' recent announcement of joining the Blockchain in Transport Alliance (BiTA) to develop blockchain standards for shipping and freight. Others focus on tokens for everything from loyalty points to rendering and compute time. These technologies could solve several issues in [supply chain management](#) and may help solve longstanding [intellectual property issues](#).

Of course, blockchain won't be the only solution offered to help combat growing privacy and security concerns. Another approach that could make waves at the show is differential privacy.

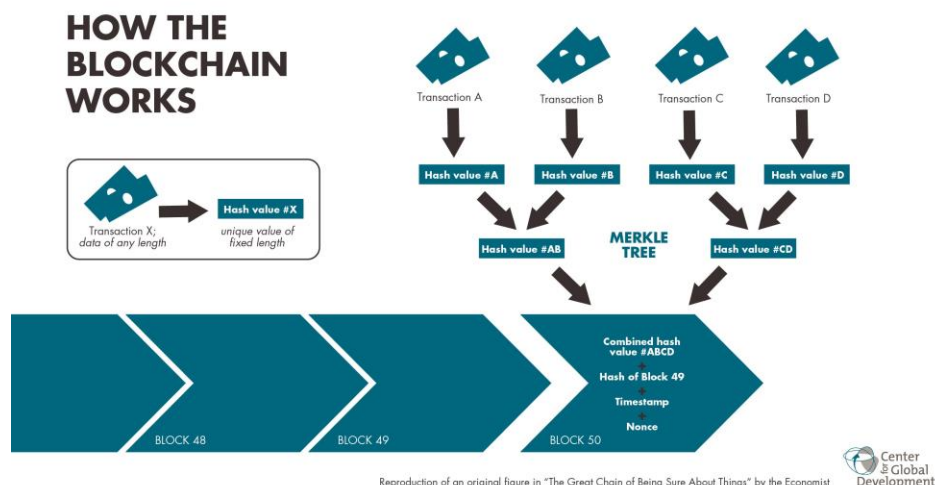
Already deployed in some form or another in multiple Apple offerings, differential privacy algorithms are intended to obscure not just individual user data but whether or not an individual user's information is in the data set at all. This is achieved by injecting enough noise into the data such that user's actions are not known with certainty, but not so much that the utility of the dataset as a whole is lost.

Data protection acts like the Health Insurance Portability and Accountability Act (HIPAA) and the recently enacted European General Data Protection Regulation (GDPR), have expedited the fiscal necessity of these algorithms. And, while there was little clarity on the effectiveness of the individual approaches at the show, it will be very telling if companies, especially startups, have begun to take notice of these changing regulations in their product offerings.

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*Distributed ledgers, the term of art for blockchain's underlying technology, offer a new way to transact business without a central authority, Shelly Palmer writes in the introduction to his self-described "nontechnical, simplified description of the component parts." [Read it here](#).*

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## Kudelski CEO Brings Content, Data & Security Together

In a world where everything is digital, the two assets to protect are content and analytics,” said André Kudelski, chairman and CEO of the Kudelski Group, the parent company of NAGRA, during the Variety Entertainment Summit at CES in Las Vegas. In a headliner conversation with *Variety* New York digital editor Todd Spangler, Kudelski focused on data, security, storage, content delivery and innovation as he addressed fundamental shifts affecting today’s media and entertainment industry.

While piracy and disintermediation continue to be a substantial threat to media and entertainment companies, Kudelski answered the threats and opportunities with a series of products, services and visions.

Kudelski sees a need to construct content in ways that enable consumers to have more meaningful engagement. Today’s market has shifted from broad demographics, to households, and now to the individual level. In a consumer or audience-first world where technology and innovation assure constant change, he suggests “content that is adaptive to the future.”

Data and analytics figured prominently in Kudelski’s conversation with micro-understanding of individual audience members now possible. As we move from general to specific data and insight, “How to better use data” is key. For content creators and distributors, that means “not only what to serve viewers but also what you want to finance or acquire.”

Kudelski also noted the need to shift what is valued as an asset, suggesting the typical finance perspectives account for the content side of the equation, but content in the absence of actionable user data is significantly less valuable. So, it is important for finance to understand content and data security in addition to traditional business numbers.

“A secure chain protects payments, data, and content integrity,” he said.

The conversation diplomatically acknowledged Kudelski’s upcoming trip to the World Economic Forum and an expected encounter with the U.S. President among other world leaders.

The executive touched on blockchain as a big opportunity in content security, although he allowed that many questions remain among the opportunities. One of the questions that impacts both blockchain and Internet of Things (IoT) is “the chain of trust,” he said.

## AUGMENTED, VIRTUAL, AND MIXED REALITY



### Beyond the Hype - Niche Applications and Location-Based Entertainment

Virtual reality, augmented reality and immersive experiences crossed over the apex of the hype curve and are now tracking the slope of enlightenment as they develop into niche market applications or pivot into location-based entertainment. Resolution, frame rate, horizontal and vertical field of view in the HMDs (head mounted displays), and head and body tracking technology, have all improved over the last year with further advances on display at CES 2018 in Las Vegas. This applies equally to next generation HMDs, projection, and heads-up approaches to immersive experiences.

#### Spatial Audio

Audio, especially head-tracked spatial audio, got more respect in 2017, although monophonic or non-tracking 360 experiences are still common. Other control and sensory input technologies, such as eye- and hand-tracking control systems and haptic feedback solutions also continue to improve, both adding creative options for experience design and muddying the waters of what will constitute a clearly messaged consumer immersive media experience product.

#### Sensors

Embedded sensors communicating with either internal processors or cloud-based resources such as geolocation, object/facial recognition, obstacle avoidance, and AI/personal assistants are expanding the tools available to experienced developers and blurring the distinction between the real and virtual worlds of work and play.

The Teslasuit Simulates Full-Body Touch in VR by Zapping Your Nerves, as described in [this story](#) from Digital Trends.

### Immersive Experiences

Location-based immersive experiences, from theme parks to small installations within arcades and purpose-built attractions in storefronts, received a significant amount of funding and support in 2017, especially in Asia. Press coverage of IAAPA Attractions Expo 2017, the annual out-of-home amusement conference, highlighted both VR and AR overlays on traditional rides and mixed reality experiences incorporating escape rooms, puzzle solving, and immersive experiences.

Hologate, the creator of turnkey multiplayer VR experiences, sold more than 60 units of its easily-maintained 4-player experience at IAAPA.

### Investment

The number of funded startups and established companies in both the [VR and AR ecosystem](#) continues to grow, implying sustained confidence in the future of the industry. The press was filled with announcements of advances in cameras, photogrammetry tools, volumetric and lightfield image capture and processing, audio and video editing and game engine tools.

### Sales

Price cuts and product bundles drove an increase in integrated HMD sales in the second half of 2017. One million HMDs were shipped in Q3. Sony accounted for 49 percent of those, followed by Oculus (21 percent) and HTC Vive (16 percent). Those numbers are separate from mobile HMD sales. For example, Samsung Gear VR has sold well over 5 million units in the past year.



*17 - PlayStation has a 49% share of the tethered HMD market and an addressable market of more than 73 million Playstation 4 owners.*

### Standards

A large number of key players, with the notable exception of Apple, are involved in the OpenXR effort run by the Khronos Group to standardize the way AR and VR apps communicate with HMDs. Microsoft joined OpenXR in November.

AREA, the Augmented Reality for Enterprise Alliance, released functional requirements for AR devices that could be a good template for entertainment guidelines. Many other standardization efforts,

including the IEEE's, are still in the early stages of developing big picture statements of what they want to drill down to before they work on specific recommendations.

The market, technology and art of immersive experiences is still immature, so it is not clear what should be standardized as opposed to what provides competitive advantage.

### **Immersion and Engagement**

Immersion and engagement are the keys to driving adoption of VR and AR, but they must be built on a good story-world. Alejandro Iñárritu was awarded a special Oscar for illustrating how this could be done in a site-specific way with his "Carne y Arena" (Virtual Present, Physically Invisible) installation piece at the Los Angeles County Museum of Art.

This year saw growth in the number of VR, AR and immersive experience competitions at existing festivals, as well as festivals dedicated to immersive experiences. The 2018 edition of New Frontier at the Sundance Film Festival is a collection of mixed media performance pieces, AI-enabled experiences, multisensory interactive experiences, and mobile VR/360 documentaries.

A potentially mass-market example is "Wolves in the Walls" from the former Oculus Story Studio team. The work is getting strong buzz for the way it uses game engine technology to support compelling interactive moments that don't distract from the overall narrative.



*18 - "Wolves in the Walls" Generates Excitement*

### **HTC VIVE PRO – Higher Resolution VR**

The HTC VIVE Pro includes dual-OLED displays for a crisp picture resolution of 2880 x 1600 combined, a 78% increase in resolution over the current VIVE HMD. This premium resolution enhances immersion for VR enthusiasts, and the improved clarity means text, graphics and overall experience all come into sharper view.

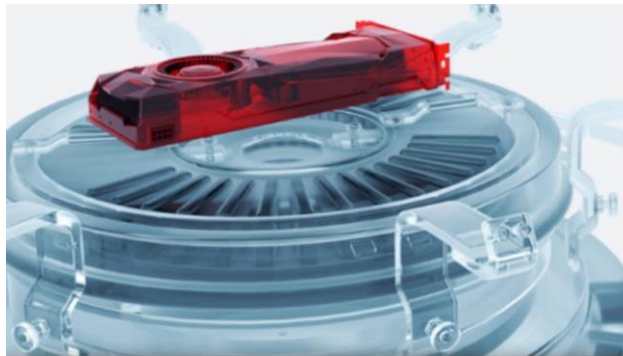


*19 - HTC VIVE PRO – Higher Resolution VR*

### **Cryptocurrencies Present New Ways to Fund Buildout of Immersive Media Ecosystem**

The heat that was on VR and AR last year has moved on to Bitcoin, blockchain and cryptocurrencies this year, and there are efforts to use blockchain to enable new entertainment opportunities and business models. ICOs (Initial Coin Offerings) are a new way to fund the build-out of elements of the immersive media ecosystem ahead of and in support of the development of the market for immersive experiences.

StreamSpace, an Austin, Texas startup, is building a platform for secure video distribution using blockchain. StreamSpace is funding its business build-out with an ICO.



Similarly, OTOY has announced the Render Token, a blockchain-based currency that underpins a distributed GPU rendering network for rendering lightfield image files. People who buy the Render Token will be able to redeem it for computer rendering time in the future, with the hope that the coin will increase in value so the amount of computer resources it will buy will also increase over time.

### **Kodak Introduces Image Rights Management Platform**

The most significant blockchain announcement at CES appears to be Kodak's foray into the space.

Through various licensing partnerships, Kodak launched an image rights management platform, [KODAKOne](#); a photo-centric cryptocurrency, KODAKCoin; and a mining solution, KashMiner. KODAKOne and KODAKCoin are especially intriguing, as they could represent some of the creative industry's first steps toward a new means of tracking usage, managing payment, and enforcing licensing agreements in the absence of a centralized authority. [Read More](#)

## Is This a Turning Point

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Ted Schilowitz, Futurist-in-Residence at Paramount

*"Are we at the last wave of primarily passive entertainment being the most popular form?" he asked.  
"Will it be more like a game or more like a movie?"*

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### Location-Based Settings for AR/VR Experiences

During a CES 2018 panel, specialists in bringing AR and VR outside the home talked about the social value that location-based venues bring to the experiences. Fortune 500 companies ignore AR/VR at their peril, according to Hollywood Portfolio founder/managing director Mariana Danilovic, who moderated the discussion.

The conversation quickly pivoted to a focus on Hollywood, and National Association of Theatre Owners (NATO) vice president of data and research Phil Contrino talked about the members' enthusiastic embrace of AR/VR. "Our members look at AR/VR as an opportunity and a social experience in the movie theater." [READ MORE](#)

### Looxid Labs: Applied Emotion and Gaze

Startup Looxid Labs is developing a user emotion recognition system optimized for Virtual Reality (VR), earned a CES 2018 *Best of Innovation Awards* in Virtual Reality for *LooxidVR* -- a mobile based VR headset for eye tracking and EEG recording. Embedded EEG sensors and eye tracking cameras can keep track of a user's brain activity, eye movement, and pupil dilation. Enabled by an expandable API, LooxidVR's time-synchronized acquisition of eye and brain data concurrent with VR content can be widely applicable in various VR industries that require better understanding of users' emotional status such as stress level, preference, and engagement. Available as of February 1. [More at Looxid Labs.](#)



20 - Looxid Labs: Applied Emotion and Gaze

### Jaunt Announces Platform

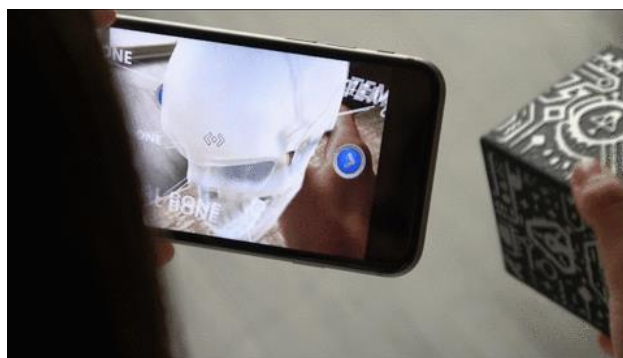
At CES, Jaunt was addressing big brands and entertainment companies with their announcement of their Jaunt XR Platform. As reported in VentureBeat: Jaunt XR will be a white-label distribution platform,

meaning big brands and media could adopt it to launch their own stores or web sites for mixed-reality content

The Jaunt XR Platform provides a highly scalable solution for the distribution of all immersive content, including virtual reality video, interactive VR, branched storytelling narratives, augmented reality and mixed reality," the company described in their announcement. "The XR Platform allows customers to seamlessly and simultaneously publish immersive content across all 360 social platforms including Facebook 360, YouTube 360 and Twitter, native iOS and Android mobile apps, and all VR platforms and headsets. The new Jaunt XR Platform also includes an end-to-end Media Manager purpose build for immersive content, a publishing solution that supports 28 languages, and an Intelligence Suite that provides data and analytics specific to immersive content. The XR Platform sits on a scalable cloud-based infrastructure and provides globally localized solutions in a modular way. [Read More](#).

### **MergeVR – Appealing to Parents and Kids**

*"Marshmallow soft" headset images itself as "Toys of the Future" and focuses on family niche for both VR and AR. Offering Library of content.*



## Augmented Reality

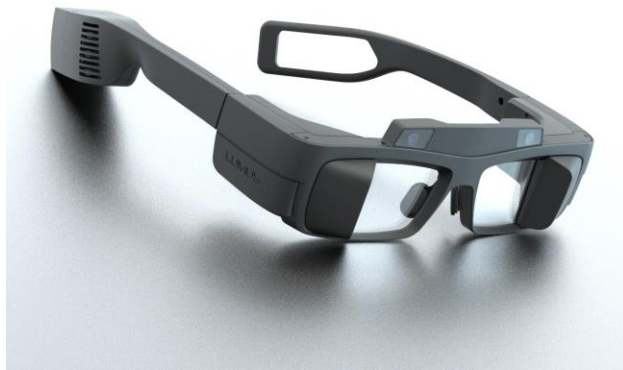
### Mira – AR at a Budget Price Point



Slip an iPhone into the low-cost Mira and it becomes an inexpensive, perhaps cheapest, avenue to AR content, such as this example of multiplayer gaming. [Mira website.](#)

### Lumus

[Lumus](#) creates optical engines that drive augmented reality (AR) solutions, a key component for AR products. Entrepreneur Magazine suggests that the high quality of their transparent OEM displays position could become the 18 year-old Israeli company's technology to be the “Intel Inside” of the next generation of hardware. [READ MORE](#)



### Vuzix Blade

Vuzix Blade, a CES Innovation Award Winner before the show, won a slew of recognition at the show, including:

- TIME - “One of the 10 Coolest Gadgets at CES 2018”
- Rolling Stone - “One of the Best Gaming Gadgets at CES 2018”
- CNET - “Best of CES 2018: Day 1”
- FOX News - “Best Wearable”
- Tom’s Guide - “Best Augmented Reality at CES 2018”
- TechRadar - “Best AR on Show at CES 2018”

The Blade enables a view of the real world while allowing augmented reality content, such as mapping directions, restaurant menus, weather information, event happenings, stock information, video conferencing, sports updates, and more, to be naturally overlaid without holding onto anything or having to deal with the gyrations required for AR to work on a phone.



### Bullish on a Wireless Future for AR/VR

A Digital Hollywood panel at CES 2018 comprised of top AR/VR executives from Google, Unity Technologies, THX, HP and MPC considered the pace of the technologies’ adoption and predicted the progress we’ll see in 2018. Moderator Steve Masur, a senior partner at MG+ tech law firm, noted that many are disappointed with the pace of AR/VR adoption — but he is not one of them. “I think the

industry is just fine,” he said. “A few years ago we thought we’d gain mass consumer adoption, but we have to go through revolutions of adoption.”

To that point, Google head of AR/VR partnerships Aaron Luber reports that the company is in “a big second phase” of VR. “We always said 2018 would be an important year, based on how industry works,” he said. “There’s a great barrier to entry with VR now with headsets. On the low end, it’s the phone, but maybe it drains your battery. We need a dedicated VR headset that you just pick up and be in VR in a few seconds; that’s a huge deal that doesn’t exist today.” [Read more](#)

### **[Gaming is Killer VR/AR App According to Industry Developers](#)**

Although AR/VR experts in another CES panel said that enterprise will be the driver for this nascent field, a group of game designers and producers beg to differ. Gaming is the killer AR/VR app, they believe, with examples and enthusiasm to back up their claim. S&P Global Market Intelligence analyst Greg Potter reports that snap-in headsets (such as Gear VR) are currently leading the pack, due to commodity-like pricing. This platform will increase in 2018 and peak in 2019, as more people look for a better experience. [Read More](#)

## Displays and Image Capture

### **Sony: Artist Intent and Customer Experience**

Sony Corporation president and CEO Kaz Hirai began his solo CES media briefing with the Alpha 9, a mirrorless and completely silent camera ideally suited to shoot at the top of a golf swing or on a quiet soundstage, and continued to celebrate accomplishments across every division, including Sony Pictures, Sony Music, and PlayStation. “If you see the name Sony on any product, content, or service, it symbolizes our promise to move you emotionally,” he said. “Our products are designed to have a personal and individualized place in all of your lives.”

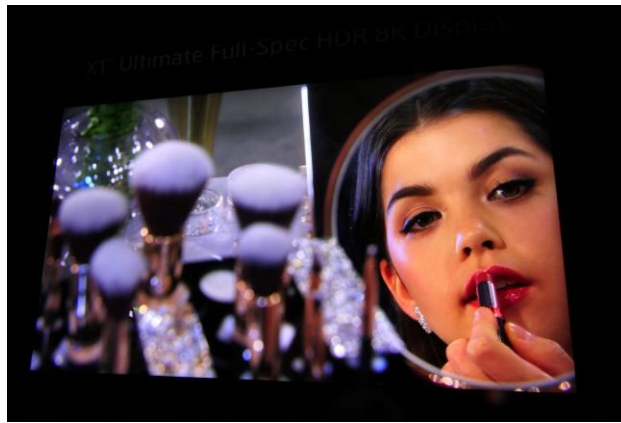
As the market for televisions becomes increasingly commoditized, the most prominent display area in the Sony booth was its line-up of cameras. In addition to the new Alpha 9, Sony showed the latest addition to its RX100 series of ultra-compact waterproof cameras: the RX0 (above). Along with it, the company showed an optional control box that can connect up to 100 RX0 cameras with or without wires and without synchronization to create “bullet time” imagery, VR, and other creative applications.



## *21 - Sony Press Conference*

The combination of audio and television display was seen in the 4K OLED Bravia A8F series that features a 4K HDR image processor X1 Extreme together with Sony's unique Acoustic Surface technology that vibrates the display and enables sound to be output directly from the TV screen. Although this seamless integration of audio and image was available last year in the A1 Series, the new design minimizes the footprint.

Also on display, a prototype 8K display demo driven by the X1 Ultimate next-generation picture processor showed real-time processing of 8K HDR content as well as a peak brightness of 10,000 nits, the highest in the HDR format. The processor seeks to deliver the highest level of picture quality by bringing out the best of both LCD and OLED display panels.



*22 - The Sony X1 is a "Full Spec HDR, 8K Display" with an unequaled brightness level of 10,000 nit.*

Two soundbars, the HT-Z9F and HT-X9000F, both support Dolby Atmos and DTS:X, the latest audio formats. Equipped with Sony's Vertical Surround Engine technology, the front speakers of each model can produce 3-dimensional acoustics all by themselves.

A new Life Space UX product, the LSPX-A1 is a 4K Ultra Short Throw projector that fits seamlessly into any living environment. It will launch in spring 2018 in the U.S.

Sony is incorporating Google Assistant into numerous devices, turning speakers into Home stations.

Sony's own AI discovery prototype, "It's all here," uses AI-enabled content analysis and mapping to display large amounts of music, movies, and books to find the content that piques your interest.



23 - Sony Electronics' New 4K Ultra Short Throw Projector LSPX-A1 from Life Space UX

## COMPANIES, COUNTRIES, AND COMMERCE

### Enabling Platforms

#### Top Platforms, Enabling Technologies Impact CES

Facebook, Amazon, Apple and Google may not all have had big booths at this year's CES, but their presence was surely felt. Google made a huge splash at this year's CES with a booth and several hospitality suites. If Google had been low key in year's past, they were omnipresent this year, especially with its Google Home products, but, given the company's showing at this year's event, it's possible that it will be releasing something new.

For example, dozens of new devices that are "Alexa-enabled" to appear on the show floor. Ever since Amazon Web Services opened up Alexa to the developer community in 2015, voice-enabled devices have really taken off and Alexa has been endowed with hundreds of new "skills." At CES, we saw a wide range of voice-enabled smart speakers and IoT devices, "Made for HomeKit" sensors and devices, more private and hybrid cloud products, and a continued push into VR, AI and live streaming.

Facebook is expanding its Spaces functionality potentially creating the first VR experience at scale. Spaces may prove to be invaluable in previz and production meetings as teams become more geographically dispersed. Further, we expect to see many products that simplify the process of live streaming, which Facebook will be pushing more heavily in 2018.



24 - LG ThinQ 8K HDR OLED ultra-thin panel, which is bonded on transparent glass, doubles as a fine art display.

Apple (which, sadly, has always eschewed CES) will not be there again this year. However, there should be plenty of “Made for HomeKit” sensors and devices that work on the Apple platform. LG will also be showing its latest full Thunderbolt 3 monitors. These monitors will come in both 32-inch (4K) and 34-inch (5K) UltraWide options.

Other enabling technologies to note for this year’s CES: Intel is going head-to-head with Nvidia on AI with its newly announced Nervana chipset and Movidius Neural Compute Stick, and we may see some early implementations. In addition, Intel will be releasing its new Core H processor that combines CPU, graphics and RAM all in a single module. This should lead to even smaller devices or existing devices (like laptops) that will use the extra space to include things like larger batteries.

Finally, while we also expect to see larger and faster private cloud and hybrid cloud devices at CES, they will likely be consumer grade and therefore less relevant for production uses. However, we continue to evaluate cloud storage as a key component of any production in the cloud workflow.



25 - Paramount Pictures chairman and CEO Jim Gianopulos (left) and Intel CEO Brian Krzanich (right) celebrate the companies' partnership to explore what's next in entertainment content

## Samsung: Everything Connected and Smart

Samsung wants to be everywhere. The company’s CES 2018 media briefing led by Tim Baxter, president and CEO of Samsung North America, demonstrated Samsung’s strategic focus on connecting almost every aspect of its customer’s life. When they lifted the black curtains that protected Samsung’s entire

Central Hall exhibit before the floor opened, visitors could see the evolution of the tech giant's product line from the living rooms to living spaces. An R&D investment of \$14 billion has accelerated an IoT strategy and the promise that all Samsung products will also be "Smart" by 2020.

"The real value to consumers is when devices enable consumers to do more. Less complexity. More simplicity," said Baxter.



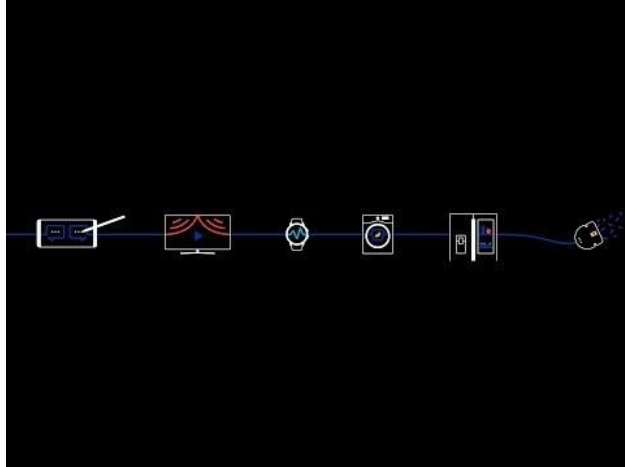
The 2020 timeframe represents a new marker for the company, which is two years ahead of schedule on a promise to make all of its products IoT-ready by 2020. Ninety percent of its products already are.

Samsung is one of the leading companies in the Open Connectivity Foundation (OCF), a 397 member-company organization dedicated to providing specifications that leverage existing industry standards and technologies, provides connection mechanisms between devices and between devices and the cloud, and manages the flow of information among devices, regardless of their form factors, operating systems, service providers or transports.

A center of Samsung's strategy is SmartThings, an ecosystem of interoperable products and services that are now further connected with the SmartThings Cloud that was announced at CES.

SmartThings extends beyond the home and into the car now that Harman, the automotive component company that Samsung acquired in March 2017, will join the SmartThings ecosystem with products installed in connected cars.

Together, Samsung and Harman are looking ahead to autonomous vehicles and the rollout the advancement of 5G, and envision all devices working together with an Intelligent Cockpit.



Samsung, now the #1 television brand, announced a new universal guide search function personalized to a viewer's taste. This is achieved by installing Bixby, the company's AI-enabled assistant into all new televisions.

This plus SmartThings technology makes the TV the dashboard for the Smart Home. The company demonstrated a simple set up process that can be accomplished through the customer's mobile device, whether Android or iOS.

Samsung's MicroLED non-emitting television screen won a CES Best of Innovation Award, is modular in design and can be configured in virtually any size imagined.

The Family Hub — the screen-equipped-refrigerator door that was a curiosity when first shown in 2016 — now includes 14 products that can be integral to a connected lifestyle.

The media briefing also highlighted the latest Gear 3 and 4 wearable products, new tablets, Chromebooks, and PCs, including a 2.2 pound Samsung Notebook 9 Pen. Samsung also presented its re-imagination of the modern meeting in The Flip, a new smartboard that facilitates high levels of collaboration and sharing functions.



26 - Samsung's The Wall at CES 2018

## Nvidia

In a roving two-hour presentation, Nvidia CEO Jensen Huang unveiled a raft of products, partnerships and performance achievements at CES 2018. Focusing mostly on the automotive industry, Huang showed off the GPU giant's new autonomous driving software stack powered by Xavier, a system-on-chip (SoC) for artificial intelligence-empowered car platforms, and touted partnerships with more than 320 car and truck companies. Huang also showcased a large HDR display for giant-screen, PC gaming and streamed an AI-generated motion picture theme composed in the style of "Star Wars" by John Williams.



Xavier is designed to process data from a vehicle's radar, cameras, lidar and ultrasonic systems with a stunning increase in efficiency and a significantly smaller form factor than anything else on the market.

It sits at the center of Nvidia's trio of automobile platforms covering every aspect of the next-generation automobile experience: Drive AV, which uses neural networks to enable cars to drive themselves; Drive AR, which fuses AI, computer vision and computer graphics to deliver information points, alerts and navigation aids in AR; and Drive IX, which gathers sensor data to enable AI assistants for drivers and passengers.

Xavier features more than 9 billion transistors with a custom 8-core CPU; a 512-core Volta GPU; an 8K, HDR video processor; and deep-learning and new computer-vision accelerators.

According to Huang, the SoC performs 30 trillion operations per second using only 30 watts of power, a mere 10 percent of the previous generation's 300-watt requirement. "The more you buy the more you save," the affable CEO joked numerous times.

Among the new relationships that Huang announced at CES's opening press day were partnerships with Uber to bring Nvidia's AI computing systems to the on-demand car company's fleet of self-driving vehicles and with technology companies Baidu and ZF to build production-ready, AI autonomous driving platforms for China.

Volkswagen CEO Herbert Diess joined Huang on the stage to celebrate the German car manufacturer's adoption of Drive IX as an AI co-pilot.

A slice of the evening was devoted to gaming, most notably to the launch of a 65-inch, 4K, 120Hz, HDR display with Nvidia's advanced streaming technology dubbed BFGD (big format gaming display).

With less fanfare, Huang also highlighted impressive advancements in the speed and performance of image recognition technologies; the creation of Generative Adversarial Networks (GANs) generated human characters; audio-driven facial animation; and AI music composition.

Also relevant to entertainment content creation was Nvidia's partnership with Disney to train an AI to compose an orchestral piece like Academy Award-winner John Williams. "We laid John Williams' style on top of a platform trained to compose like Bach and Beethoven," Huang explained.



## Global Startups

Eureka Park, where some 1,000 start-ups and early stage companies vie for attention, gathered more companies under national and regional banners.

HRH Prince Constantijn of the Netherlands, Business France's Pascal Cagni, and IBM Global Technology Services CTO Bridget Karlin discussed how countries and companies around the world leverage capital, talent and the markets to gain an edge in today's global innovations. In a conversation at CES 2018 led by Time Inc. chief content officer Alan Murray, both Europeans were quizzed on how their countries create an entrepreneurial culture. Prince Constantijn pointed to his country's focus on tech education and open migration policies.

"We didn't start from zero," he said. "We already had an entrepreneurial culture, but we strengthen the talent pool by teaching coding in school. Starting a year-and-a-half ago, we put a program in place where any startup, if it gets a place in an accelerator, gets a visa to work in the Netherlands. About 1,000 people have used it already."



Cagni (above, left) noted that France has made itself a culture focused on innovation by "setting the tone." "A few years back, if you were a young student, the model was to become a civil servant," he said. "Over the last five years, the number of young people who want to be entrepreneurs grew from 10 percent to 50/60 percent."

France now offers a visa system for a startup's founder and his partner, and offers tax incentives. "That has made France one of the most competitive places for development," he said.

To a question about how new U.S. immigration policies have impacted companies, Karlin (above, right) replied that IBM, with operations in 170 countries, can find its talent nearly everywhere in the world. “Innovation is really everywhere,” she said, noting that IBM has 3,000 researchers on six continents. “IBM will comply with new U.S. immigration policies, but to my knowledge it hasn’t impacted our company.”

Murray asked if the Netherlands and France compete with big companies. “Everybody is competing for money and talent,” said Prince Constantijn. “But we see a counter movement away from Silicon Valley with its high cost of living. Giant companies also commoditize products, which lets other developers get involved.”

Karlin said that IBM “competes and partners with all those companies.” IBM chief executive Ginni Rometty noted that 80 percent of the data in the world is in closed systems; Karlin added that companies hold 80 percent of the data, which is their competitive advantage.

Murray pointed out that Europe has taken a much stricter stance on data protection. Cagni added that, “China has paid no attention to that, which is why they were able to build such an amazing business. How do you compete? We won’t regulate but define the frame that allows people to function safely.” Prince Constantijn added that, “smaller and medium-sized companies will find it harder to be compliant with regulations.”

In the U.S., said Karlin, “we would want to encourage policymakers to make policies that promote openness and transparency.” Regulation is difficult since the technology changes so quickly, added Prince Constantijn. “You need to push the conversation between industry and governments.”

### **How Social, Mobile Are Transforming Entertainment Marketing**

“The perfect companion for mobile is social,” said Facebook head of industry, entertainment division Gwen Throckmorton during a CES 2018 panel. “Match that with entertainment, and the combination yields a variety of opportunities. What we see is that, through stories, people are looking to find meaning, connect and share.” A group of marketers, moderated by Deloitte Consulting managing director Rob Aitken, examined the parameters of social as a factor in marketing, and one panelist stressed it begins with mobile.

“You can’t underestimate that it starts with mobile,” said BBDO New York chief marketing officer Tara DeVeaux. “It’s less about short versus long format and more about understanding consumer behavior. Then we have to do all of it and be great at all of it.”



*Business Insider* chief revenue officer Pete Spande noted that people are already consuming more hours than there is in a day — 33 to be exact — due to multitasking. He agrees with DeVeaux's assessment of mobile. "Once we discovered the phone had an app experience, it was additive," he said. "We're now at a pace where it's an attention *share* battle."

Throckmorton added that, "it's shifted from time spent to time well spent."

J. Walter Thompson Atlanta chief operating officer Spence Kramer reports that format and style are constantly changing. "All these changing formats and norms are taking place at the same time," he said. "It's extremely challenging for creators, consumers and advertisers." Spande agreed, saying "social platforms have a fast metabolism when it comes to iterating products."

"I could argue sometimes too fast," he said. "It's hard to optimize on a platform that itself is optimizing." Throckmorton added that, "as new formats emerge, people will challenge the way engagement is measured."

Shareable chief executive Tania Yuki noted that, "our mission as marketers and content creators is to find underserved audiences or unmet interests and craft content to meet those needs." "It's why you see micro-content creators doing well," she said. "But how to take this information and craft it into great content on the fly is still a big challenge."

Influencers don't work well by simply regurgitating messages, said the panelists. "The influencer is more about how to behave," said Kramer. "People watch to learn how they can become a mini-influencer." DeVeaux said that the influencer's role is "to introduce Brand X to a new audience or communicate value to that audience."

"But the brand needs to do work to be entertaining or useful to that audience," she said. "If they're not doing that and relying heavily on the influencer, then you do get into trouble if that influencer gets into trouble."

Asked for their "bold predictions" for 2018, Spande said we'll see a "Blair Witch" moment "that changes how people think about marketing on social." "We haven't seen it yet but we will," he promised. Yuki believes, "there will be no further delineation between watching full format on social media or TV."

"We'll really embrace that programs can be launched and consumed in their entirety on social," she said. Kramer countered that he's a believer in large-scale entertainment, and Throckmorton believes Messenger will "fundamentally change how we communicate."

"I think that we have just scratched the surface of social being used as a catalyst to drive change," concluded DeVeaux. "We would never have imagined that a hashtag would completely transform how Hollywood behaves, but it's done that and it's just the beginning."

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Rob Scott, ETCentric Editor

Don Levy, Communications + Publishing Manager

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Yves Bergquist, Project Director, Data and Analytics

George Gerba, Consultant

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Philip Lelyveld, Project Director, Immersive

Experiences Seth Levenson, Project Director, Cloud

Erick Moen, PhD, Consultant

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### Administration and Production

Edie Meadows, CAO + Program Manager

Eileen Zuniga, Administrative Assistant

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