

# AUSTIN FORUM

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ON TECHNOLOGY & SOCIETY

*Connect. Collaborate. Contribute.*™





## **Top Tech Trends for 2020 (and Beyond)**

*January 7, 2020  
Austin Central Library*



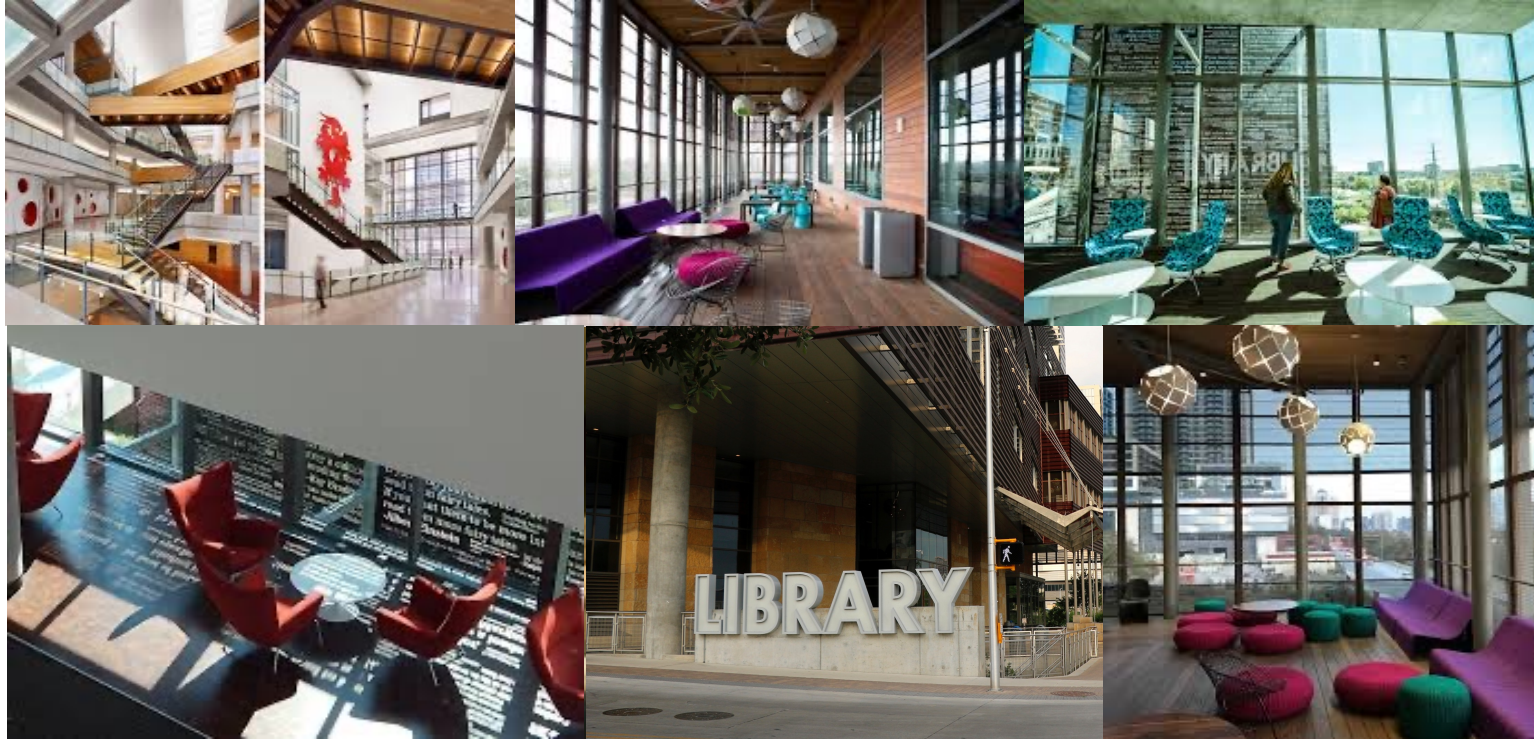
**Jay Boisseau**  
Austin Forum  
Dell Technologies  
Austin CityUP  
Vizias



**Jay Williams**  
Quantum Materials Corp  
Williams Technology  
Group

***Welcome!***

# Thanks to the Austin Central Library!





# Our Annual Partners Make This Possible!



arm



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AUSTIN TECHNOLOGY COUNCIL



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slalom



SXSW

# Welcome Marie, Slalom, Kirsten!



Marie Todd  
*Slalom Consulting*

slalom



Kirsten Billhardt  
*Dell Technologies*

# AUSTIN FORUM

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on Technology & Society

# We Are Passionate About Technology Influence & Impact on Society



***Connect! Collaborate! Contribute!***

# Austin Forum Events: Expert Presentations to Inform & Inspire

We bring leaders, thinkers, builders, creators, and learners together to [connect, collaborate, contribute!](#)



5:15-6:15

early networking in lobby

**6:15-7:45**

**presentation and Q&A**

**7:45-8:15**

**networking and discussion**

8:15-?

discussion, drinks, and pizza at *Trifecta on 3rd*



**AUSTIN FORUM**

ON TECHNOLOGY & SOCIETY

@AustinForum  
#techtrendsAF

# Join Us for Great Events in 2020!



## Coming up this year:

- **Health Tech**
- **Tech & Art**
- **Creating tech startups**
- **Tech & food**
- **Gaming**
- **AI**
- **Military/Defense Tech**
- **and much more in 2020!**



# More Great Content:

## Austin Forum Upload & Austin Forum Update!



<https://medium.com/@AustinForum>



*Help us share the Austin Forum goodness with everyone!*

Remember to tweet!  
**#techtrendsAF @AustinForum**

Questions for speakers?  
<https://www.sli.do> in browser  
or download the [sli.do](https://www.sli.do) app!  
Use event code **#techtrendsAF**



# SXSW

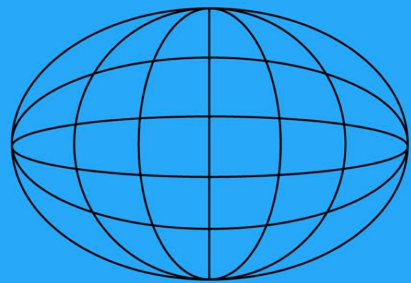
Use [sli.do](https://sli.do)  
to submit questions  
and maybe win a  
SXSW badge!

To win, you must :

1. Post your *questions* in [sli.do](https://sli.do) using event code **#techtrendsAF** , and providing your name
2. Be registered and be present
3. Follow AF and SXSW on some social media (Facebook, Twitter, etc.)

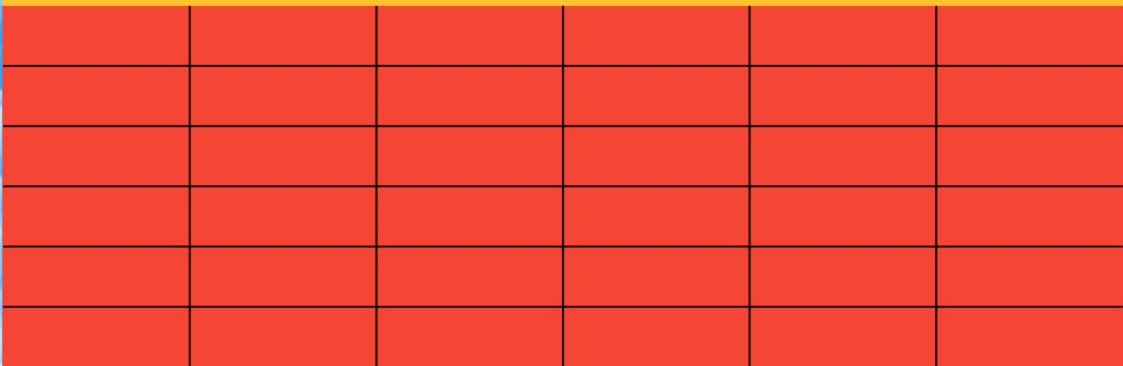
# SXSW

# 2020



AUSTIN •

MARCH 13 - 22 •





# A FEW OF TRENDS & THEMES AT SXSW

- Election 2020 will be an underlying theme in March
- The ongoing impact and effects of techlash
- Startup innovation in numerous different verticals
- Diversity and inclusivity across all industries
- Lots of attention to climate action
- Ever-evolving impact of games on culture and society
- More space-related content than ever (March 18-20)
- Continued focus on emerging cannabis industry
- Continued strong focus on all things international



# IMPORTANT SXSW DATES AND LINKS

- More about trends & themes at [sxsw.com/conference](https://sxsw.com/conference)
- Browse online schedule at [schedule.sxsw.com](https://schedule.sxsw.com)
- Next big programming announcement is Mon, Jan 13
- Next registration deadline is Fri, Jan 17 / save \$250
- Link for registration information is [sxsw.com/attend](https://sxsw.com/attend)
- Application deadline for SXSW Release it is Fri, Jan 17
- First Austin Meet Up is Wed, Feb 5 at Mexic-Arte
- Sign up to volunteer at [volunteer.sxsw.com](https://volunteer.sxsw.com)
- Send all SXSW questions to me at [hugh@sxsw.com](mailto:hugh@sxsw.com)



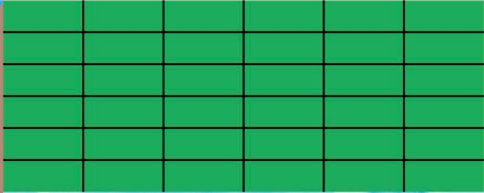
**SXSW** ↙



**20**



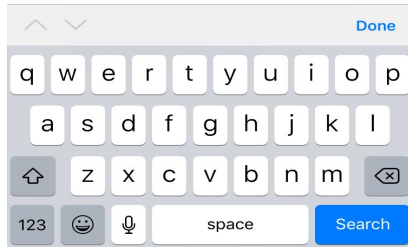
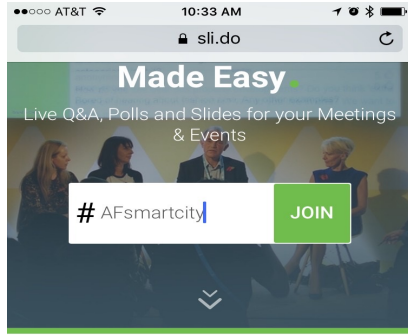
**20**



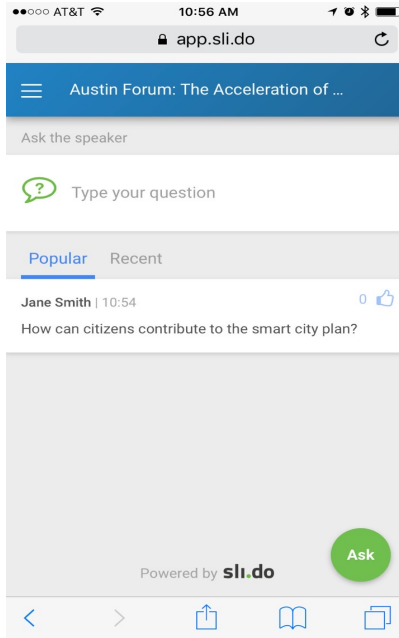
AUSTIN

• MARCH 13-22

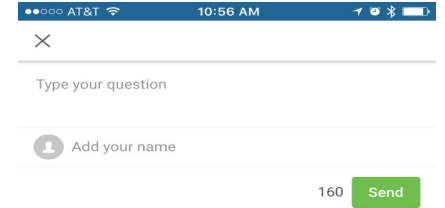
# Using sli.do from your smartphone is easy!



Enter hashtag **#techtrendsAF**



Type your question/comment



Add your name

# And now, our featured presentation...

## Please:

- ✓ Silence your devices
- ✓ Hold conversations until the networking session
- ✓ Share key points via Twitter ([#techtrendsAF](#) [@AustinForum](#))
- ✓ Share questions via Sli.do ([#techtrendsAF](#), and *your name*)
- ✓ Learn, think, enjoy!



## **Top Tech Trends for 2020 (and Beyond)**

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# Why Is This Event Important?

- Technology, data, and knowledge are increasingly rapidly (see next slides)
- Importance of learning/adopting new technologies faster is increasing rapidly: compete, survive, thrive!
- The needs to solve global human problems—health, safety, food, housing, education, and opportunities for all—is fundamental and persistent
- **Awareness, understanding, and context** can lead to **familiarity, prioritization, learning, adoption, and impact!**
- So, tonight we will attempt to inform and inspire you to:

*connect, collaborate, contribute!*

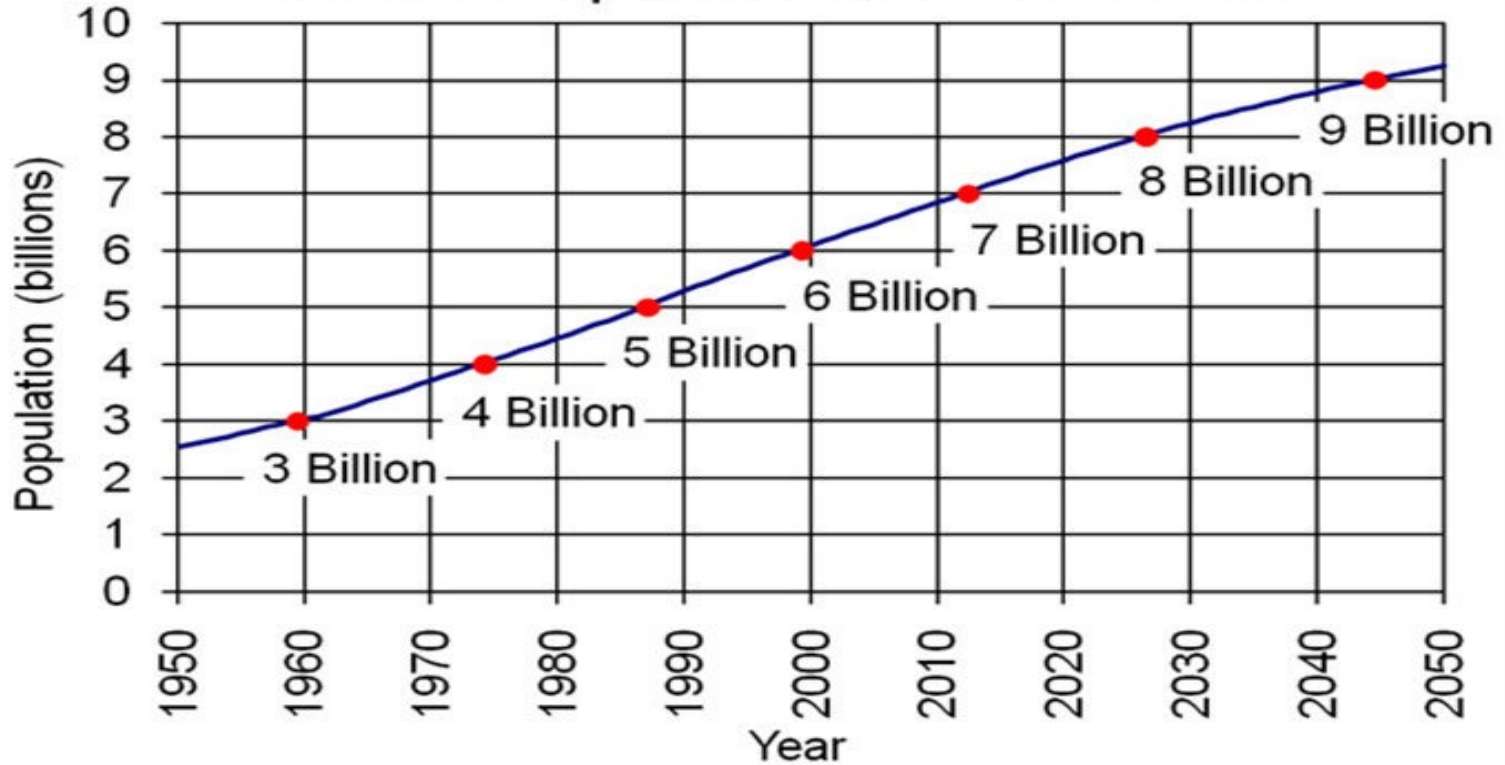


# What We Will NOT Achieve

Tonight, in 50 minutes, we will **not**:

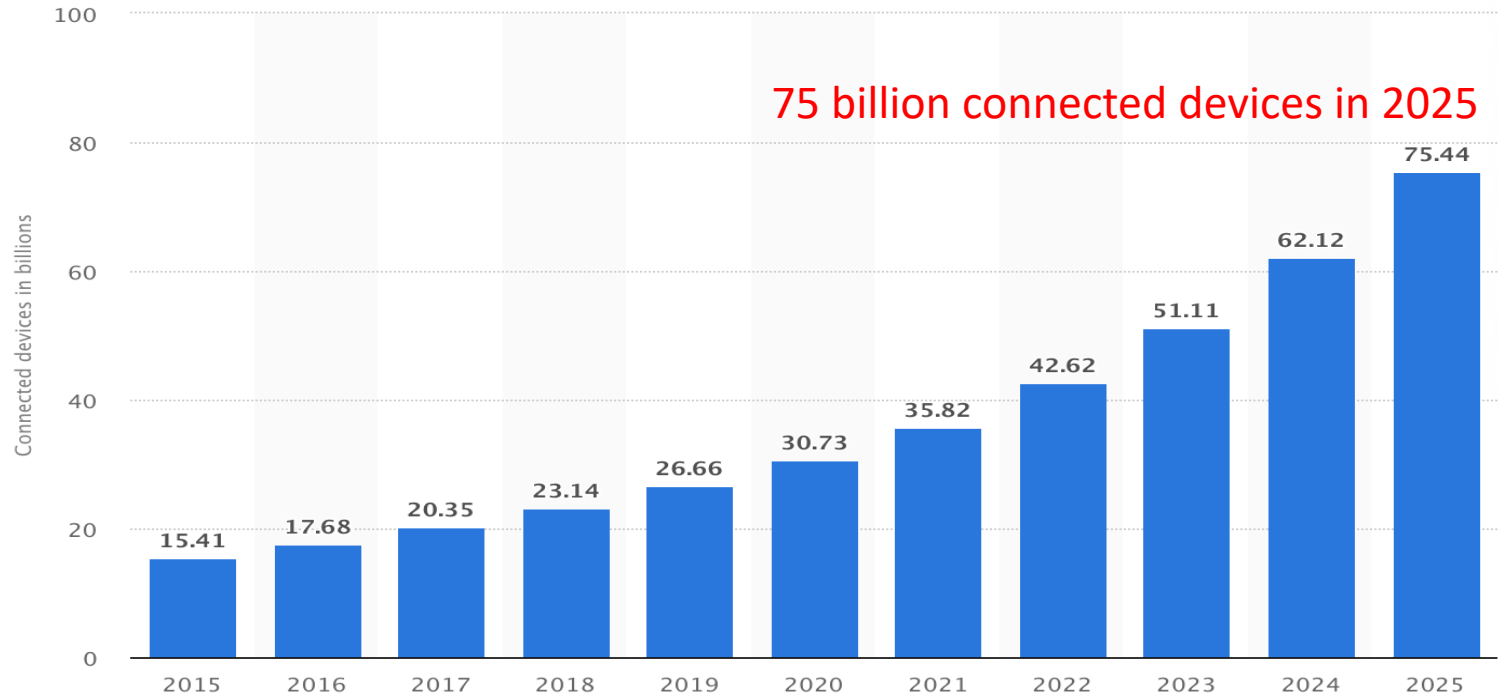
1. provide expert-level understanding of technologies,  
BUT we will cover everything in dedicated events & blog posts later in 2020!
2. cover every emerging, important technology  
BUT we will cover our top ones, and many others later in 2020!
3. provide sound investment guidance 😊  
BUT we hope you will be inspired to learn more and be successful
4. provide policy opinions 😊  
BUT we'll be at Trifecta after the event with beer & whiskey....

# World Population: 1950-2050



Source: U.S. Census Bureau, International Data Base, December 2010 Update.

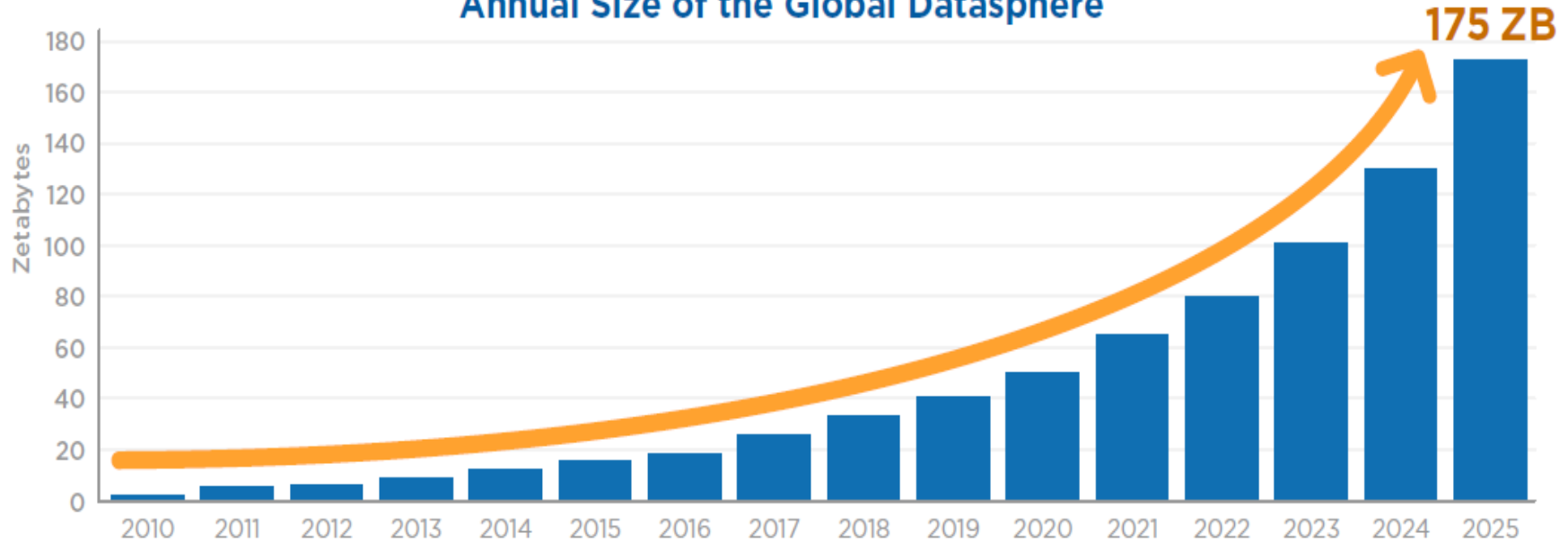
# The Power of Exponentials: Devices



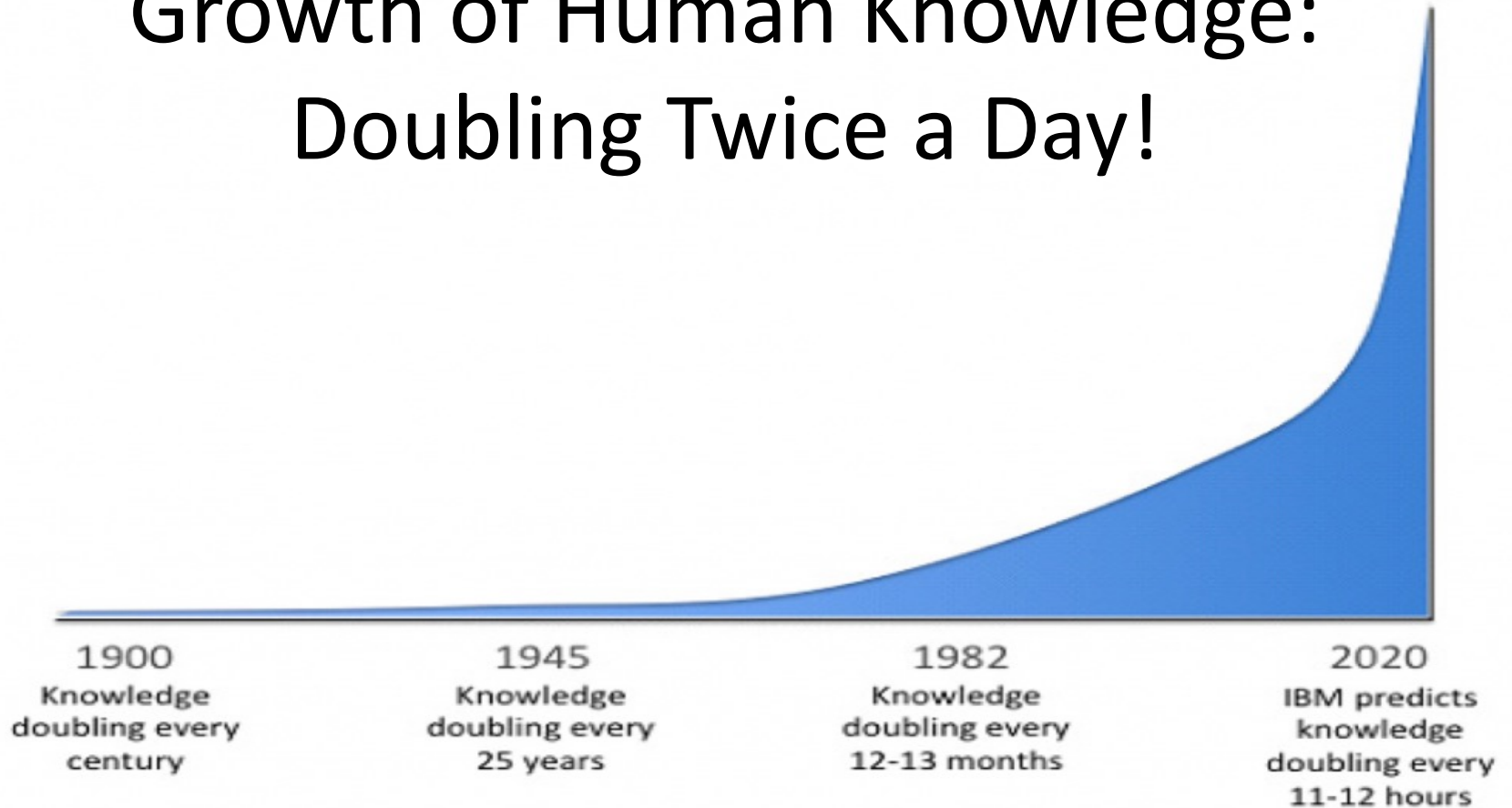
# The Power of Exponentials: Data

175 zettabytes of data in 2025

Annual Size of the Global Datasphere

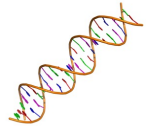


# Growth of Human Knowledge: Doubling Twice a Day!



# Top Tech Trends

- **Cloud computing** *matures*, scales further, integrates more
- **AI acceleration** continues, more impact on business, lives
- **Edge computing** solutions *realize financial benefits* in enterprise, alter corporate IT strategies, and eventually leads to the **IoT**
- **Blockchain (distributed ledgers)** *proves its value*
- **Cybersecurity** market explodes to protect data & identify, not just IP
- **Quantum** technologies *achieve broad awareness*, massive investment, early niche success (broader success in 2020s)
- And of course, **5G** is built into every leading smartphone, but most important apps are 2021+
- **AR** and **VR** have ups and downs, but AR in particular finds some sustainable successes
- And I remain hopeful for **gene editing** and precision drugs...





# Technologies vs. Applications

- Core technologies rarely change society individually: usually many technologies are integrated into applications
  - e.g. AI, advanced imaging, HPC simulation, gene editing: **precision healthcare**
- We love technologies, but we care about health, safety, education, business, mobility, finance, society
- Integrated combinations of these technologies are what change our lives and world



# Some Key Tech MEGA-Trends

# AI: Leaders Are Proclaiming Disruption, Revolution!

“AI is the most far-reaching technological advancement in our lifetime. It changes every industry, every company, every thing.” – Jen-Hsun Huang, Nvidia CEO

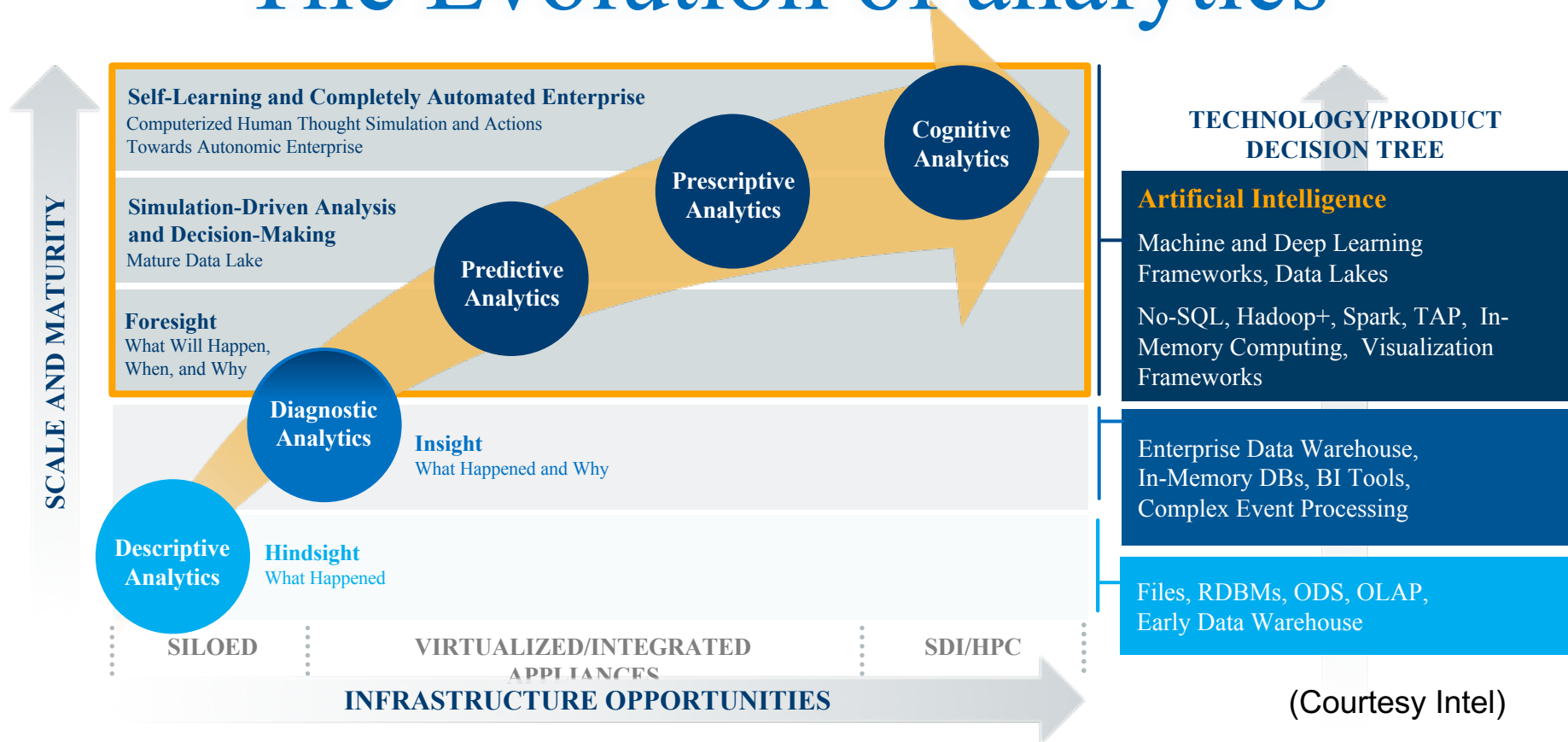
“Just as electricity 100 years ago transformed industry after industry after industry, I think AI powered by deep learning will now do the same... It’s hard to think of an industry that will not be transformed by AI in the next decade. ” – Andrew Ng, former Baidu Chief Scientist



*“When you get all this data coming in from hundreds of billions of connected devices and apply to that artificial intelligence, it’s almost like a fourth industrial revolution and an incredible opportunity for companies to re-imagine themselves in this digital age....**The last 30 years have been incredible in IT, but the next 30 years will make it look like child’s play.**”*

– Michael Dell, Sapphire SAP Conference May 16<sup>th</sup> 2017

# The Evolution of analytics



# AI: Machine Learning & Deep Learning

**Artificial Intelligence** is the broader concept of machines being able to carry out tasks in a way that we would consider “smart”.

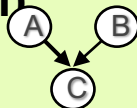
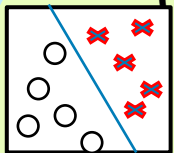
**Machine Learning** is an approach in which we enable computers make decisions without explicit programming: ***we use data to train a model which can then be used to make inferences, predictions, etc.*** (probabilities).

**Deep Learning** is an area of Machine Learning that uses neural net algorithms for training the model using massive data.

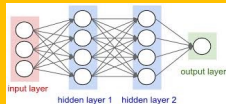
A **Neural Network** is a computer system designed to work by classifying information in the same way a human brain does. It can be taught to recognize, for example, images, and classify them according to elements they contain.

**Artificial Intelligence**

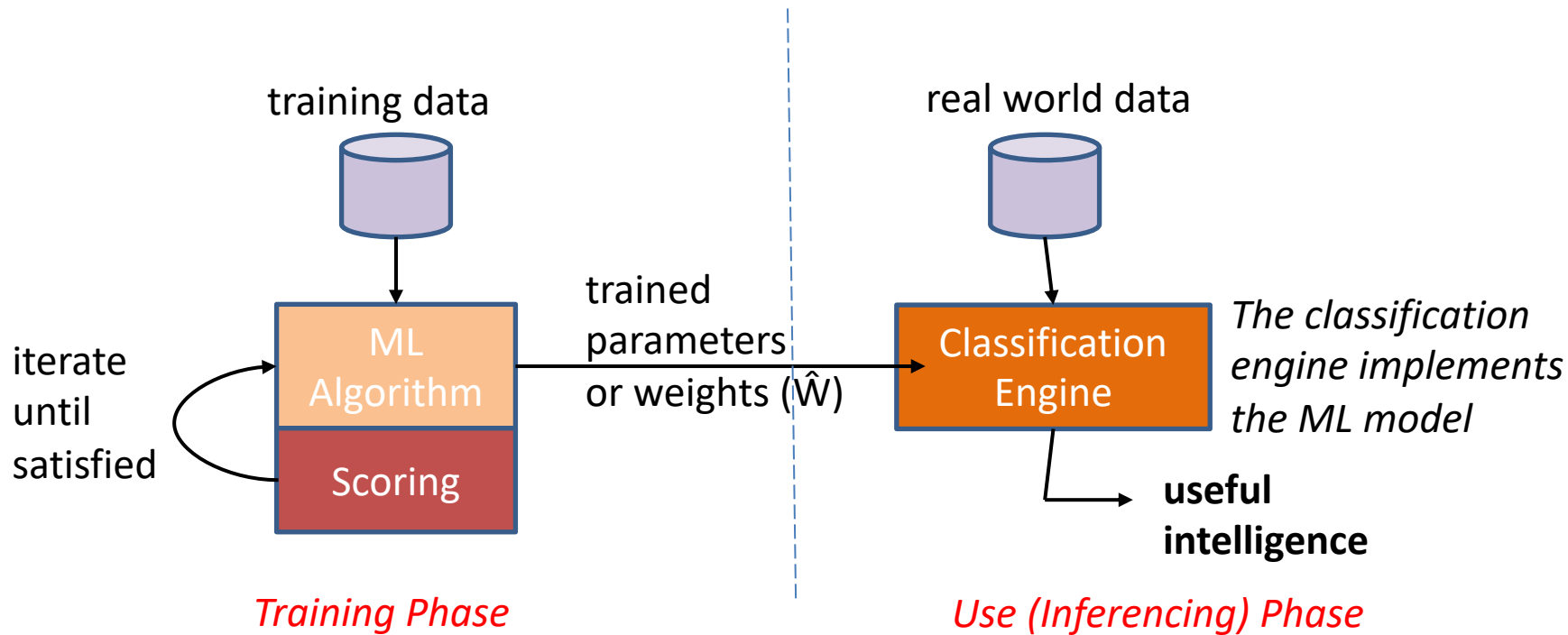
**Machine Learning  
(Statistical)**



**Deep Learning  
(Neural Networks)**

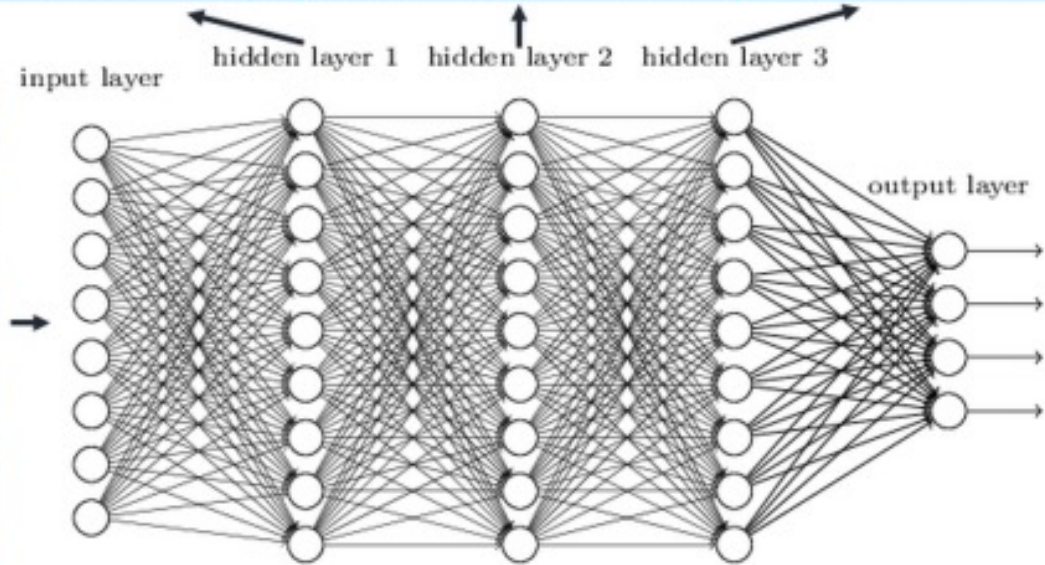


# The Machine Learning Process



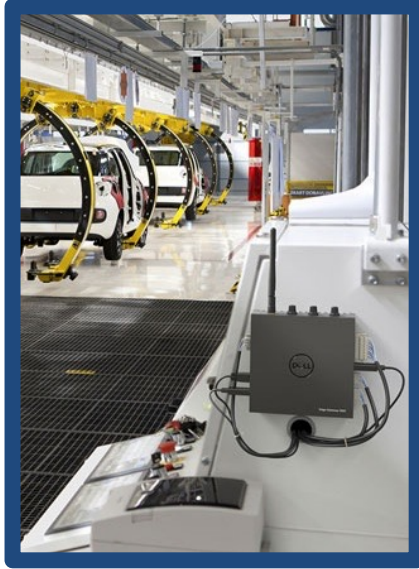
# Deep Neural Networks Learn Features in Layers

Deep neural networks learn hierarchical feature representations





# Data Occurs Everywhere: The World has Many Edges






# DATA CENTERS/CLOUDS

**DECISION MAKING**

DEEP LEARNING



REAL TIME

**INFRASTRUCTURE MANAGEMENT**

DATA CENTER/CLOUD



EDGE



Million OF DEVICES

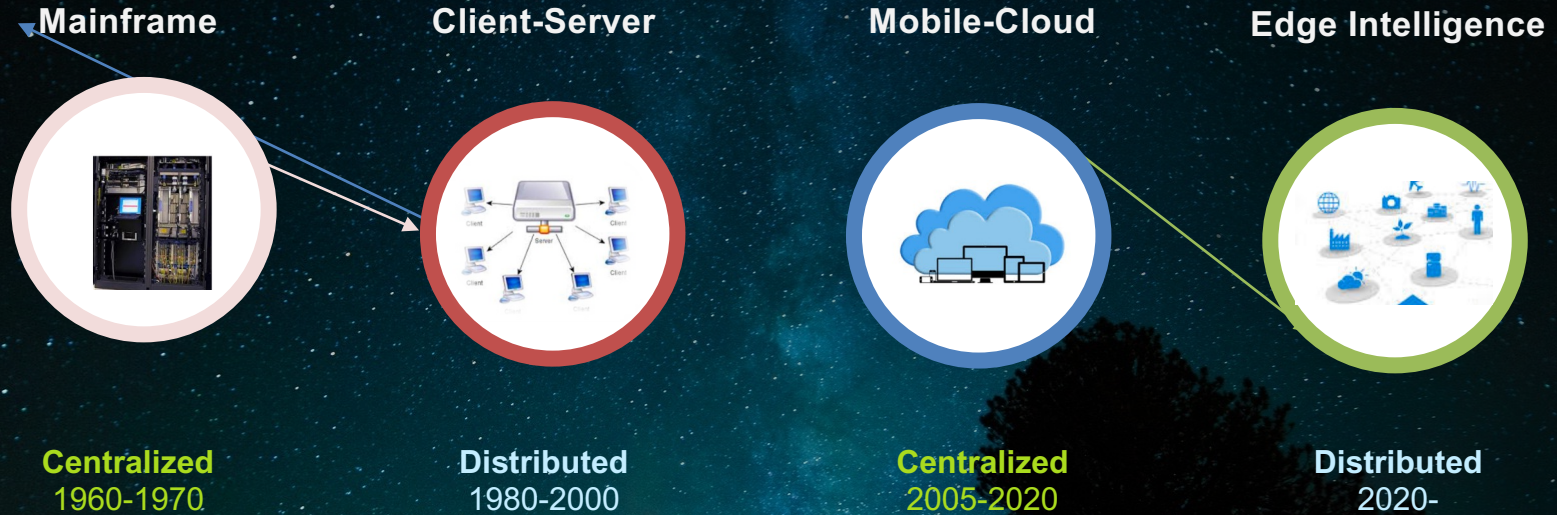


BILLIONS OF DEVICES



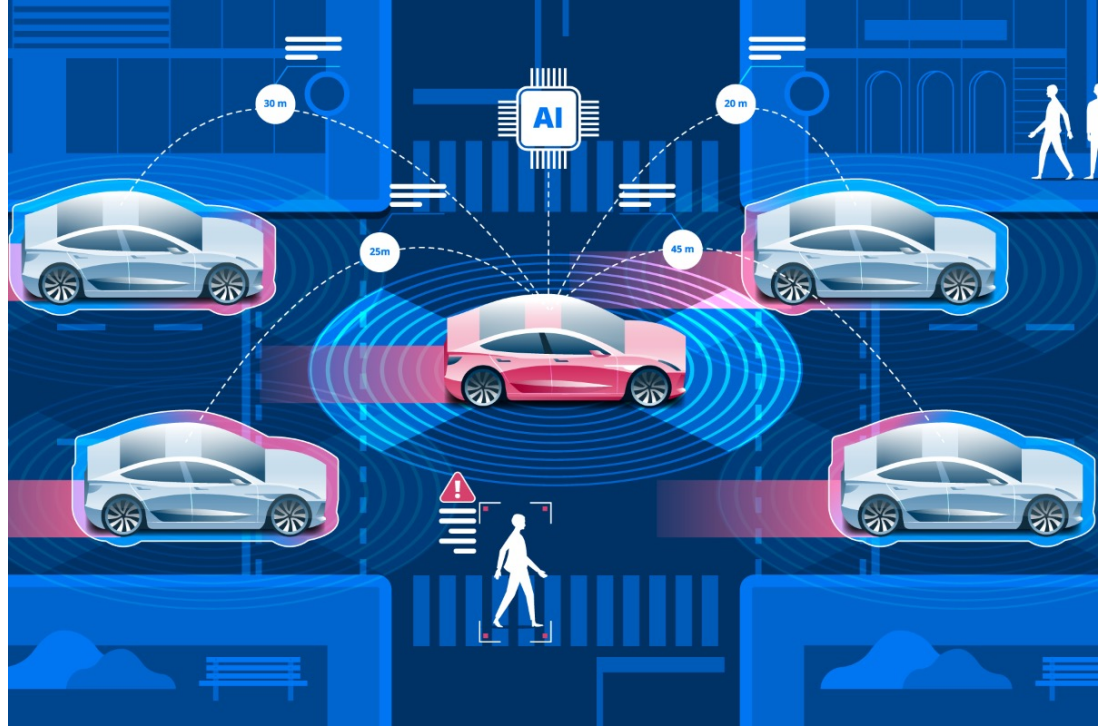


# The Inevitable(?) Shift to the Edge



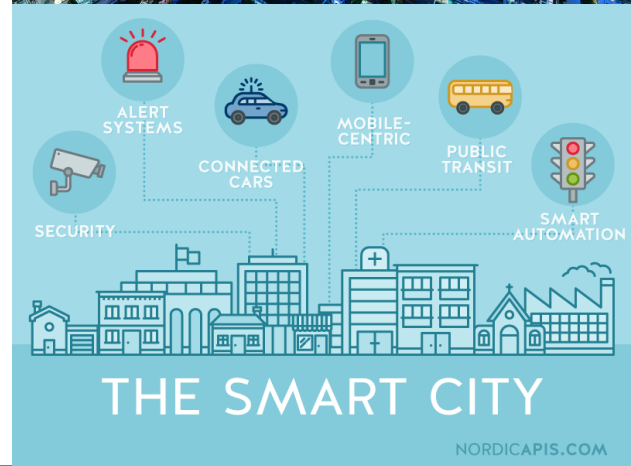
# Autonomous, Connected Vehicles are the Future of Mobility

- Human drivers stink: over 90% of accidents caused by humans
- AI systems including cars get better, and better, and better... it's not IF but WHEN!
- Other vehicles, pedestrians, road conditions, weather, etc. can be sensed, analyzed, and communicated to every AV (with AI, edge computing, 5Gm, etc.)



# Smart Cities: Bringing it All Together

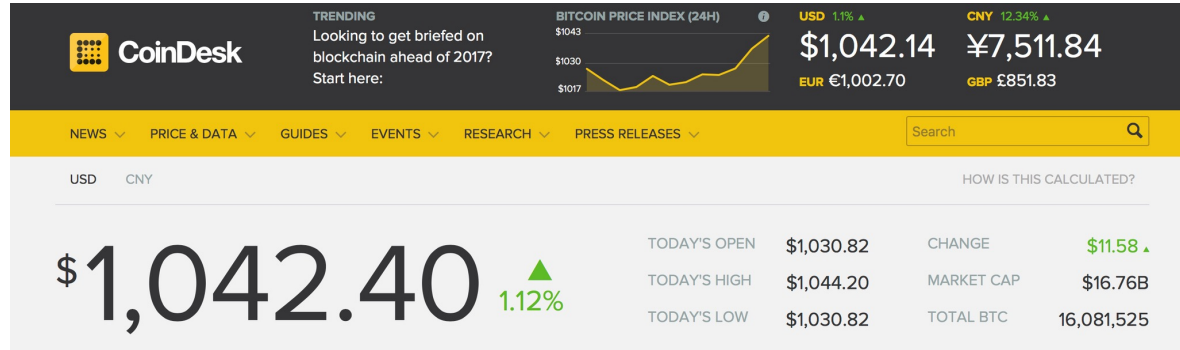
- Smart cities efforts in the future will include very large scale AI and simulation (cloud), with data collected (IoT), acted on (edge computing), and secured (blockchain)
- E.g. smart transportation
  - Smart traffic level 1: change signals based on current traffic
  - Smart traffic level 2: use historical data for day, time, etc. to adjust for patterns
  - Smart traffic level 3: include simulations of events, weather, etc. to further refine signal optimization
- Smart cities in the future will use predictive analytics *and* predictive simulations to optimize traffic, safety, energy and water utilization, and more



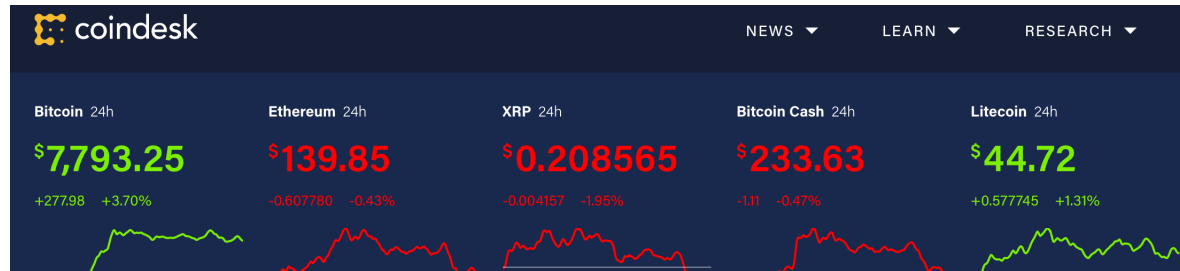


# Cryptocurrency Yesterday and Today

Austin Forum  
January 2017



This Morning



# Where did the Blockchain Go?

## 2013: Ethereum – Vitalik Buterin

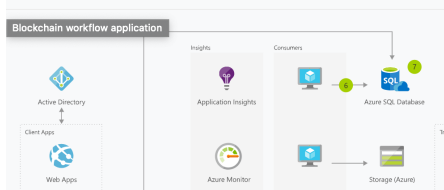
- “Blockchain with a built-in programming language”
- “Consensus-based globally executed virtual machine”
- Contracts in Turing complete programming language EVM
- Execution and storage use “gas”
- Summer 2014 presold more than \$15 million Ether



- A **blockchain**,<sup>[1][2][3]</sup> originally **block chain**,<sup>[4][5]</sup> is a growing list of **records**, called *blocks*, that are linked using **cryptography**.<sup>[1][6]</sup> Each block contains a **cryptographic hash** of the previous block,<sup>[6]</sup> a **timestamp**, and transaction data (generally represented as a **Merkle tree**).
- By design, a blockchain is resistant to modification of the data. It is "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way".<sup>[7]</sup> For use as a **distributed ledger**, a blockchain is typically managed by a **peer-to-peer** network collectively adhering to a **protocol** for inter-node communication and validating new blocks. Once recorded, the data in any given block cannot be altered retroactively without alteration of all subsequent blocks, which requires consensus of the network majority. Although blockchain records are not unalterable, blockchains may be considered **secure by design** and exemplify a distributed computing system with high **Byzantine fault tolerance**. **Decentralized** consensus has therefore been claimed with a blockchain.<sup>[8]</sup>

# It's Everywhere!

EXPLORE AN INTERACTIVE MAP OF THE TRADELENS PORT AND TERMINAL NETWORK



## Hyperledger Fabric on SAP Cloud Platform

Create hyperledger fabric nodes and connect them to a blockchain network.



### Intuitive user experience

Create nodes, networks, and channels on an intuitive, cloud-based user interface with limited blockchain experience.

### IT landscape transparency

Use service and network dashboards to view and analyze existing chaincode, related transactions, and logs.



# DIGITIZING THE GLOBAL SUPPLY CHAIN

TradeLens is an open and neutral industry platform underpinned by Blockchain technology, supported by major industry players.

TOUR

## Oracle Blockchain Platform Enterprise Edition 19.3 is now available

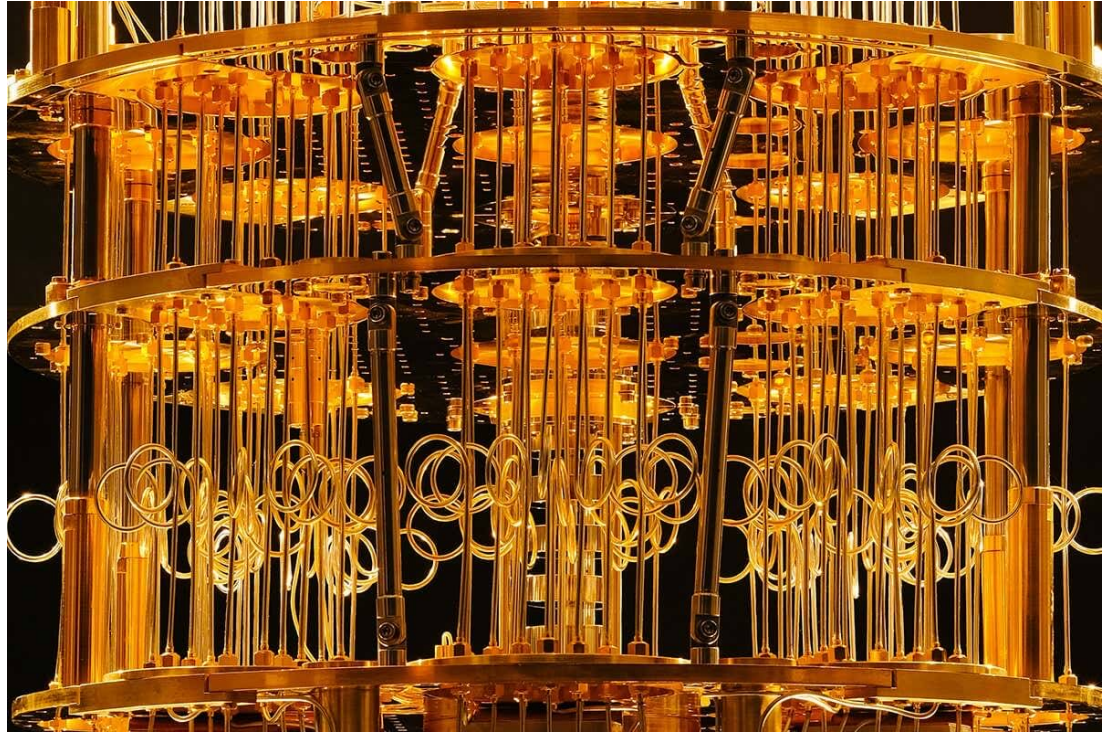


Some customers operate in industries and countries where in order to meet the data sovereignty or data residency requirements they can't deploy their blockchain instances on Oracle Cloud. Oracle Blockchain Platform Enterprise Edition gives them a pre-assembled platform for building and running smart contracts and maintaining a tamper-proof distributed ledger using an independently-installable version of Oracle Blockchain Platform built on Docker containers and delivered as a pre-built VM image for multiple virtualization options.

Learn more about Oracle Blockchain Platform Enterprise Edition 19.3

# Quantum Things

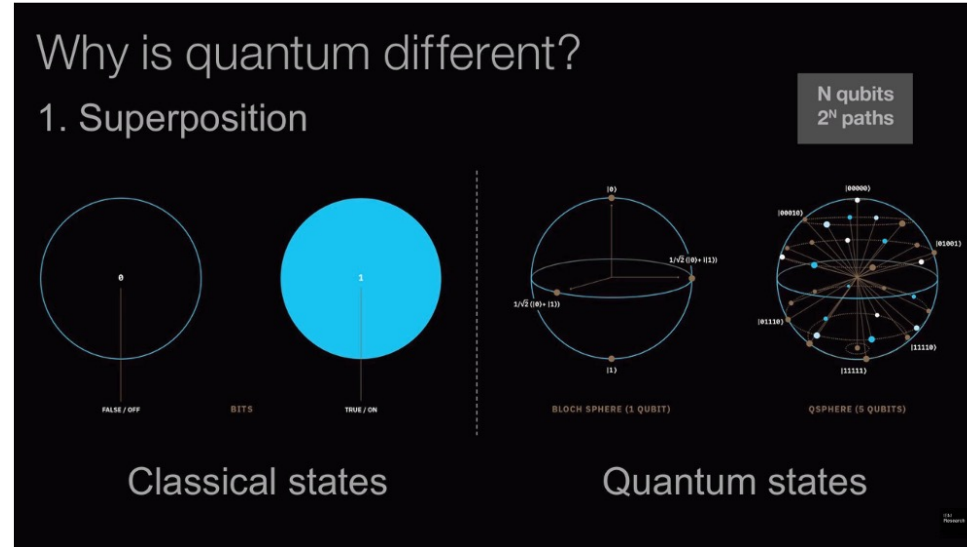
- Quantum Computing
  - Crypto
  - Chemistry
- Quantum Dots
  - Anti-Counterfeiting
  - Solar
- Quantum Sensors
  - Chemicals
  - Healthcare





# How do Quantum Computers Work?

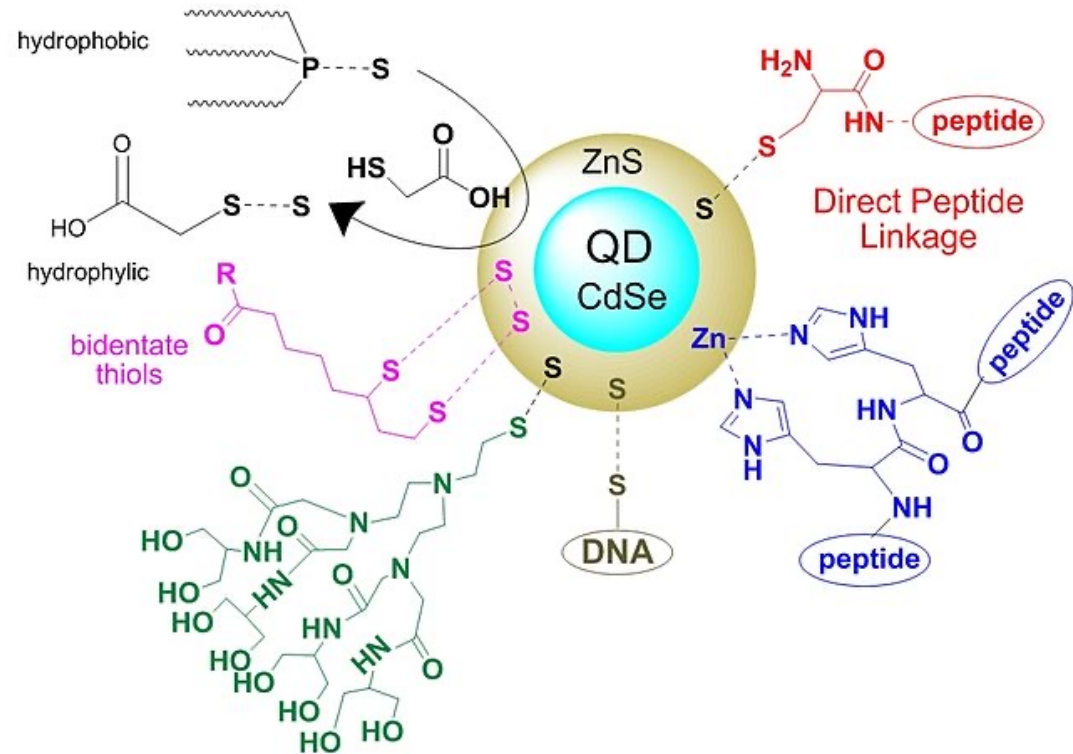
- In quantum computing, a quantum bit is a unit of quantum information—like a classical bit. Where classical bits hold a single binary value such as a 0 or 1, a qubit can hold both values at the same time: **superposition**
- When multiple qubits act coherently—**entanglement**—they can process multiple options simultaneously. This allows them to process information in a fraction of the time it would take even the fastest nonquantum systems.





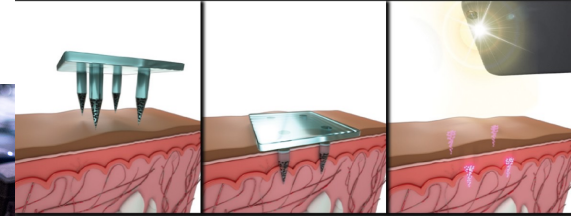
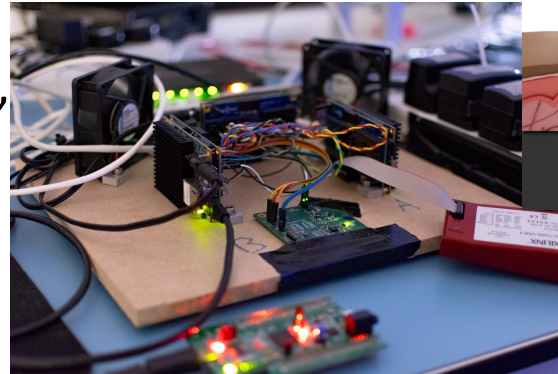
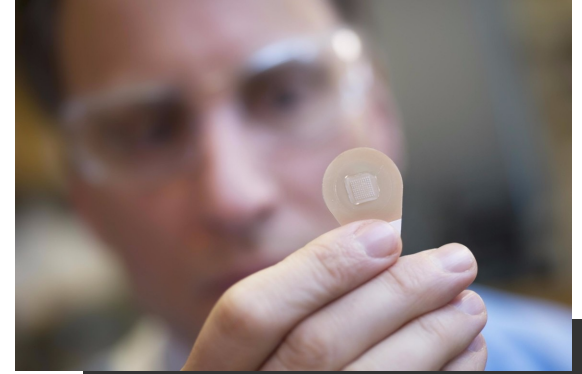
# What are Quantum Dots?

Quantum dots are very small semiconductor particles with unique electronic and optical properties. They're also highly tunable—making them intriguing building blocks for materials that might be used to advance a wide range of applications, from solar cells to medical imaging to quantum computing.



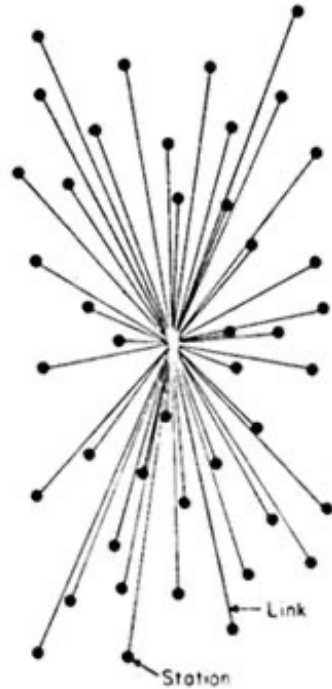
# What are Quantum Sensors Used for?

Sensors that measure photosynthetic photon flux density (PPFD) are often called quantum sensors due to the quantized nature of radiation. A quantum refers to the minimum quantity of radiation, one photon, involved in physical interactions (e.g., absorption by photosynthetic pigments). In other words, one photon is a single quantum of radiation.



# The Distributed World

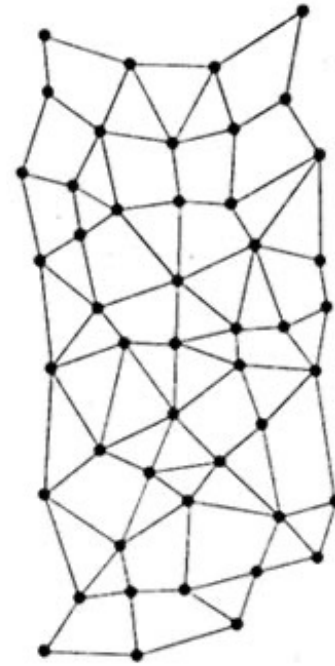
- The Edge
  - More Sensors
  - Local Processing
- Distributed Ledgers (The Technology Previously Know as Blockchain)
  - Privacy
  - Security



CENTRALIZED  
(A)



DECENTRALIZED  
(B)

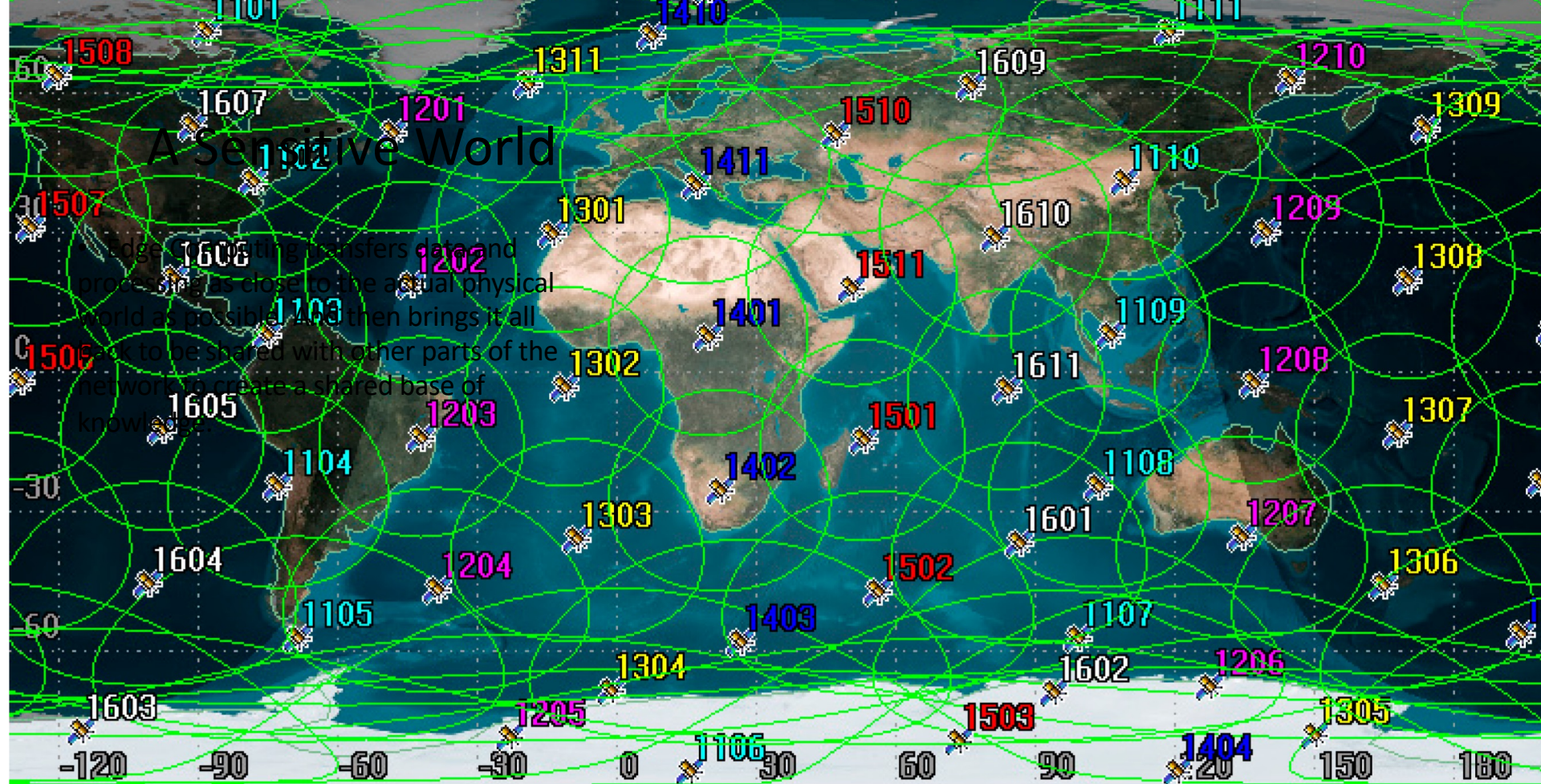


DISTRIBUTED  
(C)

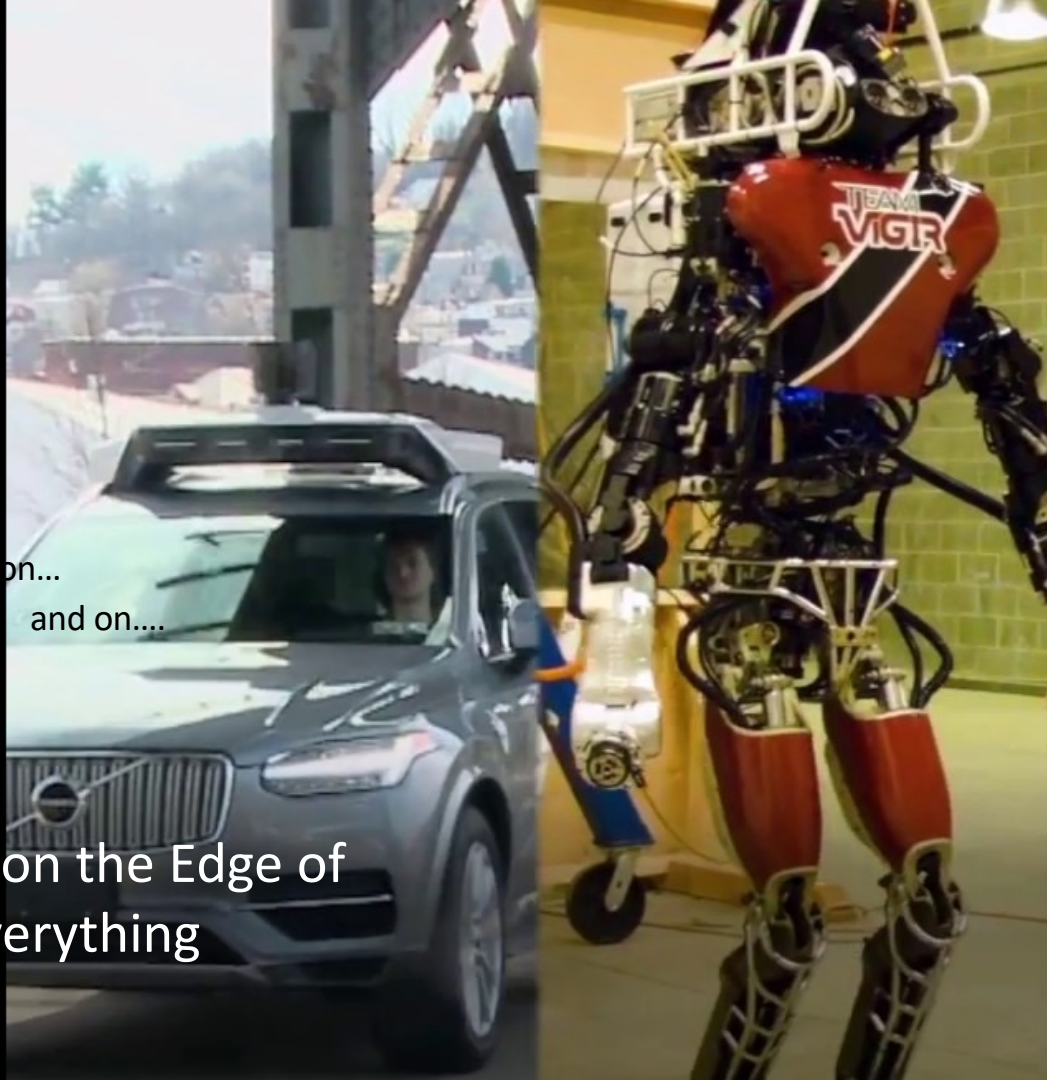


# A Sensitive World

Edge computing transfers data and processing as close to the actual physical world as possible. IoT then brings it all back to be shared with other parts of the network to create a shared base of knowledge.







on...  
and on....

# Sensors on the Edge of Everything



# Identity: Who are we?

- Identity: Who are we?
- You are not your email (or your phone number)
- How people steal your Identity
- How you prove who you are





# Who are these people?

Hint: They aren't people.

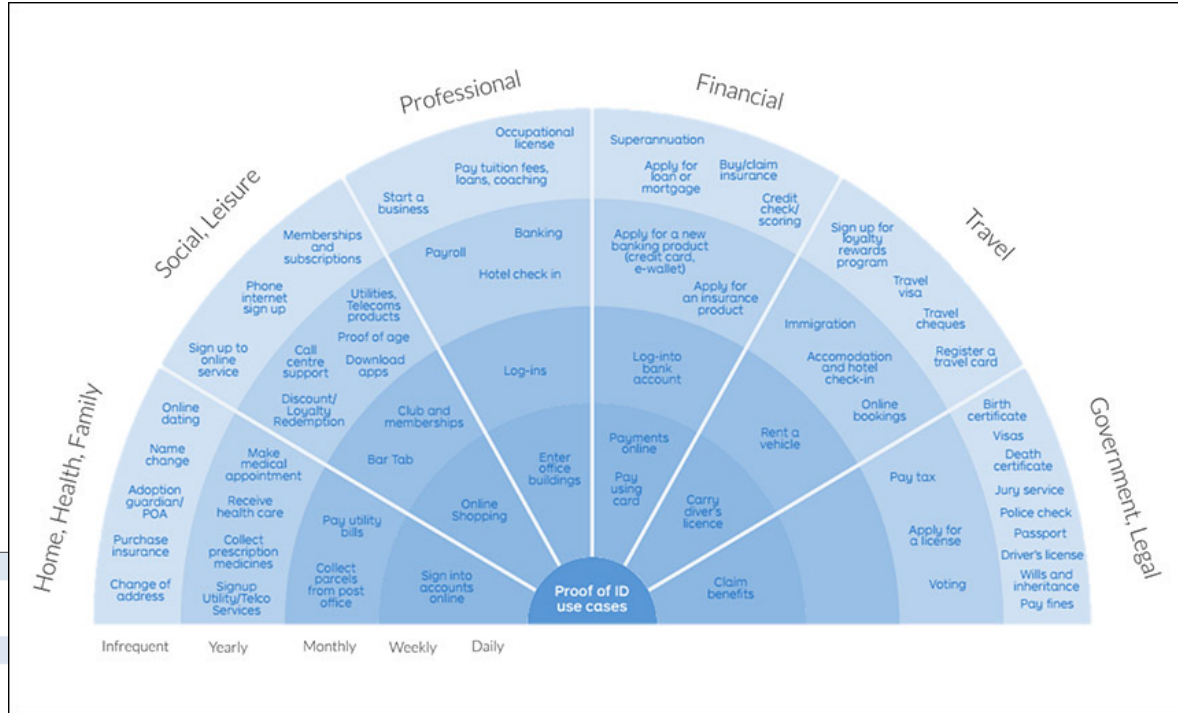


# You are not your email

In 2018, the total number of business and consumer emails sent and received per day will exceed 281 billion and is forecast to grow to over 333 billion by year end 2022.

Daily Email Traffic	2015	2016	2017	2018	2019
<b>Total Worldwide Emails Sent/Received Per Day (B)</b>	<b>205.6</b>	<b>215.3</b>	<b>225.3</b>	<b>235.6</b>	<b>246.5</b>
<i>% Growth</i>		5%	5%	5%	5%
<b>Business Emails Sent/Received Per Day (B)</b>	<b>112.5</b>	<b>116.4</b>	<b>120.4</b>	<b>124.5</b>	<b>128.8</b>
<i>% Growth</i>		3%	3%	3%	3%
<b>Consumer Emails Sent/Received Per Day (B)</b>	<b>93.1</b>	<b>98.9</b>	<b>104.9</b>	<b>111.1</b>	<b>117.7</b>
<i>% Growth</i>		6%	6%	6%	6%

Table 2: Worldwide Daily Email Traffic (B), 2015-2019



# How People Steal Your Identity

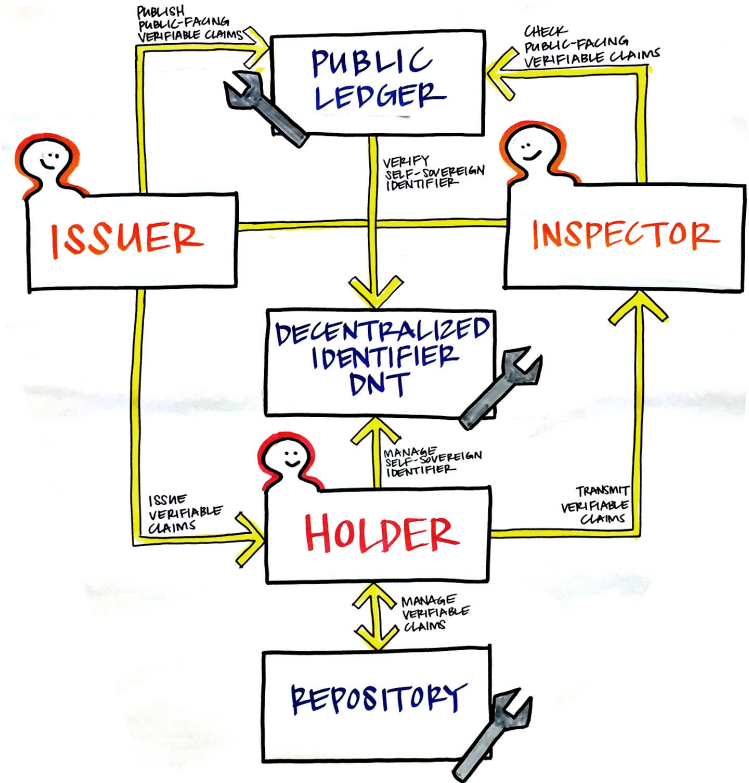
- There is a hacker **attack every 39 seconds**.
- **300,000 new malware** are created every day.
- **Multi-factor authentication and encryption** are the biggest hacker obstacles.
- You can **become an American citizen for \$6,000**.
- The average cost of data breaches will be **about 150 million in 2020**.
- The cybersecurity budget in the US is **\$14.98 billion**.
- “In total, there are **1,160,253,228** unique combinations of email addresses and passwords,” Hunt wrote, and “**21,222,975** unique passwords” in one set of stolen identity data.



# Taking Control of Your Self

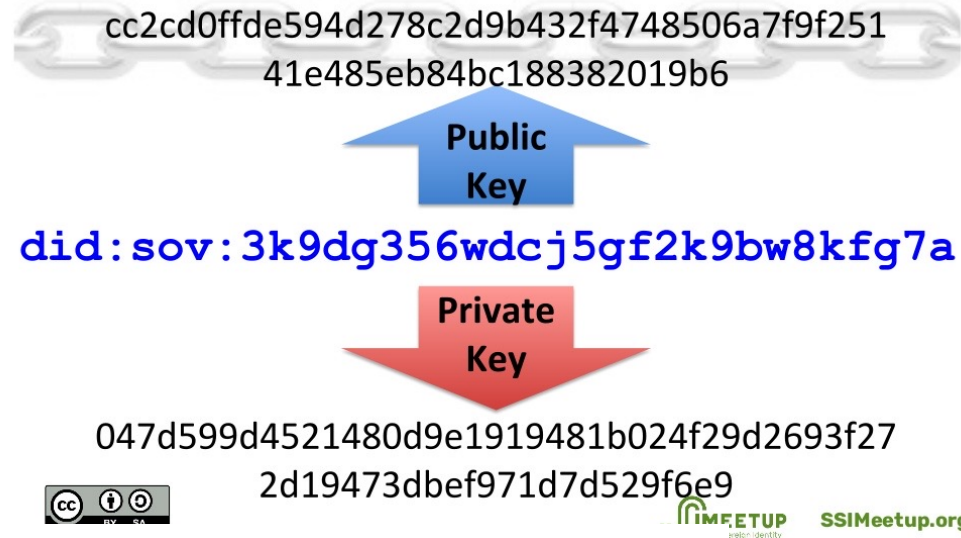
- Self Sovereign Identity is a lifetime (or beyond) portable identity for any person, organization or thing (including algorithms and avatars!) that does not depend on any centralized authority and can't be taken away or expired.
- The Evolution of Identity
  - Centralized
  - Federated
  - Distributed
  - Decentralized

## SELF-SOVEREIGN IDENTITY ARCHITECTURE 1.0

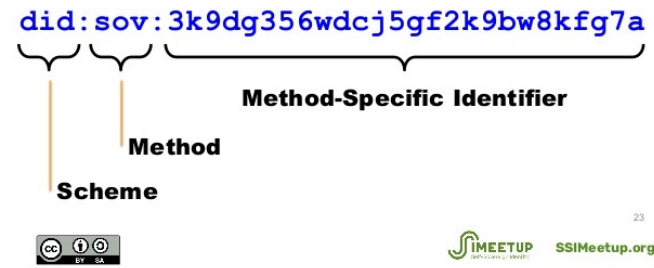


# The Keys to the Future

- You will have many keys (DIDs) for all the aspects of your relationships that will establish connected channels to the people, organizations and things that you interact with.
- You can not only PROVE your identity but establish VERIFIABLE CLAIMS that have an irrevocable history for your interactions and transaction without the need for a third party to verify them.



## DID Syntax (W3C)



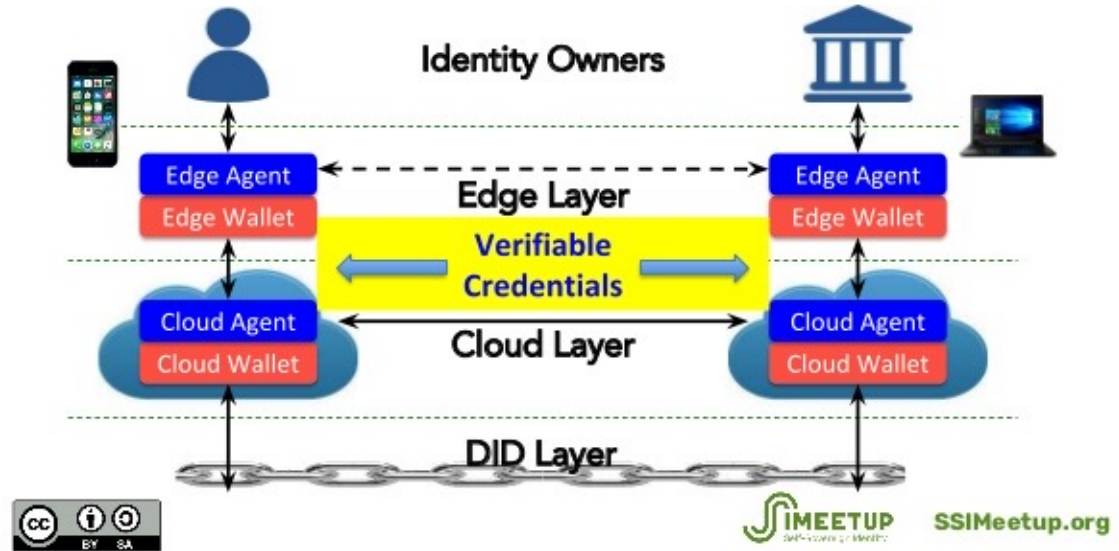


# The Evolution of Identity

Our new concepts of **Identity** build upon the technologies that are happening today.

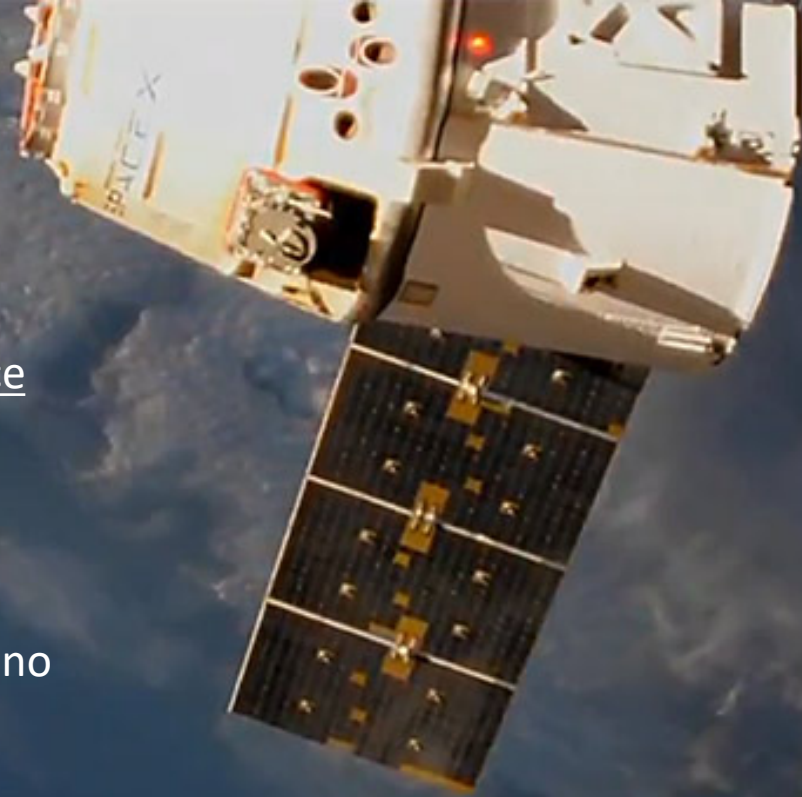


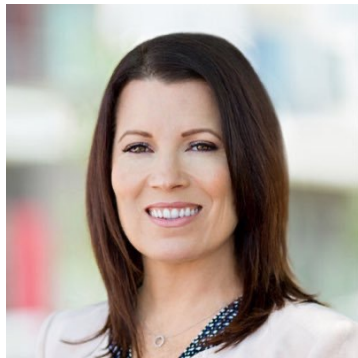
## The decentralized identity "stack"



# Dragon Released!

The SpaceX Dragon cargo spacecraft released from the International Space Station at 5:05 a.m. EST after flight controllers in Houston delivered remote commands to the station's Canadarm2 robotic arm. Expedition 61 Station Commander Luca Parmitano of ESA (European Space Agency) will back up the ground controllers and monitor Dragon's systems as it departs the orbital laboratory.





Audience Q&A with  
**Teri Kelly**  
Valkyrie Intelligence



**Jay Boisseau**  
Austin Forum  
Dell Technologies  
Austin CityUP  
Vizias



**Jay Williams**  
Quantum Materials Corp  
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And now, for the winning question,  
and a free badge to SXSW 2020...

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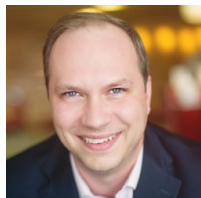


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# The BEST Advisory Board



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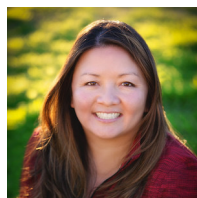
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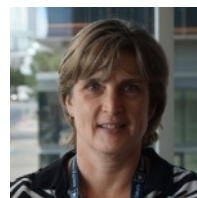
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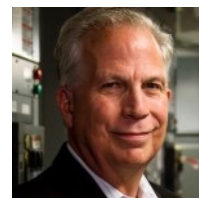
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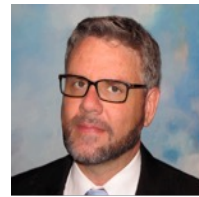
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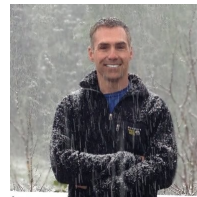
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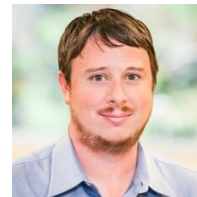
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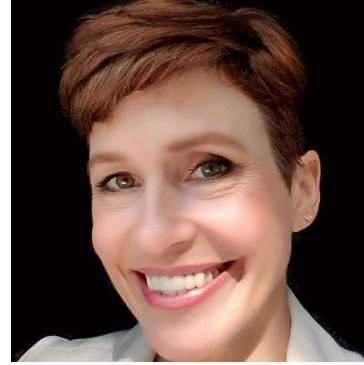
# The Awesome AF Team



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Managing Director



John Lockman  
Technology Director



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Event Manager



Kristen Grewe  
Finances & Administration

***And tonight's volunteers!***

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**Medium**

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**February 4**

*register now!*



**Tech & Arts**

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and other greats  
events on **AI, gaming,**  
**defense tech, smart**  
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# Follow us and share the goodness!



*Please share the upcoming events with your friends  
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# Network Now, and Network Later!

We'll talk here until 8:15pm, then continue at **Trifecta on 3<sup>rd</sup>**



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