

# 2020 Communication Technology Update

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# The Year of the Network

2020

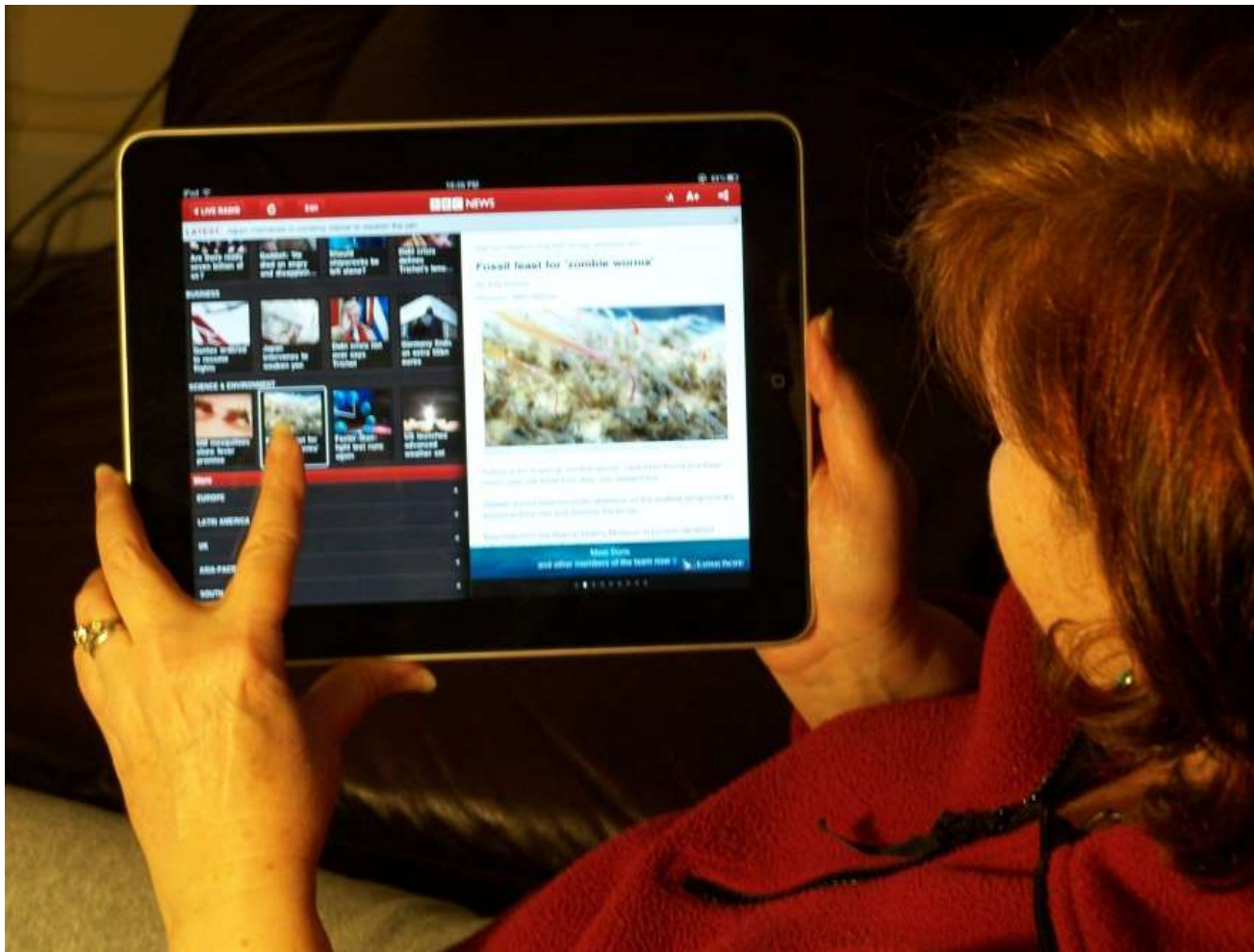
# Network Update

**5G**

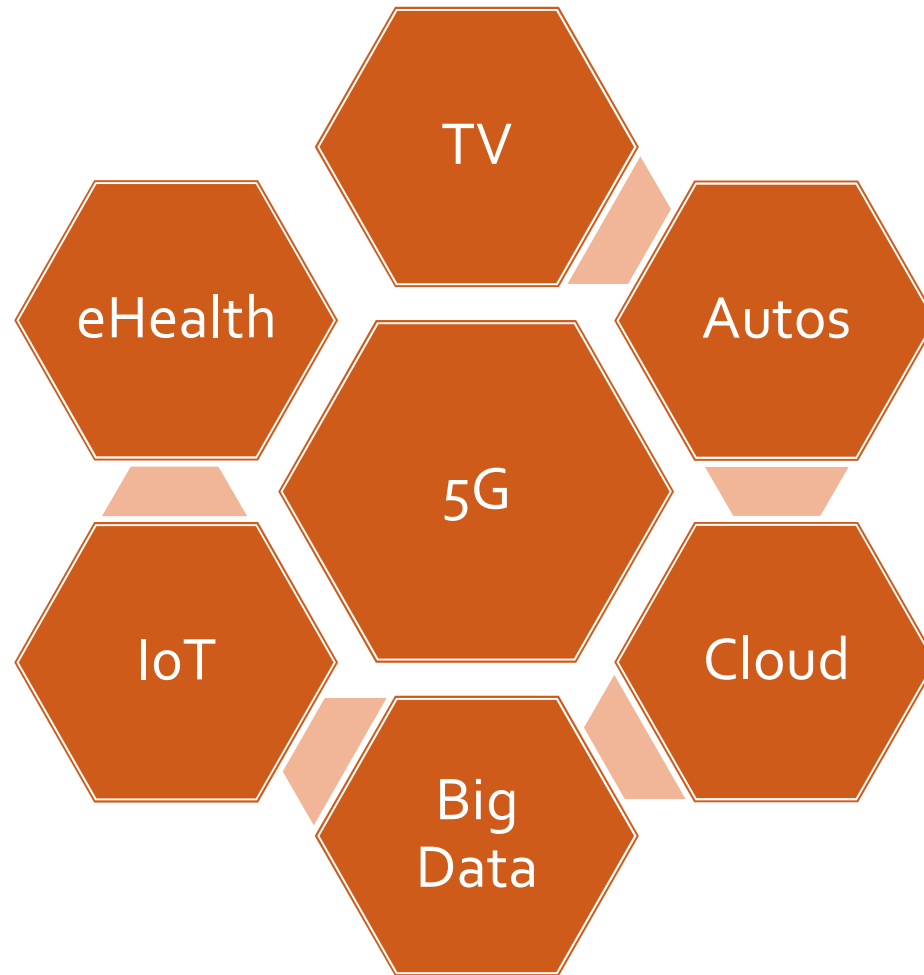
# Three dimensions of 5G

- Network
- Users
- Marketing

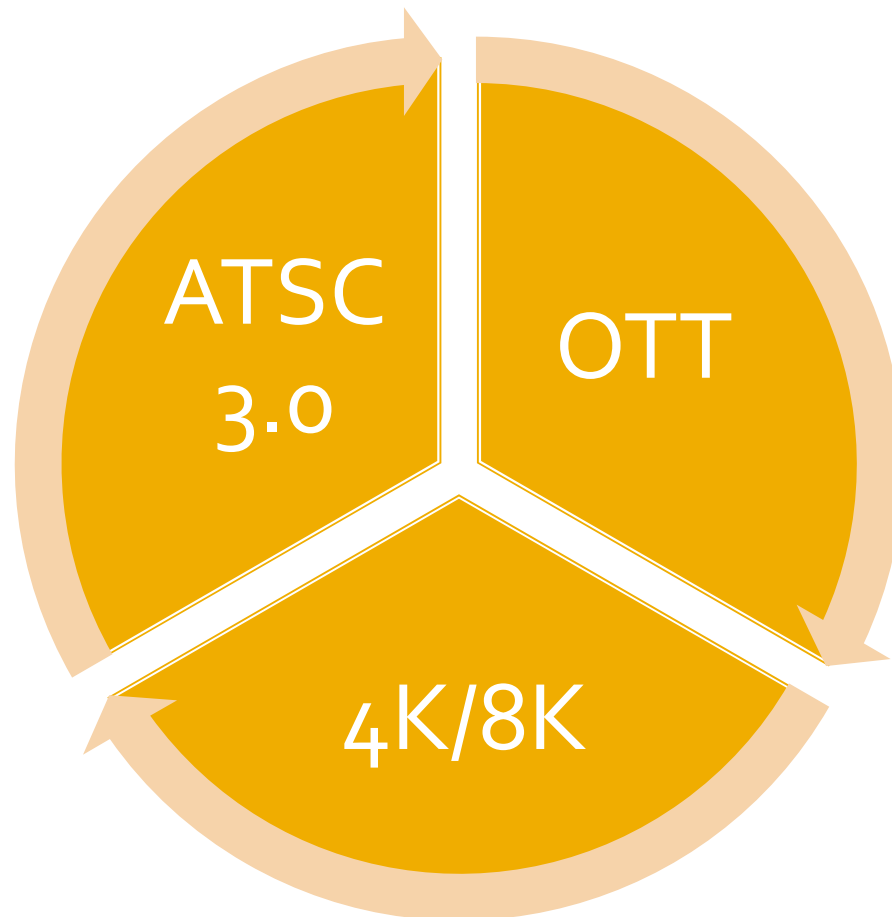
# Networks: Mobile=Ubiquitous



# Everything is Connected



# Let's Start with TV...



# ATSC 3.0 Broadcast Standard

- Delivery of 4K
- Up to 120 fps
- HDR
- Enhanced audio
- Mobile television
- Need for bandwidth
- Broadcast transition
- Targeted Advertising





# ATSC 3.0 Challenges

- Incompatible with current TV
- Separate transmission channel needed
- User awareness
- Will enable spectrum repack
- Note: revenue opportunities with digital services and targeted advertising

# OTT/Streaming Today



CBS ALL ACCESS



sling  
TELEVISION



ESPN +



amazon  
prime video



NETFLIX



Disney+



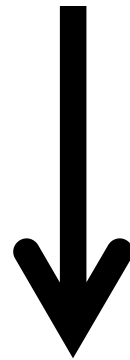
Apple tv+

# Streaming Tomorrow



# Lessons from the Airlines

Disintermediation



Reintermediation

# High-resolution TV



# Next waves in TV

- 8K
  - Primary a display technology
  - Will be used extensively in digital signage and TV production
  - Network issue—Vast increase in bandwidth
- Frame rate (30, 60, 120, 240)
- HDR

# Addressable Advertising

- Use of bandwidth to deliver and store multiple ads
  - Viewers see only the most relevant ads
  - Enables highly targeted advertising
  - Could result in fewer ads shown per program
- Significant revenue potential
  - Development of industry standard
    - Adoption needed by manufacturers, networks, & advertisers

# Audio Technologies

- iHeartMedia adoption of AI to program radio
- Potential purchase of iHeartMedia by Sirius/XM (which purchased Pandora in 2019)
- Audio remains ubiquitous



# Video Games

- Massive market
  - Significant crossover with:
    - VR
    - eSports
- New consoles
- Constant introduction of new titles

# Video Game Consoles

- Late 2020
  - New Xbox
  - Sony PS5
- Most significant change:
  - Transformation to cloud-based architecture

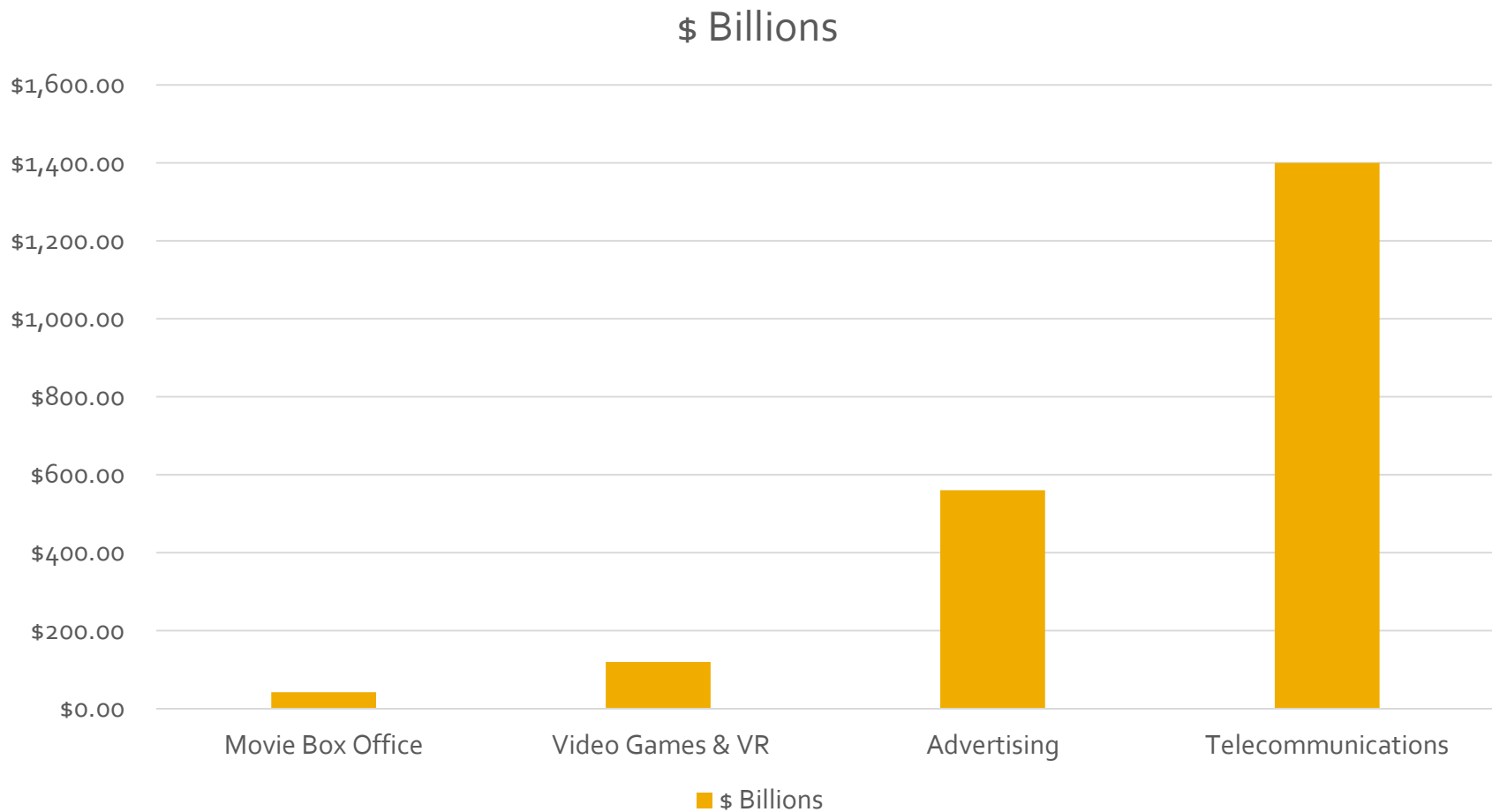
**2019 Fortnite Revenues: \$1.8b**



# Video Games: Revenues

- Estimated 2019  
global revenues:  
\$120 billion

# Relative 2019 Global Revenues



# Virtual Environments

- Virtual Reality
- Augmented Reality
- 360° video

# Virtual Reality



# VR Applications

- Games (limited)
- Training
  - Examples: biology and physiology
- Business
  - Architecture
  - Research



# VR Limitations

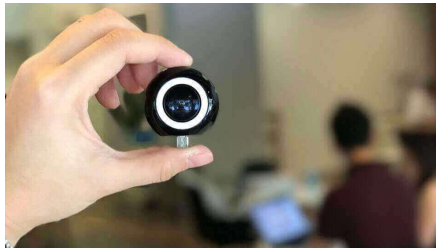
- Health issues
  - Injury during use
  - Dizziness
- Accessibility
  - Visual impairment
  - Hearing impairment
- Time
  - 5-10 minute experiences

# Augmented Reality



Remember Pokémon Go?

# 360° Video



# Internet of Things (IoT)

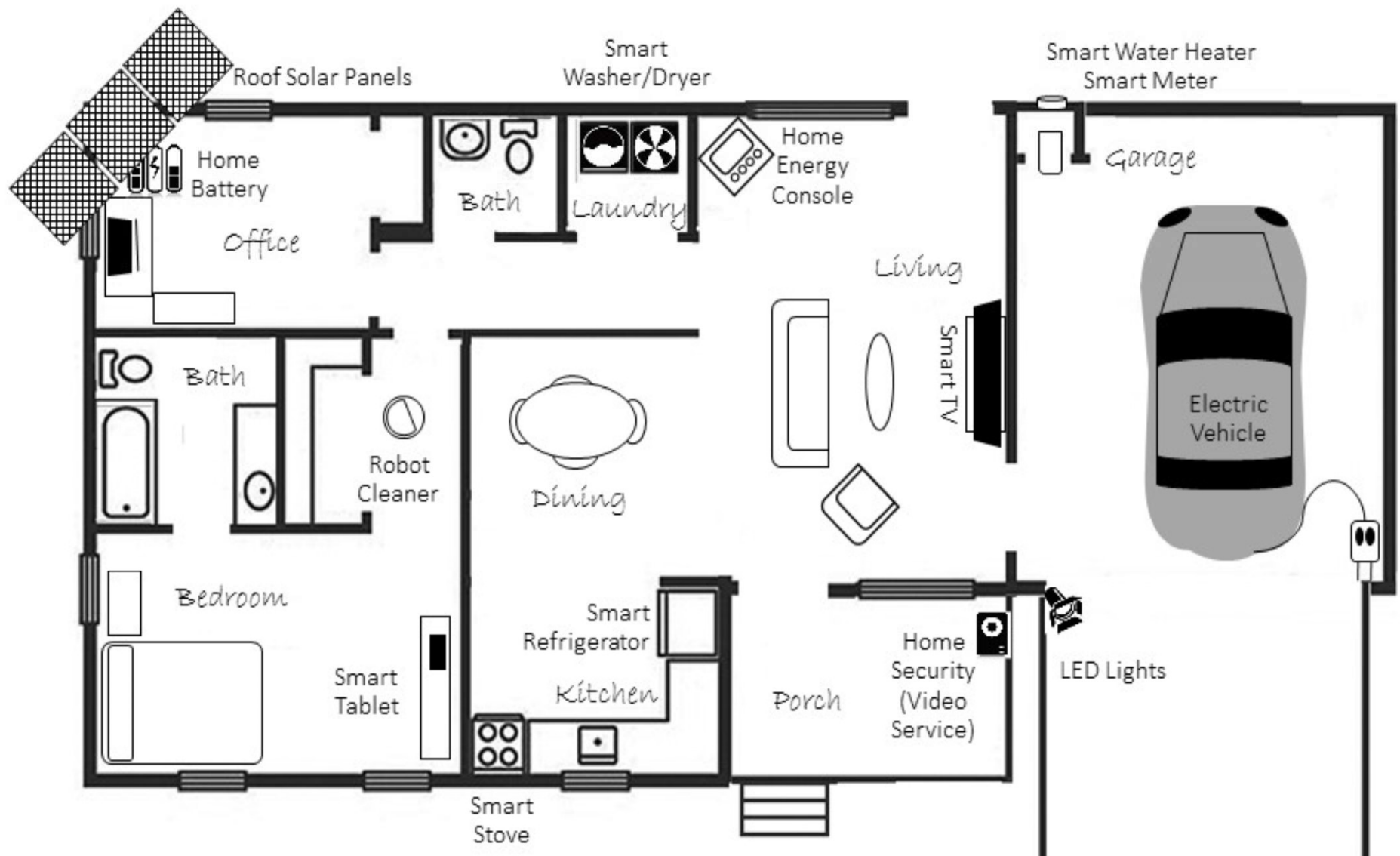
- Smart homes
- Personal assistants/smart speakers
- eHealth
- Automotive telematics

# Elements of IoT Applications

- Data
- Network
- Processing
  - Local
  - Edge
  - Cloud



# IoT=Smart Houses



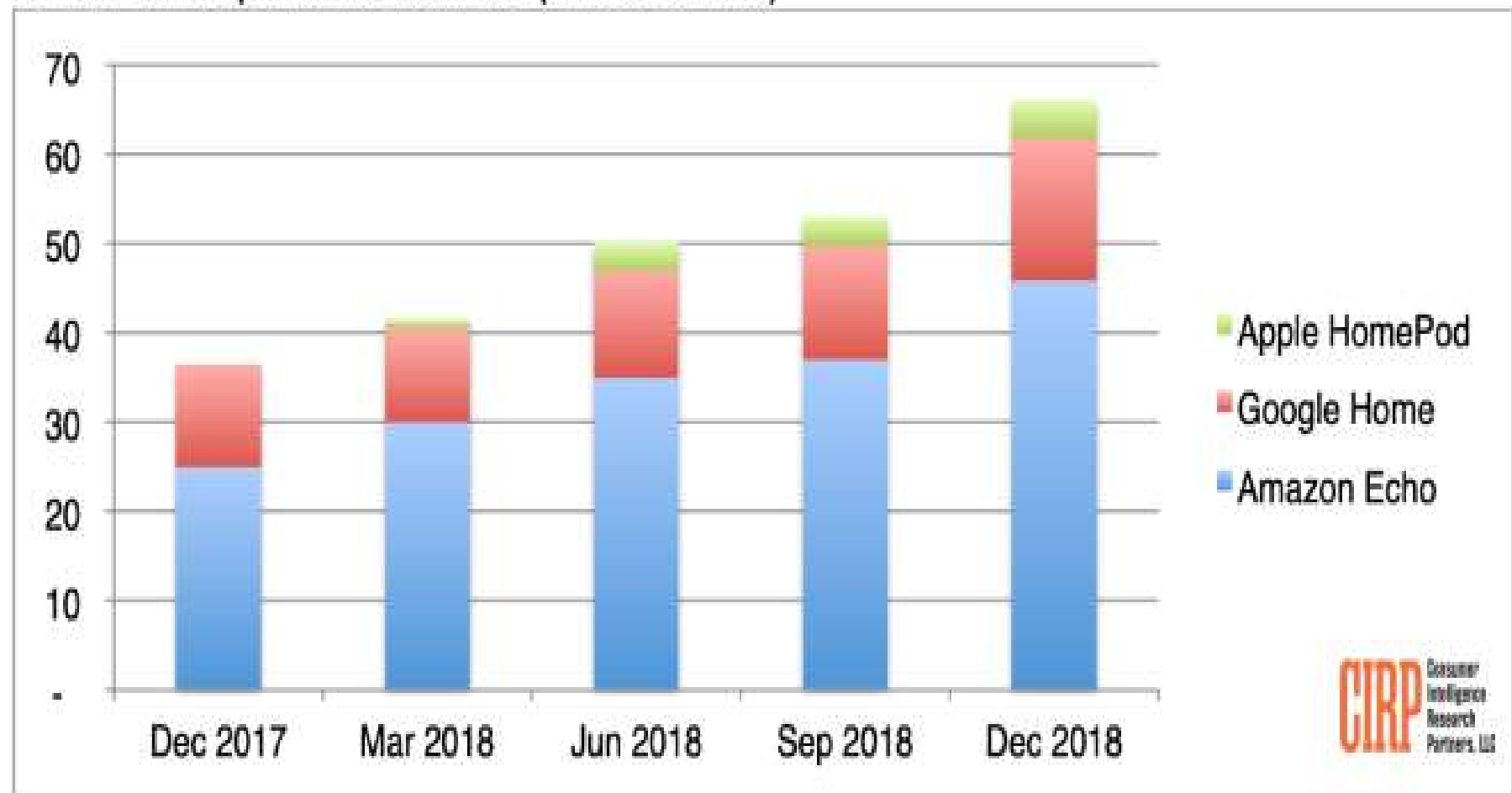
# Personal Assistants

- Google Home and Amazon Alexa



# Personal Assistant Adoption

Chart 1: Smart speaker installed base (millions of units)





# eHealth



*Sources:* Fitbit, Kardia, Doctors on Demand

# eHealth Applications

- Preventive care
  - Diagnosis
  - Monitoring
- 
- Potential to mitigate fastest growing expenses?
    - 2019 Global spending: >\$10 T

# Other Trends

- AI
- Translation
- Blockchain

# Automotive Telematics

- Autonomous vehicles
- Assistive technology
  - Vehicle to vehicle
  - Vehicle to traffic control
  - Traffic control to vehicle
  - Charger networks



# Autonomous Vehicles

Eventually, commuting time will become media time

Short term:  
Autos fully  
networked w/  
assistive tech



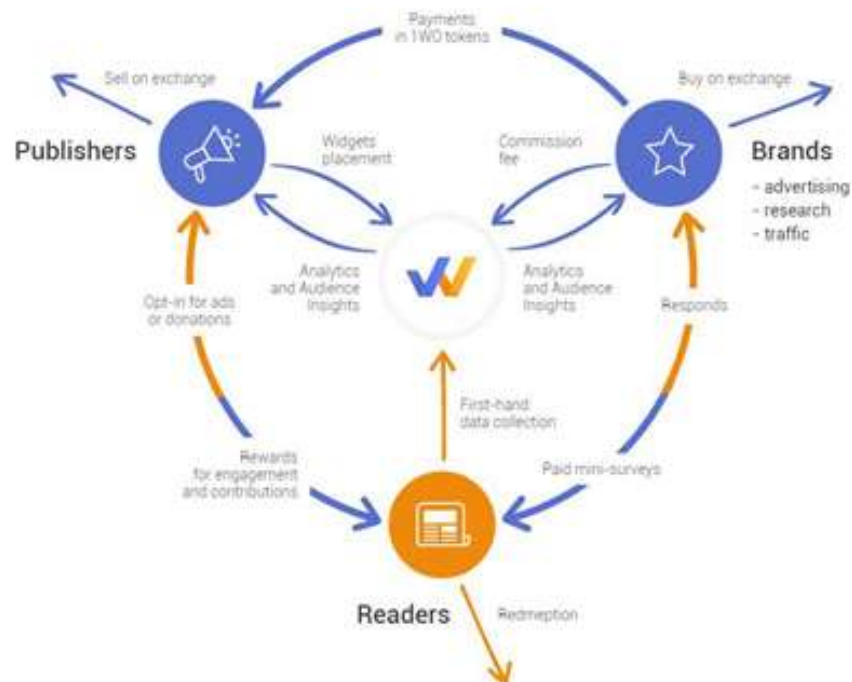
Source: Mercedes Benz

# Blockchain and Cryptocurrency

## ■ Example:



1World Tokens (aka Media Coins) – ICO in 2017



Reward Readers **Engagement**

Increase **Advertisement** streams

New revenue: **Research & more**

AI

?

# Regulatory Issues

- Privacy
  - GDPR (General Data Protection Regulations)
- Antitrust
- Equity and subsidy



# Social Media

Social media are at a tipping point:

- Privacy
- Increased costs
- Decline in use
- Increase in hypertargeting
- Critical mass

# Back to the Network

- Almost all developments require bandwidth increase
  - New applications
  - Edge and cloud computing
- Challenge
  - Dependence on the network increases importance of network security

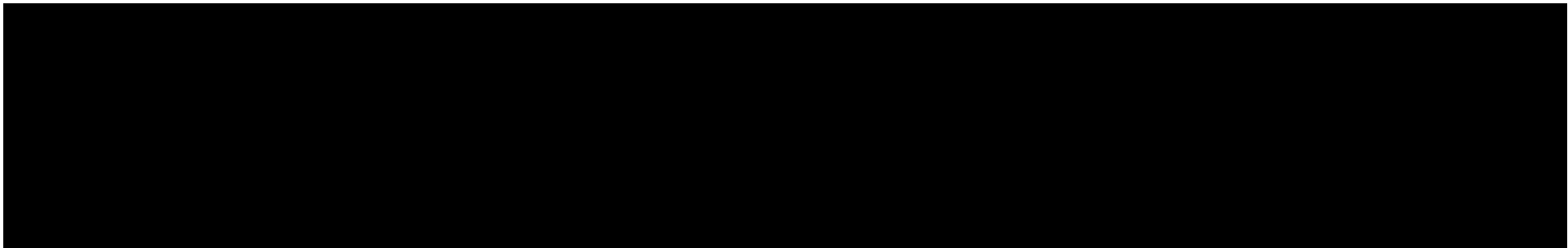
# Things to watch in 2020

- 5G
- IoT
- Streaming video adoption
- Cyberwarfare
- Privacy

# Thank you!

More Info:

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# Communication Technology Ecosystem

