

# Data Centres On the Edge

Brought To You By:



MORRISON HERSHFIELD  
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WZMH



# Exponential Thinking

## Creating the Infrastructure for the New Disruptors

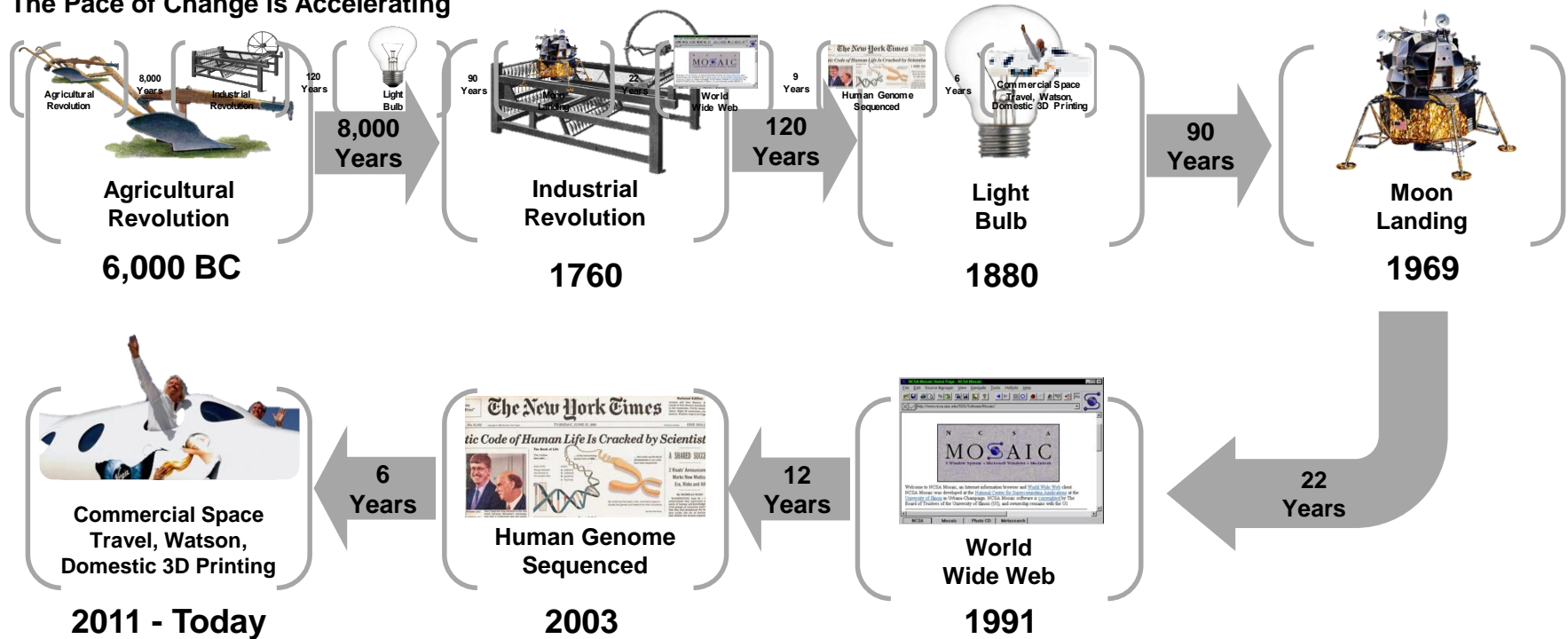
Q2|2017

**Phill Lawson-Shanks**

Chief Architect & VP of Innovation

# We are living in Exponential Times

The Pace of Change is Accelerating



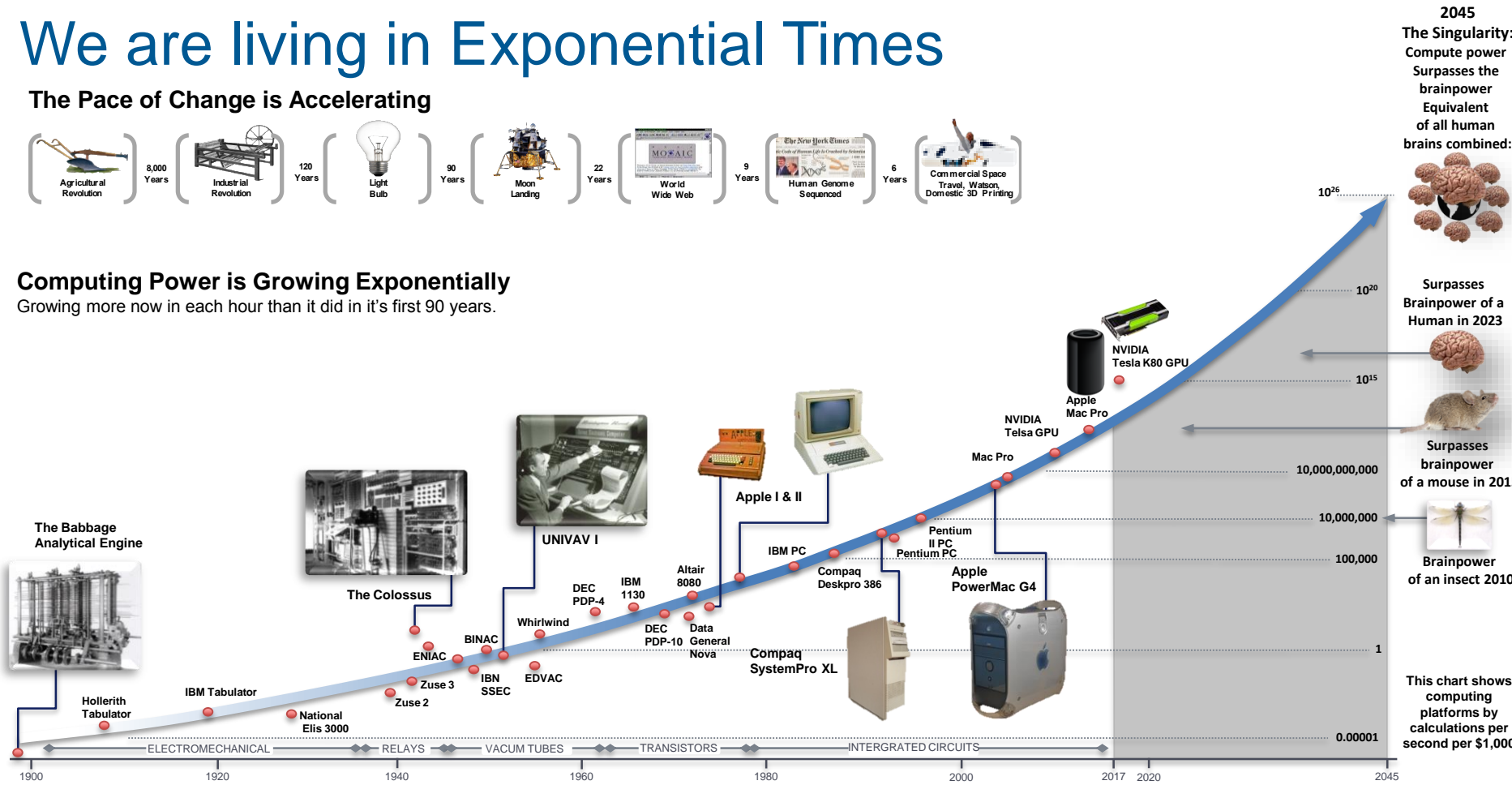
# We are living in Exponential Times

## The Pace of Change is Accelerating



## Computing Power is Growing Exponentially

Growing more now in each hour than it did in it's first 90 years.

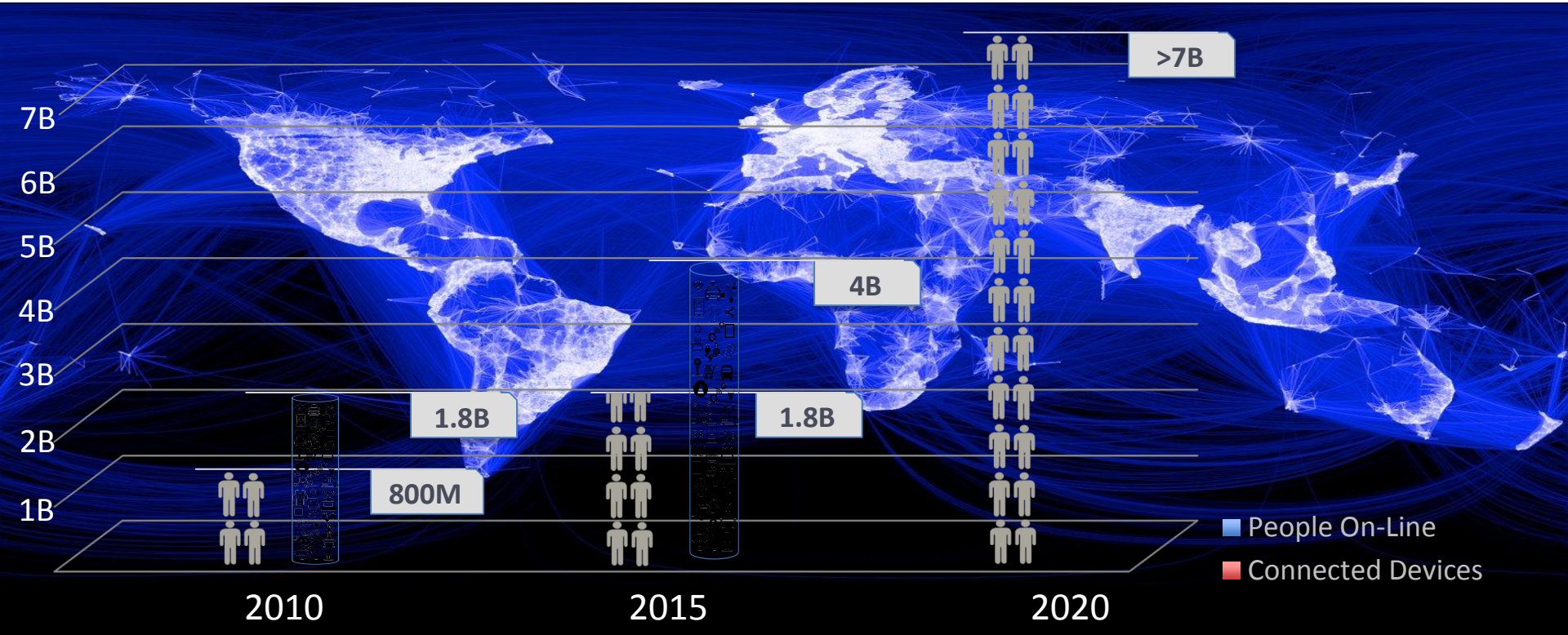


Sources: Dr. Peter Diamandis, Ray Kurzweil, EdgeConneX



# Hyper Connected World

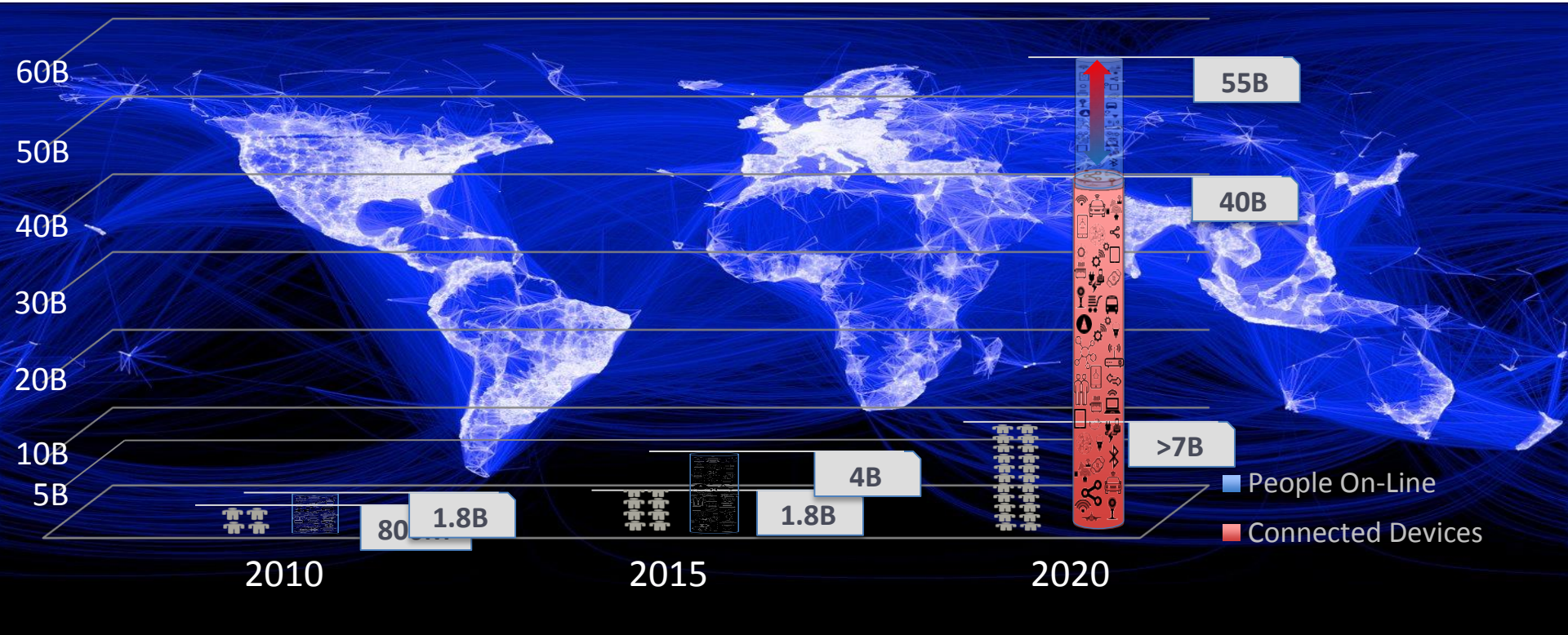
We are in an age of exponential growth



Sources: Cisco ,Gartner, CMA Research, EdgeConneX

# Hyper Connected World

We are in an age of exponential growth



Sources: Cisco ,Gartner, CMA Research, EdgeConneX



# The Internet:

The Ultimate Democratizing Technology & Business Disruption Enabler

## Brick & Mortar Business



## Services Business



1975

Kodak Invents the  
Digital Camera



1996

Market Cap: \$28B  
Employees: 140K



2007

Apple Launches  
iPhone



2010

Instagram Launched  
Employees: 3



2012

Bankrupt  
Employees: 17K



2012

Market Cap: \$1B  
Employees: 13  
Acquired by Facebook

# The Internet:

## The Ultimate Democratizing Technology & Business

**“By 2020, more than three-quarters of the S&P 500 will be companies that we have not heard of yet.**

The **average lifespan** of a company listed in the S&P 500 has **decreased 50 years** in the last century. While successful companies lasted an average of **67 years in the 1920s**, they typically exist for only **15 years today”**

*Richard Foster, Yale University*

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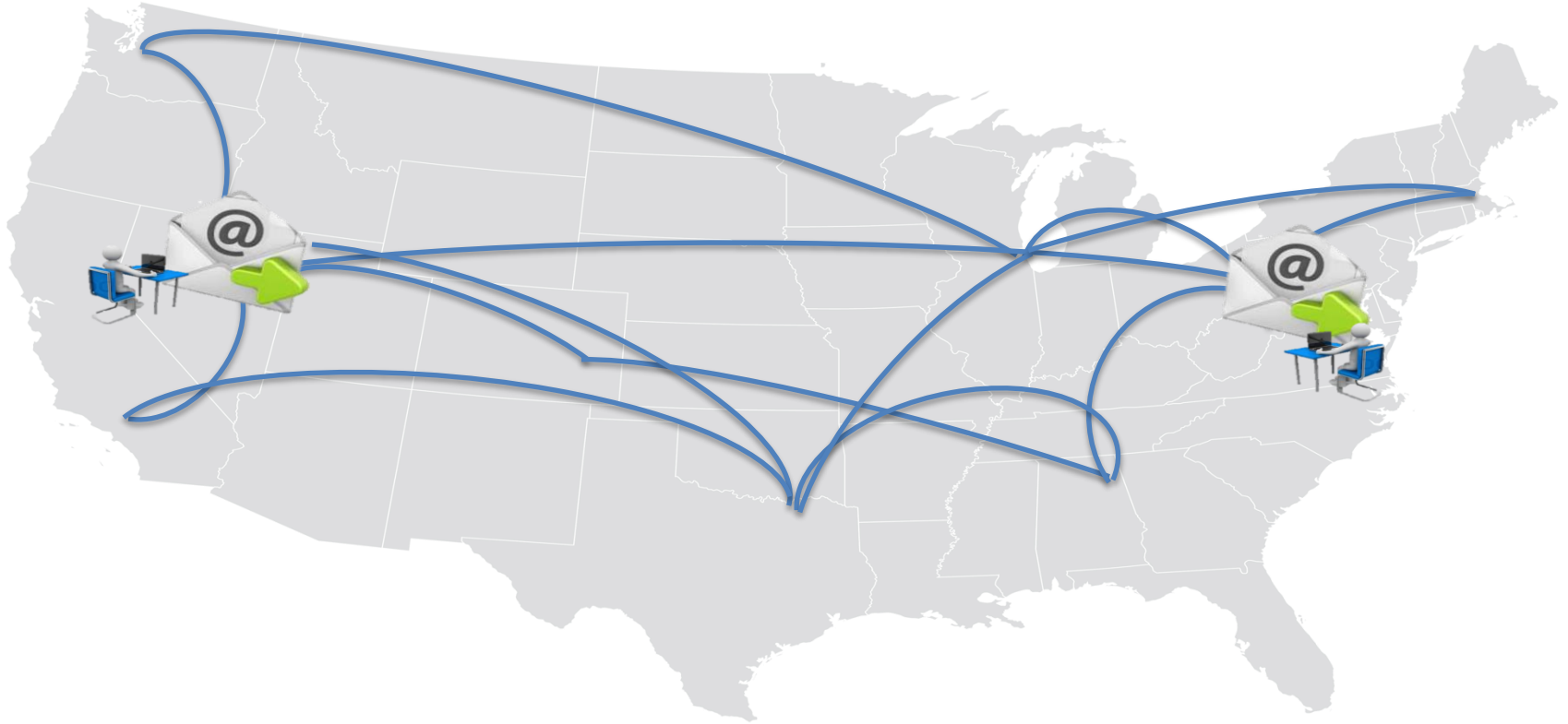
**“In 10 years, it’s predicted that 40% of Fortune 500 companies will no longer exist. *You must disrupt to survive.*”**

*John Chambers, Board Chairman, Cisco*

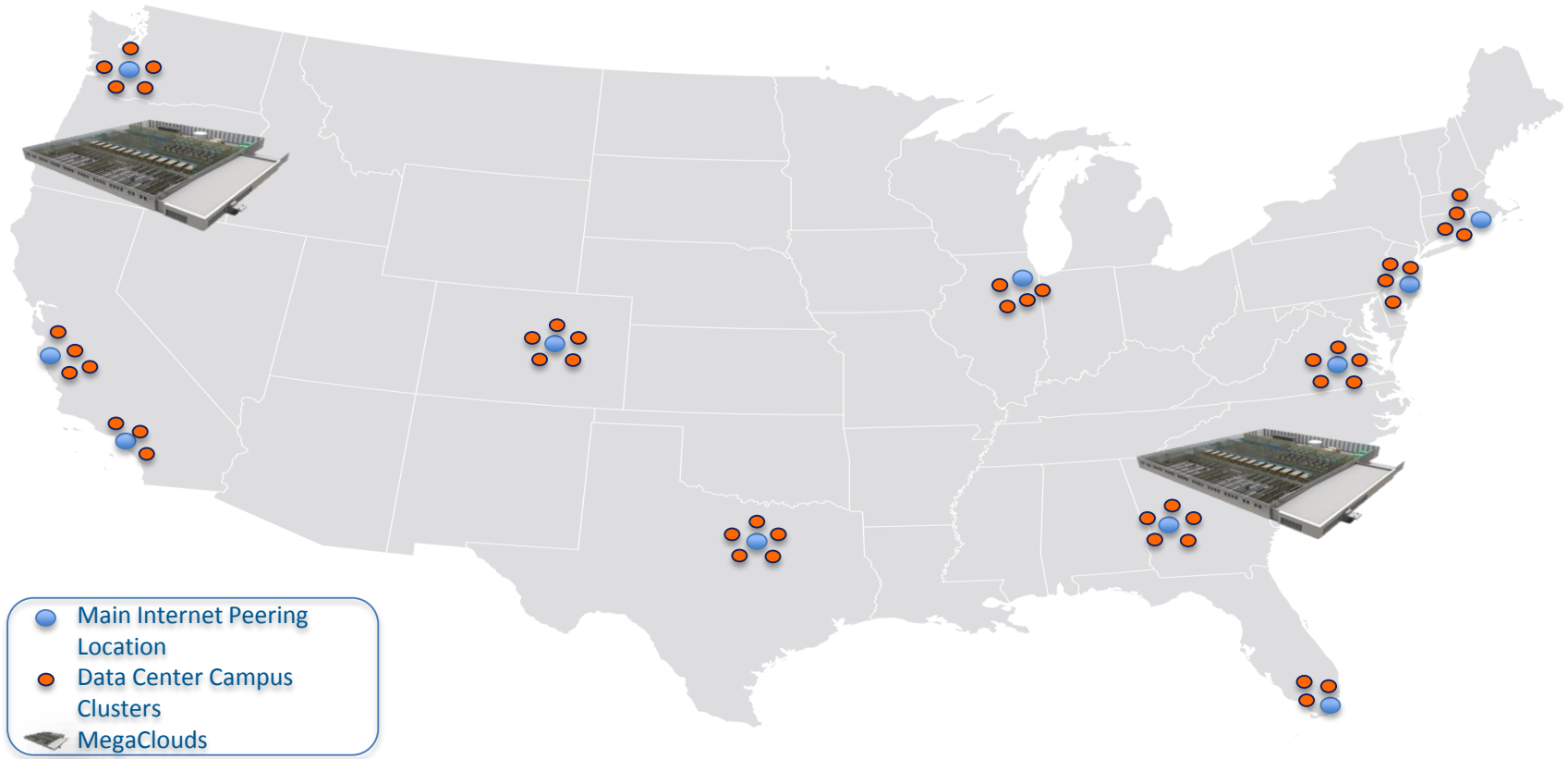


# The Internet was designed for email...

..Not Video or the Internet of Things



# .. And it's Not in Enough Places



# Internet Traffic is Changing...

OTT Video accounts for more than 70% of peak traffic – But Cloud & Streaming are growing Daily

Rank	Upstream		Downstream		Aggregate	
	Application	Share	Application	Share	Application	Share
1	BitTorrent	26.83%	Netflix	36.48%	Netflix	33.81%
2	SSL - OTHER	7.11%	YouTube	15.56%	YouTube	14.63%
3	HTTP	6.74%	HTTP	6.02%	HTTP	6.08%
4	Netflix	6.00%	iTunes	3.36%	BitTorrent	4.85%
5	iCloud	5.16%	BitTorrent	2.76%	iTunes	3.12%
6	YouTube	4.72%	Facebook	2.65%	Facebook	2.60%
7	Skype	3.45%	MPEG - OTHER	2.07%	SSL - OTHER	2.30%
8	FaceTime	2.22%	Amazon Video	1.97%	MPEG - OTHER	1.92%
9	Facebook	2.02%	Hulu	1.91%	Amazon Video	1.82%
10	Dropbox	1.83%	SSL - OTHER	1.91%	Hulu	1.77%
		66.07%		74.68%		72.89%



This Year's Data is from the Sandvine Global Internet Phenomena and Usage Report, December 2016

# Dramatic Changes How Video is Being Consumed

## The 2 Foot vs The 10 Foot Experience

**Second Screen (handheld) is becoming the First Screen - driven by the content consumed and the context of the viewer.**

- Apps have become the primary channel for consuming streaming video - not the web browser on a PC

*"The future of TV is apps"... Tim Cook*

*"An average of 4hrs and 40mins of content is watched on a mobile device every day"... Yahoo*

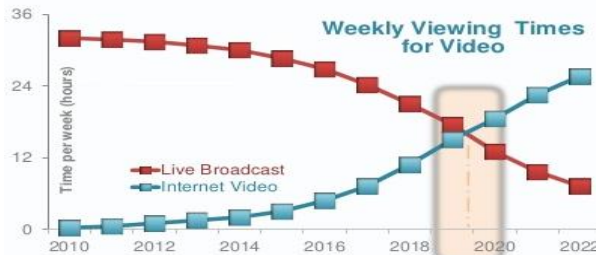
*"Millennials watch up to 6hrs a day"... David Pendelton ABC COO*



- More *sessions* are consumed on handhelds - but more *hours* are watched on a TV via apps on: Games Consoles, Roku & Apple TV devices
- Live TV can now be IP only if wanted/needed – for example: Comcast Xfinity
- Ultimately – Your “First Screen/Primary Screen” will be the one that you have wherever you are.

## OTT Video Surpasses Broadcast by 2019

By the end of this decade, more people will be watching OTT video than broadcast TV.



Source: The Diffusion Group & GDI WorldPress

## Why OTT Wins - *Cost of Customer Acquisition*

- Traditional Pay TV Subscriber Acquisition Cost = **\$850**
- OTT (Sling, Hulu etc..) Subscriber Acquisition Cost = **Almost \$0**

## Why OTT Wins – *Mobility of Content*

- OTT Apps are available and portable across most platforms, allowing the consumer to “context switch”

## Why OTT Wins – *Shared Revenue Models*

- Ultimately, the key to OTT's success is shared advertising revenue & access to Rights Holders Content Catalogs*



# Dramatic Changes in Consumer Usage

Cable Cutters/Cable Nevers and the Digital Natives: All Driving the Need for More Content at the Edge

## Cord-Cutting Alert:

**Pay-TV Business Declines for First Time During Q1 2015**



**31,000 “Cord Cutters” in Q1 of 2015**

“..for the first time ever, the sector dropped a net number of subscribers in the first three months of a year, a net loss of 31,000 customers in Q1.”  
Craig Moffett of Moffett Nathanson/Variety



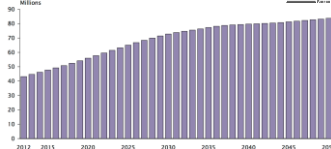
**407,000 “Cord Nevers” in the Last 12 Months**

Over the last 12 months, the U.S. has added 1.26 million households..  
But **407,000 household** net adds “*are nowhere to be found in the most recent pay-TV data. That suggests a significant number of “cord-nevers”* who are shunning traditional subscription television.”

Variety: Craig Moffett of Moffett Nathanson/Variety

Figure 1: Population Aged 65 and Over for the United States: 2012 to 2050

U.S. Census



**“Traditional/Pay-TV” Consumers Growing**

However, as the population continues to “age”, there are still significant consumers of “traditional/Pay-TV” services.

## The New Broadcasters: The Exponential Growth of Social Media

### Facebook August 24th 2015:

Facebook usage hit **1B people on a single day**. Now **1.3B** (2017 Q1)  
1/7 of the world's population.

The average Facebook user creates 90 pieces of rich media content every month.

**1 billion people used Facebook on Monday**



### Twitter & Periscope:

500M Tweets posted every day

2M Daily active Periscope Users

350K hours daily video streams



## Streaming Content & Subscriber Video on Demand

**YouTube:** 300hrs of content uploaded every minute,  
5B videos watched per day.



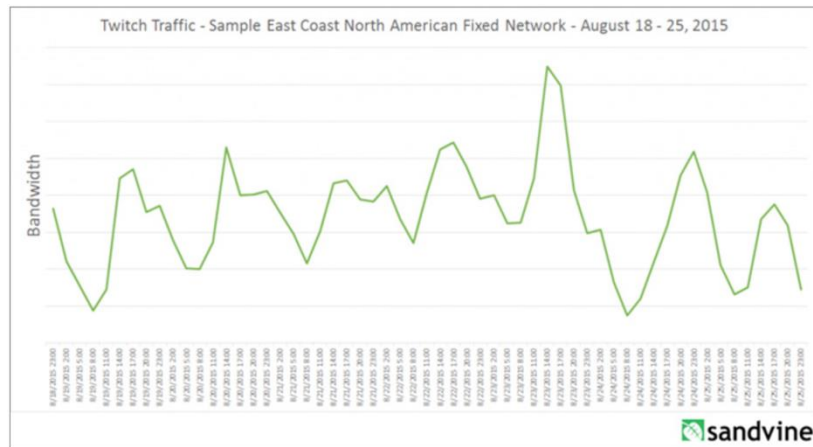
**DudePerfect Channel:** 5 friends from Texas A&M has more views than ESPN

- **DudePerfect Channel:** View Rank – 341 with total of 955,866,356 Total Views
- **ESPN Channel:** View Rank – 654 with total of 568,806,851 Total Views

Source: VidStatsX

# Internet Traffic is Changing...

Streaming eSports Grew 65% in 2016



- Twitch is the leading Streaming provider for eSports and Live Streamed Events (concerts etc..)
- In 2014, Twitch generated more traffic than HBOGO
- On August 23rd, Twitch announced that they had set a new viewership milestone, boasting more than **two million concurrent viewers**. Driven by two major eSports events:
  - ESL One: Cologne the world's biggest Counter Strike: GO tournament, and
  - League of Legends Summer Playoffs.
- Twitch reaches its peak during the late morning/early afternoon and accounts for **over 4% of total global network traffic**.

Sources: The Sandvine Global Internet Phenomena MEA & NA Report December 2016

# Kansas City's Mobile Demand Will Equal LA's in 2018

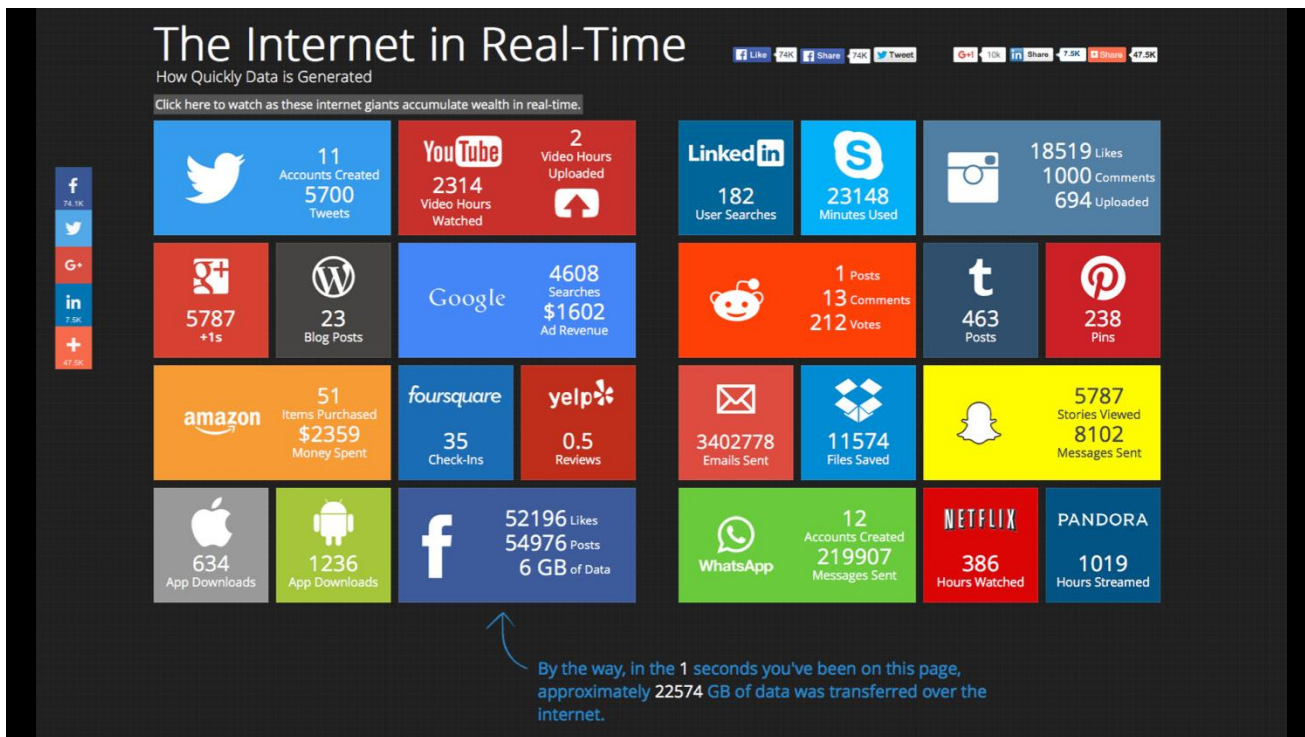
Market/MSA	2013 Population	2018 Mobile Data Demand in 2013 Pop. Equivalents	
US Population	316,128,839	2013 Pop. Equiv	Comparison to 2013 Usage
New York-Newark-Jersey City, NY-NJ-PA MSA	19,949,502	149,621,265	47% of 2013 USA Demand
Los Angeles-Long Beach-Anaheim, CA MSA	13,131,431	98,485,733	31% of 2013 USA Demand
Miami-Ft. Lauderdale- W. Palm MSA	5,828,191	43,711,433	219% of 2013 NYC Demand
Denver-Aurora-Lakewood, CO MSA	2,697,476	20,231,070	101% of 2013 NYC Demand
Kansas City, MO-KS MSA	2,054,473	15,408,548	117% of 2013 LA Demand
Salt Lake City, UT MSA	1,140,483	8,553,623	147% of 2013 Miami Demand
Dayton, OH	802,489	6,018,668	103% of 2013 Miami Demand
Reno, NV MSA	437,673	3,282,548	122% of 2013 Denver Demand
Clarksville, TN-KY MSA	272,579	2,044,343	100% of 2013 Kansas City Demand
Napa, CA MSA	140,326	1,052,445	92% of 2013 Salt Lake Demand

In 2018, Kansas City will consume as much data as  
Los Angeles did in 2013!

Sources: EdgeConneX, Cisco, CMA Research

# Internet Traffic in One Second...

## The Volume of Content Created



In Thirty seconds: 677,220GB of data is created & shared over the Internet

Source: pennystocks.la



# Localizing Content and the Cloud Drives Substantial Improvement

## Impact and Results of Localization

### Website Performance



- Estimated that 100 ms increase in load time can decrease sales 1%
- 10 search results to 30, increased the average page load time from 0.4 seconds to 0.9 seconds. This, in turn, reduced traffic and ad revenue by 20%
- Second Median Latency Increase = 15% engagement drop and 5% bounce rate increase
- Facebook pages that are 500ms slower result in a 3% drop-off in traffic, 1000ms is 6% drop-off
- 1 second delay in Bing results in 2.8% drop in revenue, 2 seconds bring revenue down 4.3%
- If Yahoo increased page load times by +400ms they see a 5% - 9% drop in full-page traffic

### Video Quality



- Minutes of video watched by consumer is negatively correlated with buffering. In 2014 a 1% increase in buffering time reduced video watched by 14 minutes
- If an audience perceives video quality as “poor,” 92% of audience will stop watching before program is over. 75% of the audience will stop watching within the first 5 minutes.

### EdgeConneX



- Studied single metro area to test the delivery of content before and after localization. Results clearly showed 11-17% lower buffering ratio for publishers prior to and after EdgeConneX was put in place. Content delivered using a separate provider in the same metro area without localization had 2% higher rebuffering
- Studies of web page load times showing significant performance improvement as well across separate metro areas and content providers. Results being finalized currently

# Third Party Validated Performance Improvement

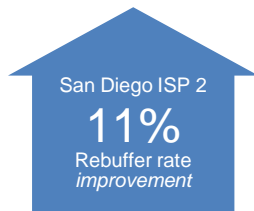
This is what happens when you implement the Edge



Top 120K video views: CDN Customer A

With  edgeconnex

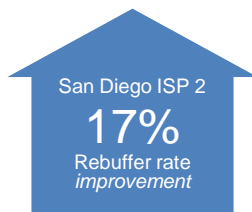
Without



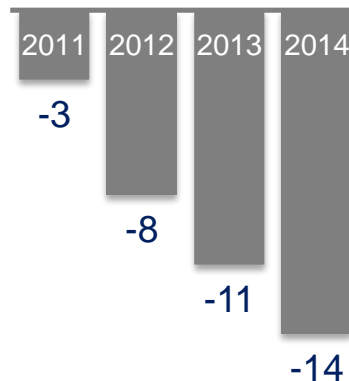
Top 120K video views: CDN Customer B

With  edgeconnex

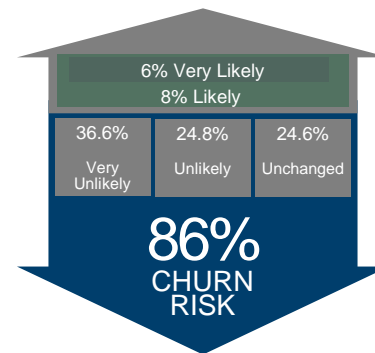
Without



Engagement Reduction (minutes)  
With 1% Increase in Buffering



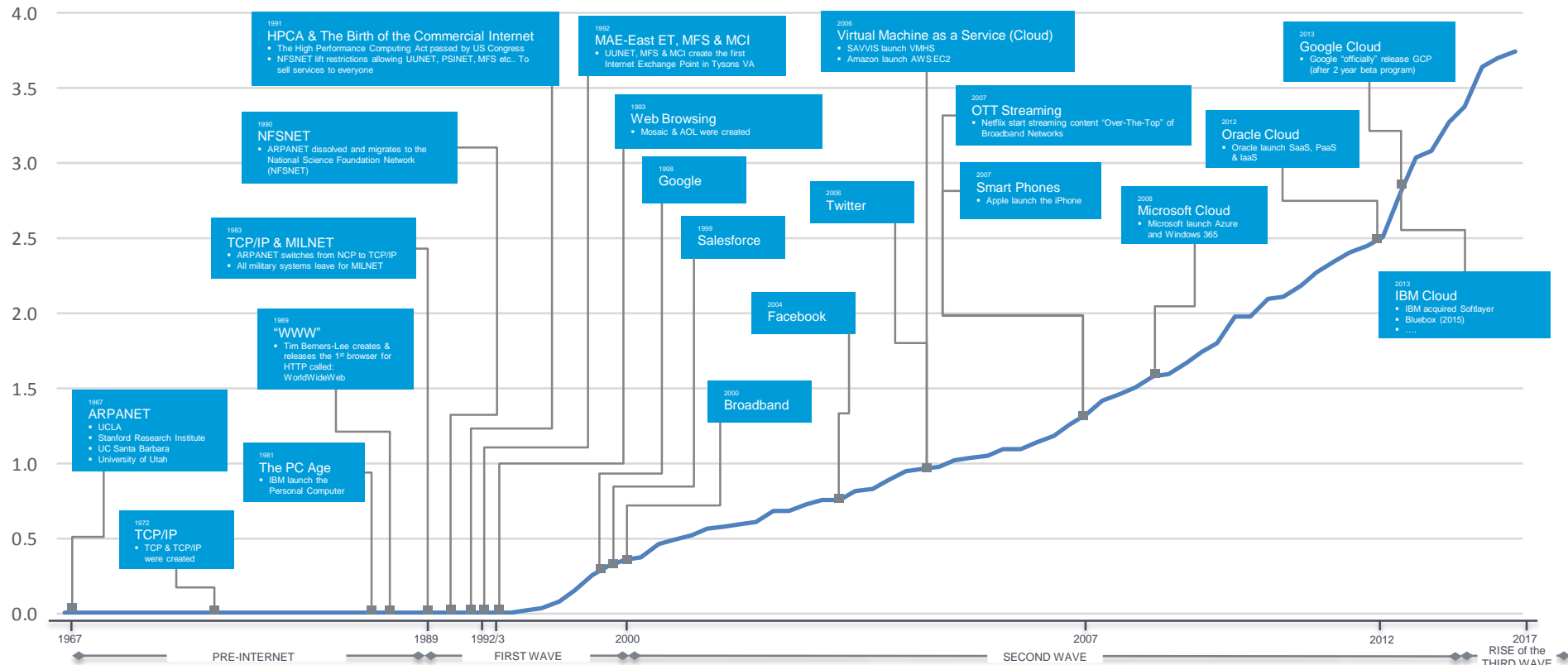
How Likely Are You To Watch  
From That Same Provider Again?



- Improvement is driven by ISP's connecting to local content in EdgeConneX facility
- ISPs & CDNs who implement the EdgeConneX solution will benefit significantly (10-25% improvement)
- This will result in higher viewing/engagement, less abandonment, and higher customer satisfaction

# The Internet is the Underlying Infrastructure

Internet Users in Billions



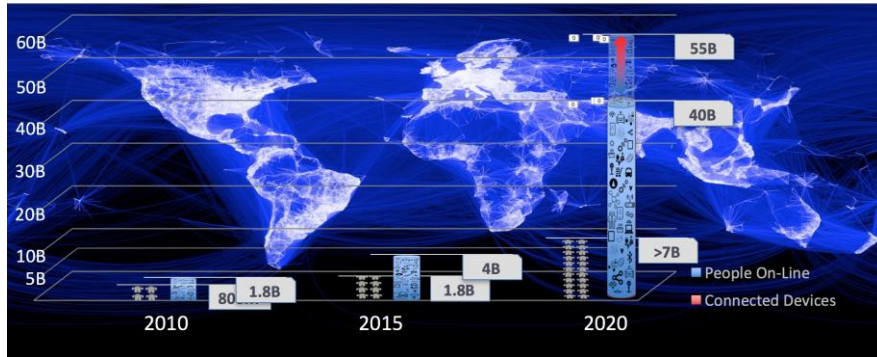
Sources: EdgeConneX & InternetWorldStats.com

# Why This Matters

Remember these slides?

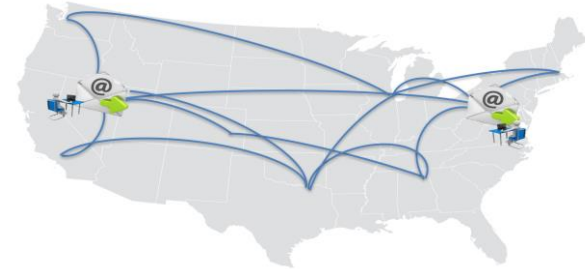
## Hyper Connected World

We are in an age of exponential growth



The Internet was designed for email...

..Not Video or the Internet of Things



.. And it's Not in Enough Places





# The Internet of Everything...

...Requires the Internet of Everywhere<sup>SM</sup>

## The Future of Video is the Internet:

- Content - all content will need to be cached at the edge
- The edge is the new internet onramp to the mega-clouds, the home for OTT content and the launch platform for the next generation of products and services to a hyper connected world

## The Internet of Things Needs the Edge:

- Localized computation platforms for high performance *clickstream analysis*
- High-Speed On-Ramps to Mega-Clouds hosting Big data and Services engines
- Lowest latency connections to the 55B sensors and devices that will enable IoT

## The Internet:

- Must be *everywhere* – *especially at the “new edge”*
- Must be constructed and maintained within an *open* and *predictable* commercial business framework
- Must support *innovation* and *expansion* of platforms and services “at the new edge of the Internet”





# Thank You

[EdgeConneX.com](https://EdgeConneX.com)

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