



Flash Memory Summit



# Future Case Studies—Thursday 8:30am

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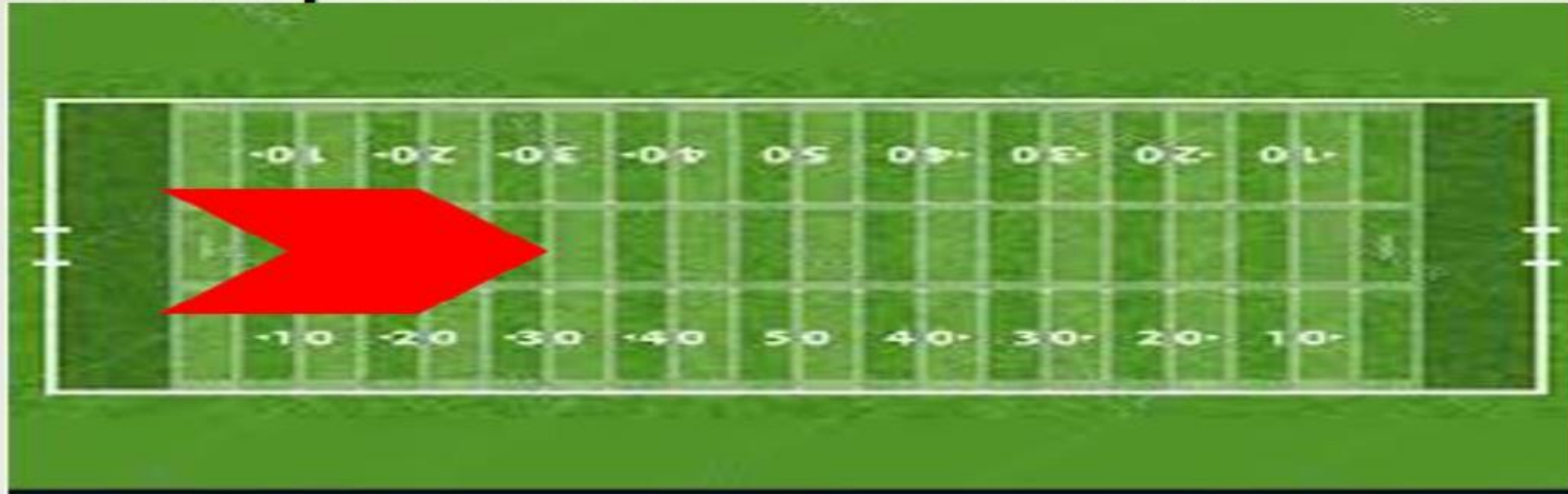


Flash Memory Summit



WE HUMANS  
THINK **LINEARLY**  
BUT TECH TRENDS  
ARE **EXPONENTIAL**

30 steps outside if each = 3 ft.





What if each step is a doubling (3 ft., 6 ft., etc?)

Circumference = ~ 25K miles  
= 132 million feet

30 doublings =  
1.5 X around the world

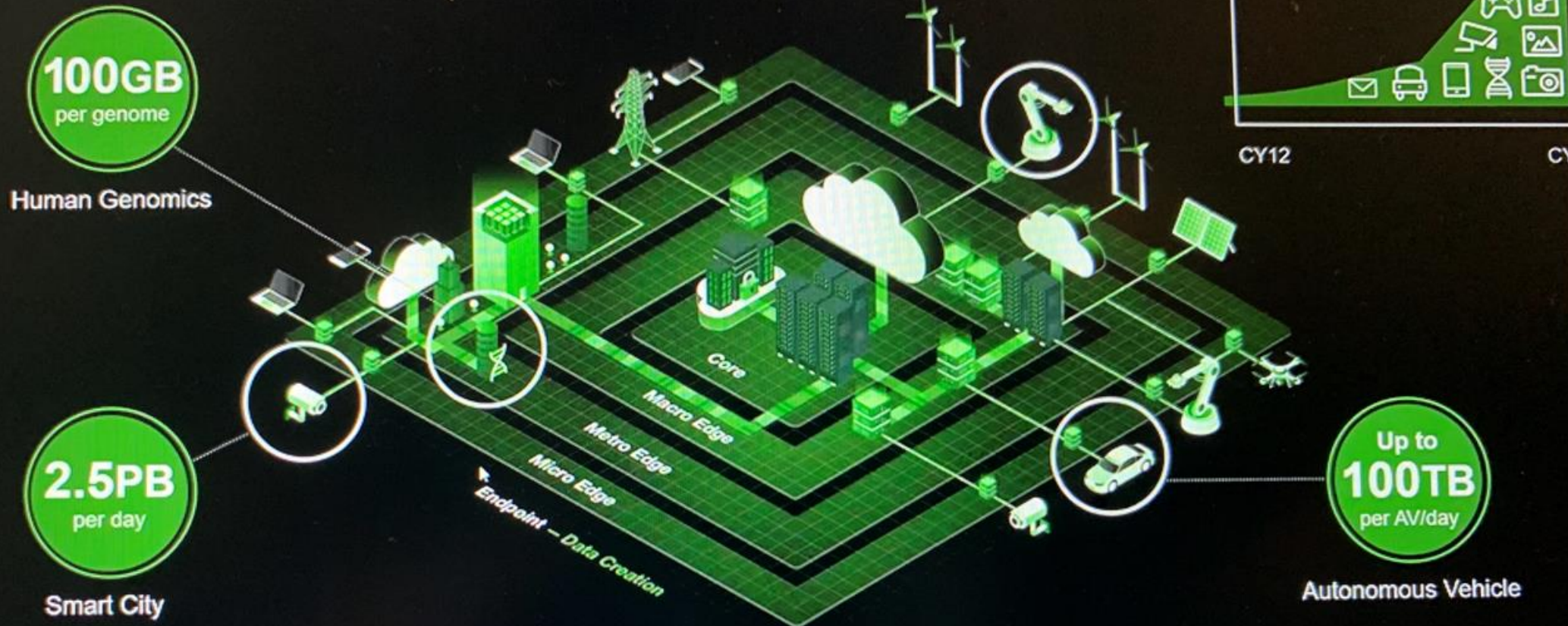


# AI/ML/DL and Exponential Technologies create ZB



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## Mega Trends Driving Need for Mass Capacity Storage from Edge to Core



# SELF-SUPERVISED LEARNING ARRIVES WITH TRANSFORMERS

Transformers are models that can learn sequence patterns in parallel. This breakthrough speed up language model training dramatically, which led to self-supervised language learning.



No longer limited by human data labelling, giant self-supervised transformers benefit from the troves of digital knowledge on the internet. The recent breakthroughs of Large Language Models is one of the great achievements in computer science. There's exciting work being done is self-supervised multi-modal learning and models than can do tasks that it was never trained on called zero-shot learning. Ten new models were announced last year alone.

3





## AI is transforming business

Enabling AI Enterprise Transformation with End to End Application Frameworks



Desktop Development



Data Center Solutions



Accelerated Edge



Supercomputers



GPU-accelerated Cloud





# Exponential Technologies – Six Ds

- Digitalization
- Deception
- Disruption
- Demonetization
- Dematerialization
- Democratization



# The Rebirth of Everything: The Future

- Advertising
- Entertainment
- Education
- Finance
- Food
- Healthcare
- Insurance
- Longevity
- Real Estate
- Shopping
- Transportation

## Acceleration of Acceleration Forces

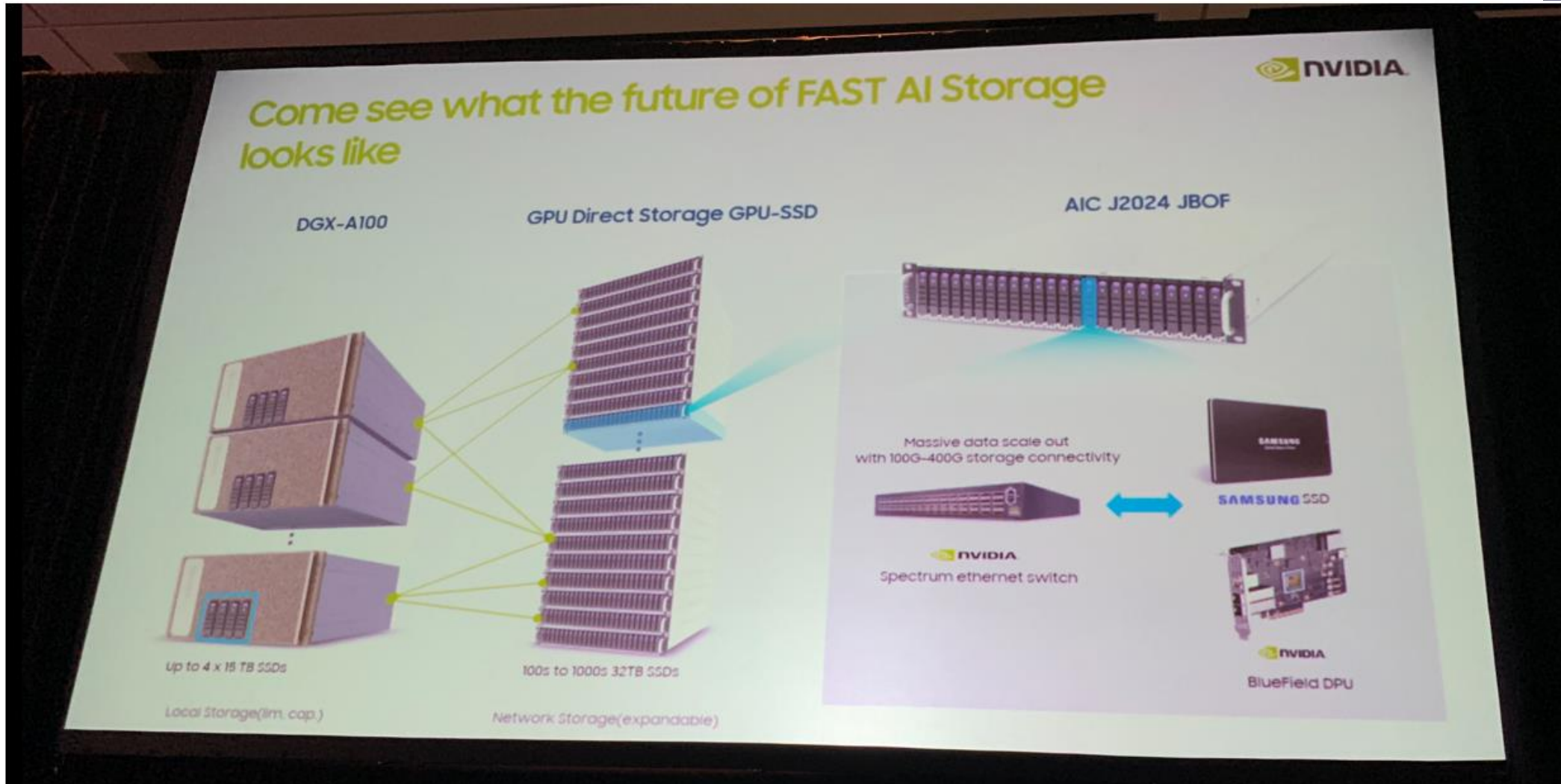
- Capital (Crowdfunding, Peer-to-Peer, Initial Coin Offerings, Sovereign Wealth Funds)
- Connected world (50% of world population was 3.8 billion vs 1.8 billion in 2010)
- Demonetization (e.g., iPhone: Music, Video, Calculator, GPS, free Apps)
- Human Intelligence (via BCI – Brain Computer Interface – Neurobiology)
- Longevity (someone born today may live to be 150)
- New Economies: (Crowd, Data, Smartness, Closed-Loop, Autonomous, Experience)
- Saving Time (AI collapses discovery times from years to weeks)

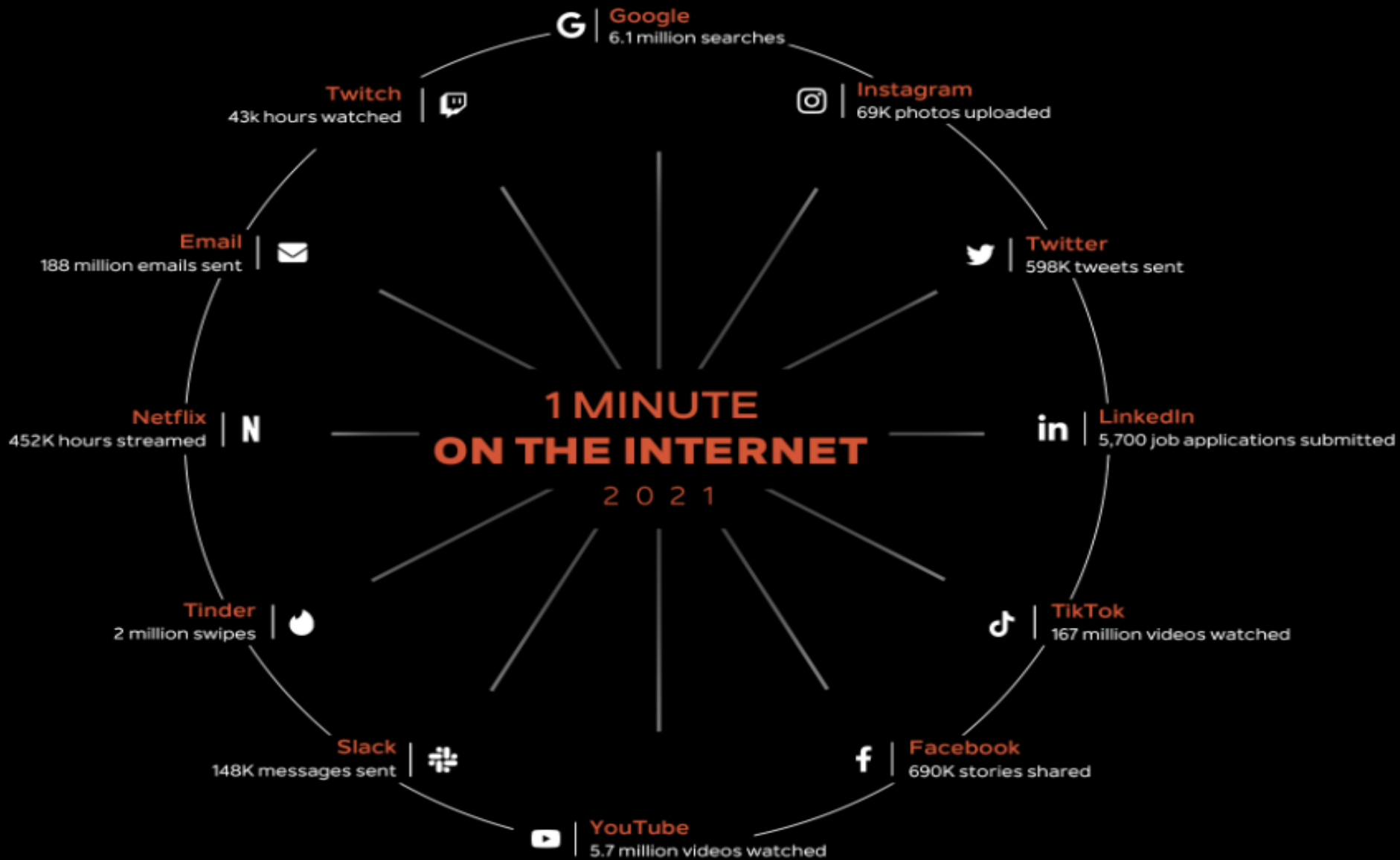




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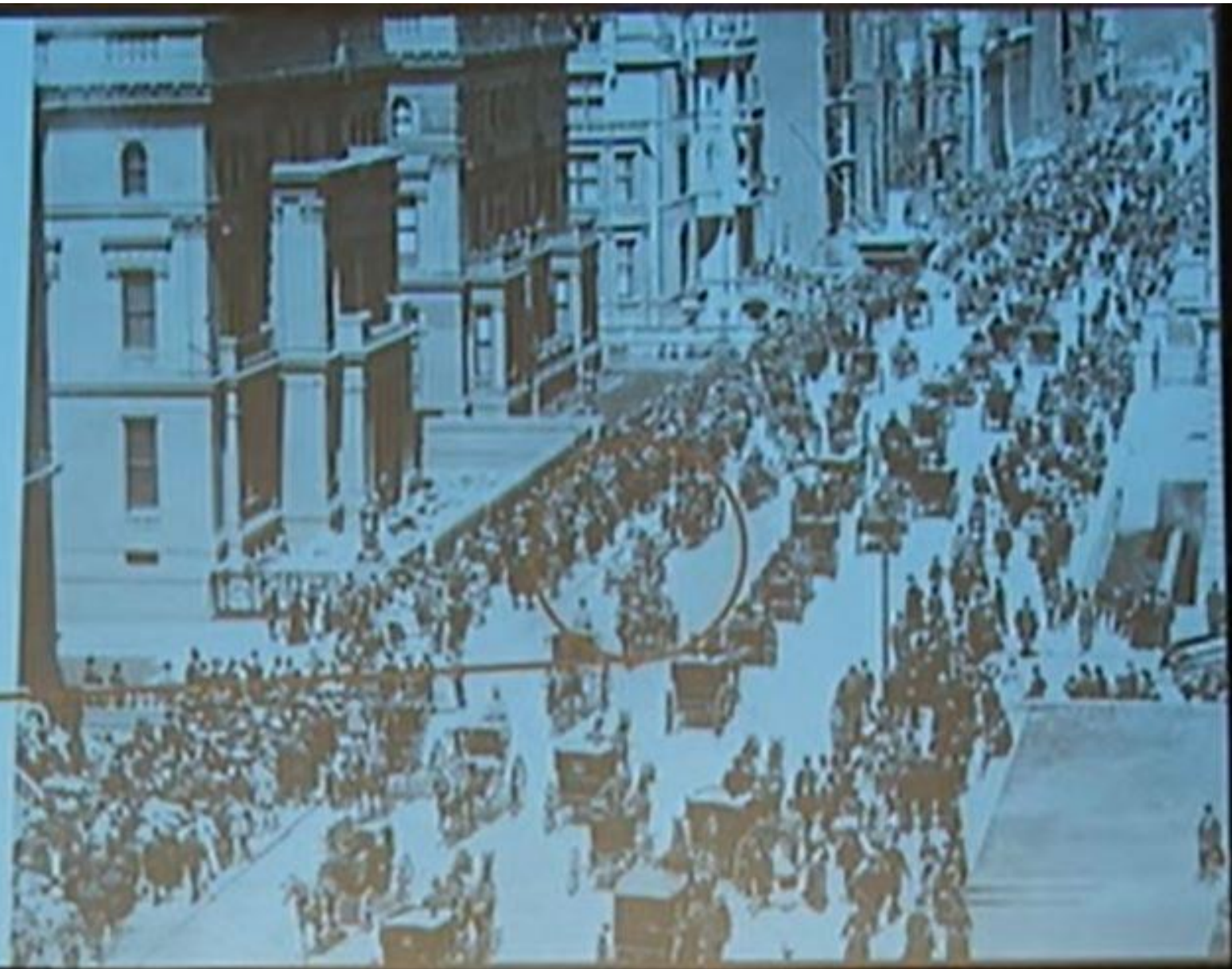


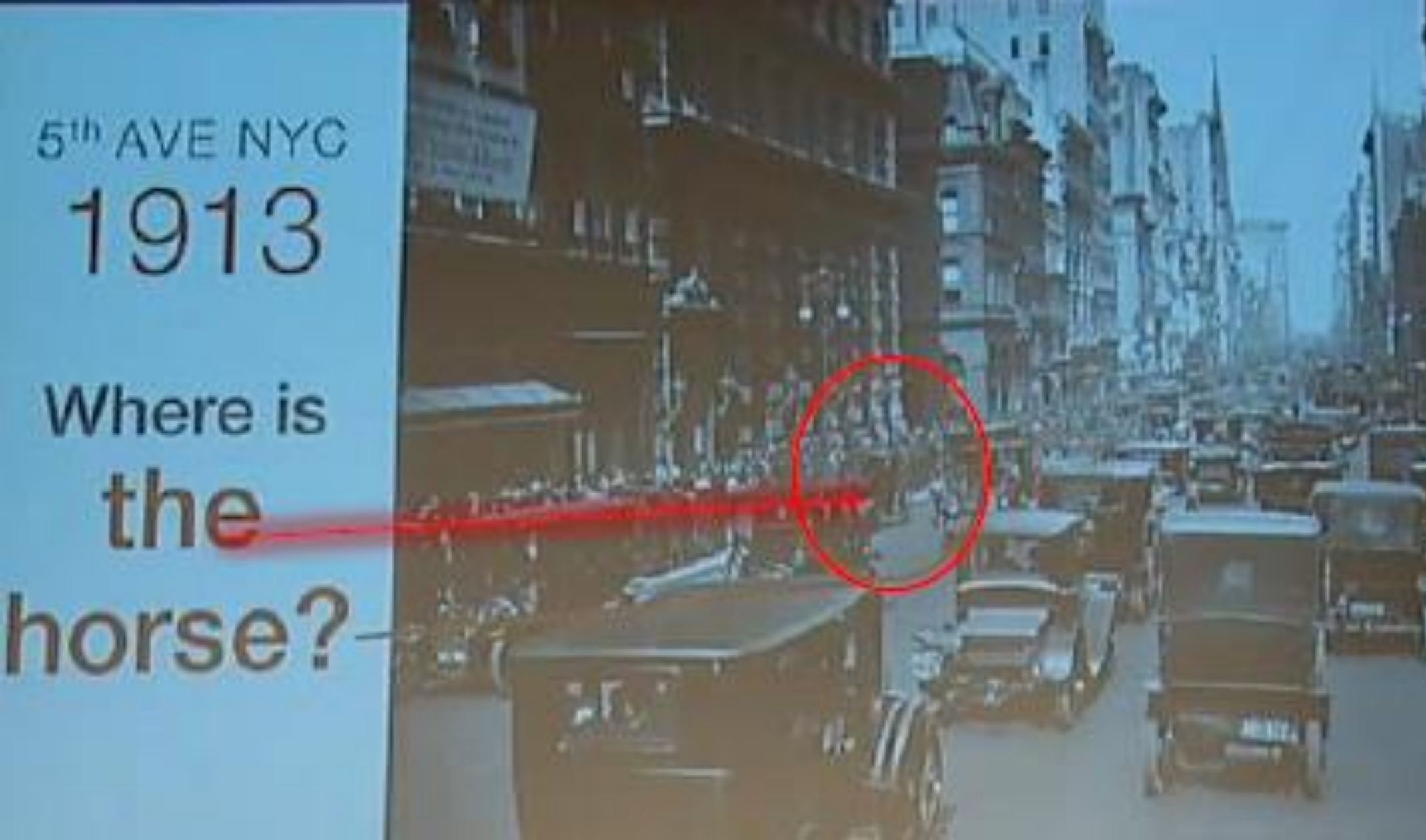




5<sup>th</sup> AVE NYC  
1900

Where is  
**the  
car?**









# The Significance of Latency

*If storage devices were sprinters*



In the time it takes a 15K Hard Drive to travel the length of a basketball court (94 feet)



NAND Flash can traverse the distance of a marathon (26.2 miles)



3D Xpoint can circumnavigate the globe (24,902 miles)



# Internet connections growing exponentially



## 2016 What happens in an INTERNET MINUTE?



## 2017 What happens in an INTERNET MINUTE?

