



Flash Memory Summit

Low-Cost Flash-Only Datacenters Going Mainstream



Tachyum™

Dr. Radoslav Danilak, Founder & CEO



Proven Team: World-Class Innovation

SandForce



10x Flash Life
\$20 → \$3 / GB
SLC → MLC

skyera



100x Flash Life
\$20 → \$3 → \$1 / GB
eMLC → MLC → TLC
Compression + Dedup.

Tachyum



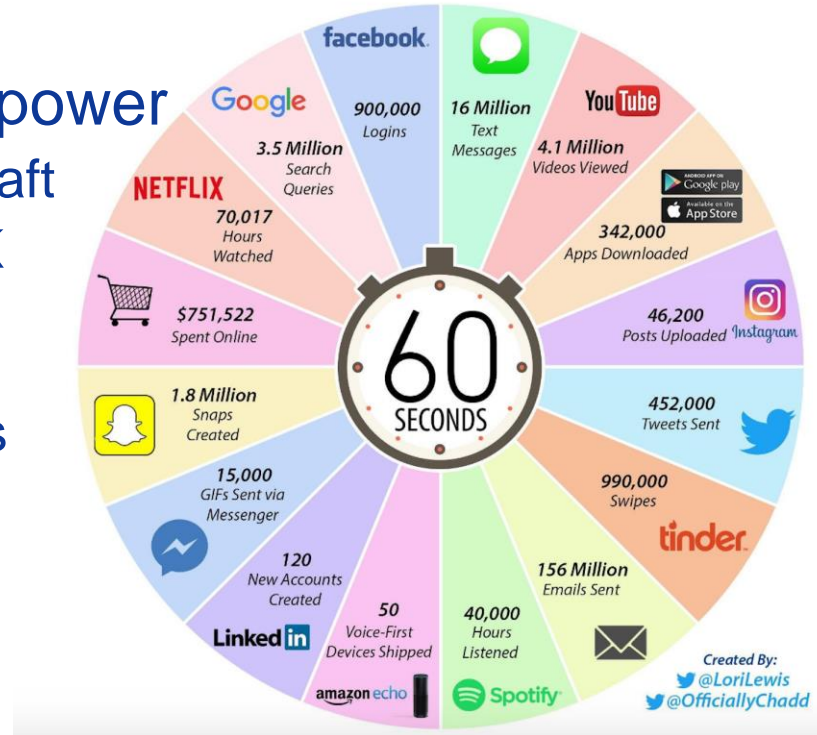
500x Flash Life
70¢ → 16¢ / GB
TLC → QLC
Multi-failure Tolerant
Compression + Dedup.
Hyperscale-Out



Future is Cloud-y

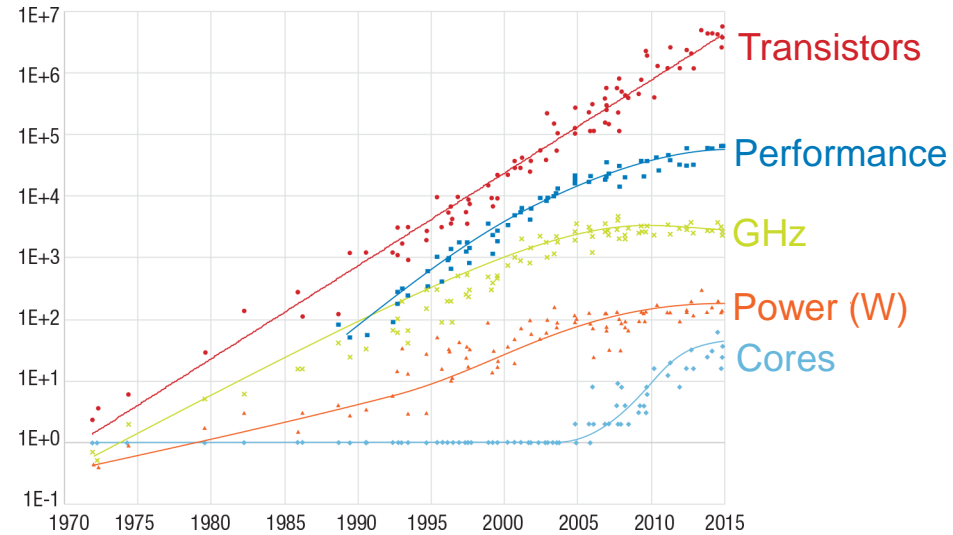
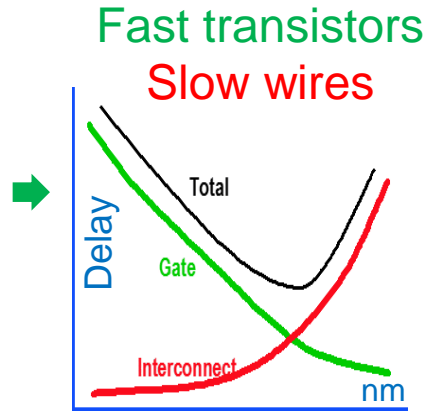
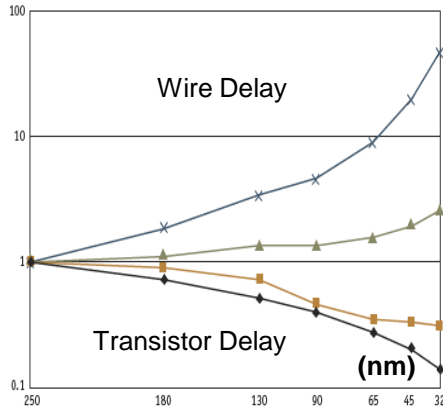
- Datacenters consume >2% total power
 - Larger carbon footprint than all aircraft
 - Consume 40% more power than UK
- Will hit power wall in ~10 years
 - 15% CAGR means 2x every 5 years
- Gartner predicts in 2017:
 - World-wide cloud services market will grow 18% to \$247B

2017 This Is What Happens In An Internet Minute





The Compute Performance Plateau



- New computational mechanism is needed to overcome this plateau
 - ARM A72 not an answer; Intel Atom has similar performance & power
 - FPGA, GPU, TPU apply only to limited applications versus CPU



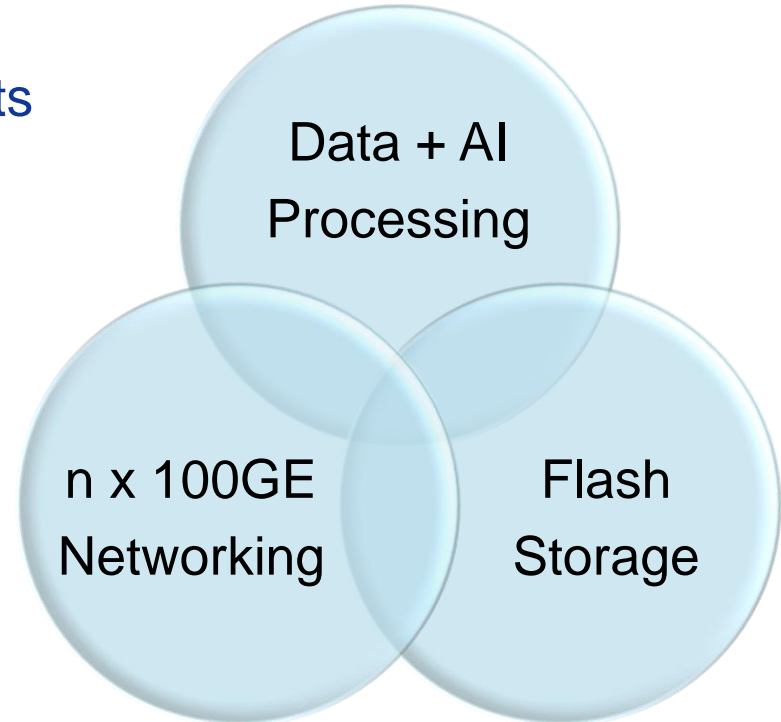
New Technology Is Answer

- Unlocks the performance of nanometer-size devices
 - By transparently resolving fast transistors and slow wires problem
 - Breaking through compute performance plateau
- Wide range of applications
 - Way more efficient than CPU but much easier to use as GPU
 - Incomparably more flexible than TPU
- Software non-disruptively enables existing applications
 - Eliminates market and customer adoption barriers
 - Optimized for big data, deep learning, and hyperscale computing



Cloud Chip

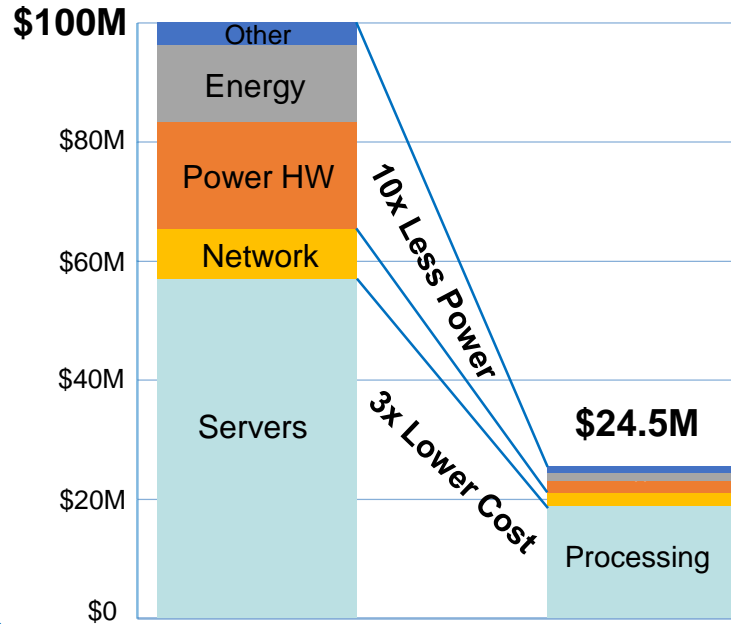
- Cloud Chip Is Composed of:
 - n x 100 Gigabit/s networking ports
 - m x 64 GB/s PCI Express
 - Flash storage processing
 - Data-path and AI processing
 - Fast and universal control-path
- Datacenter value proposition
 - 10-15x lower power
 - 3x lower CAPEX
 - 4x lower TCO





A Disruptive Value Proposition

4x Lower TCO With Cloud Chip



4x Lower TCO

Savings At Moderate Attach Rate

\$3B Google

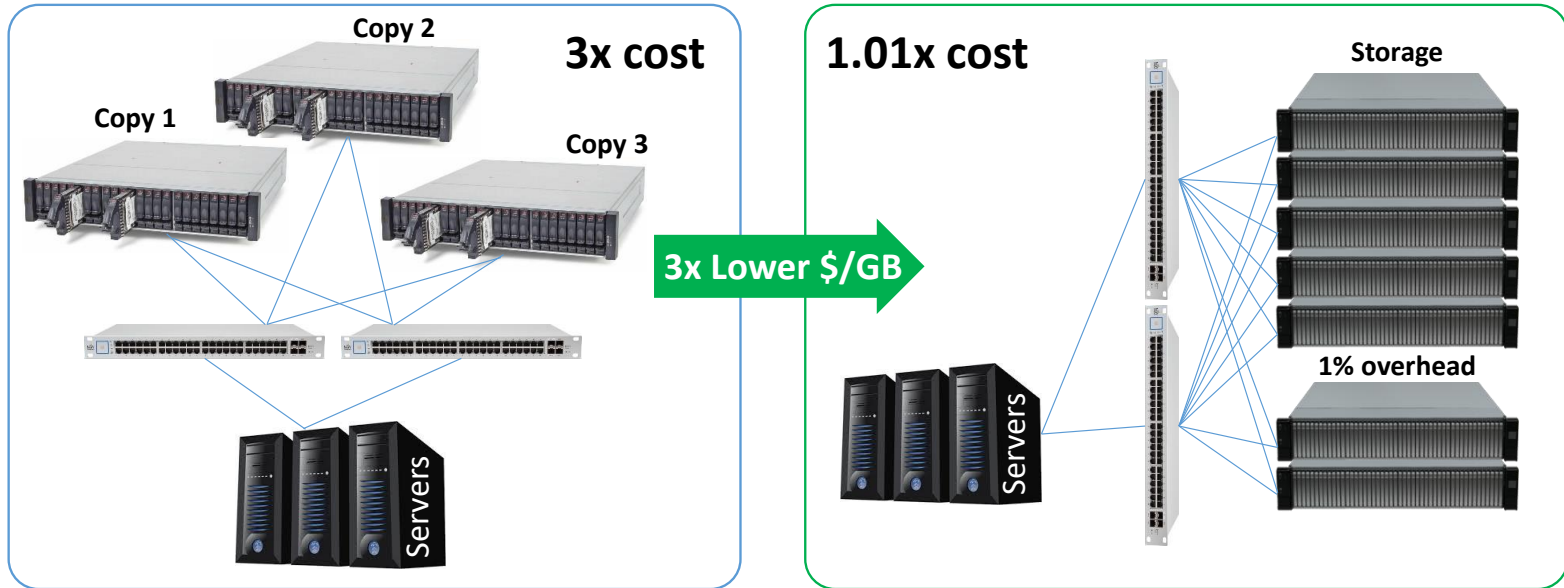
\$3B amazon

\$2B Microsoft Azure

Cloud HW	Spending	CAGR
IDC 2016	\$37B	15%
IDC 2020	\$59B	13%



All-Flash Datacenters Below Disk Cost



* DRAM Exchange 8/3/17: \$73 mSATA 256GB is 28¢/GB MLC, est. 15¢/GB QLC

- Disk 16.5¢/GB = 3 copies x \$300/10TB + 1.5¢/GB system + 1¢/GB OPEX
- Flash 16¢/GB = 15¢/GB QLC* + 0.7¢/GB system + 0.3¢/GB OPEX