



Market Research Panel

MRES-201A-1

Market Research Track
8:30AM to 9:35AM
August 8, 2018



Industry Analyst Panel

Moderator: John Rotchford, Managing Director, SASI

Camberley Bates, Managing Director, Evaluator Group

Jean S. Bozman, Vice President, Hurwitz & Associates

Thomas Coughlin, President, Coughlin Associates

Chris DePuy, Co-Founder, The 650 Group

Jim Handy, Director/Chief Analyst, Objective Analysis

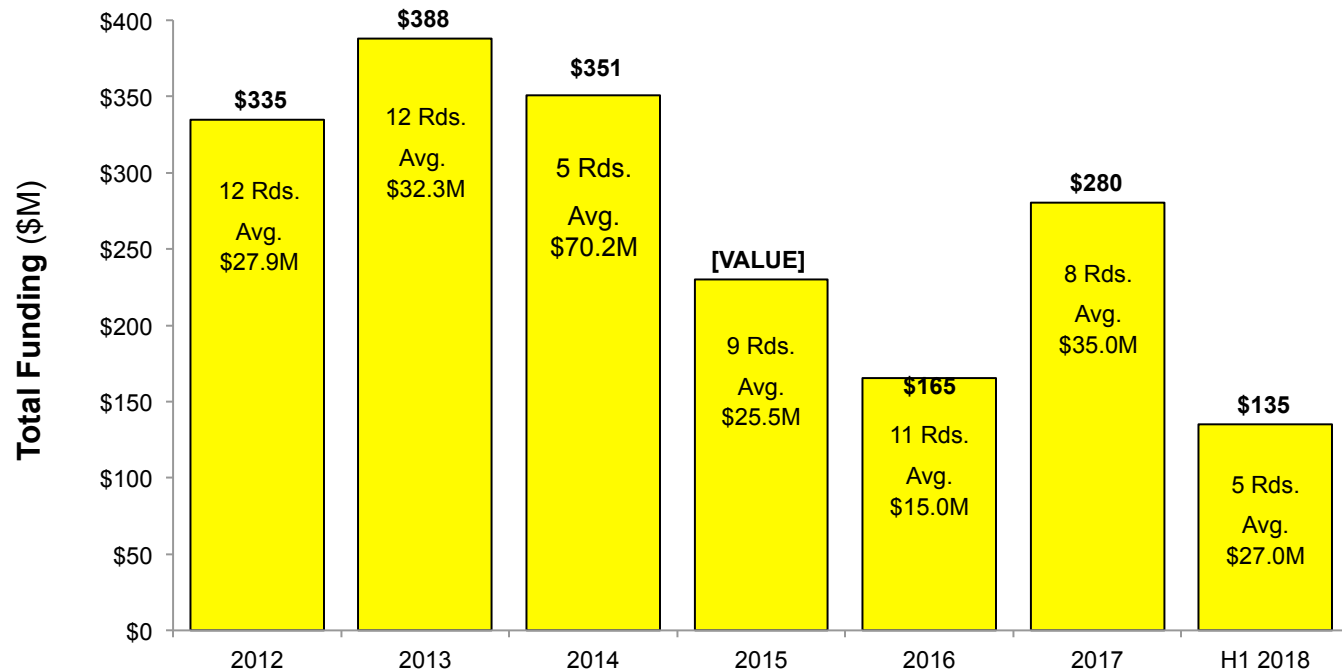
Jeff Janukowicz, Research VP SSDs, IDC



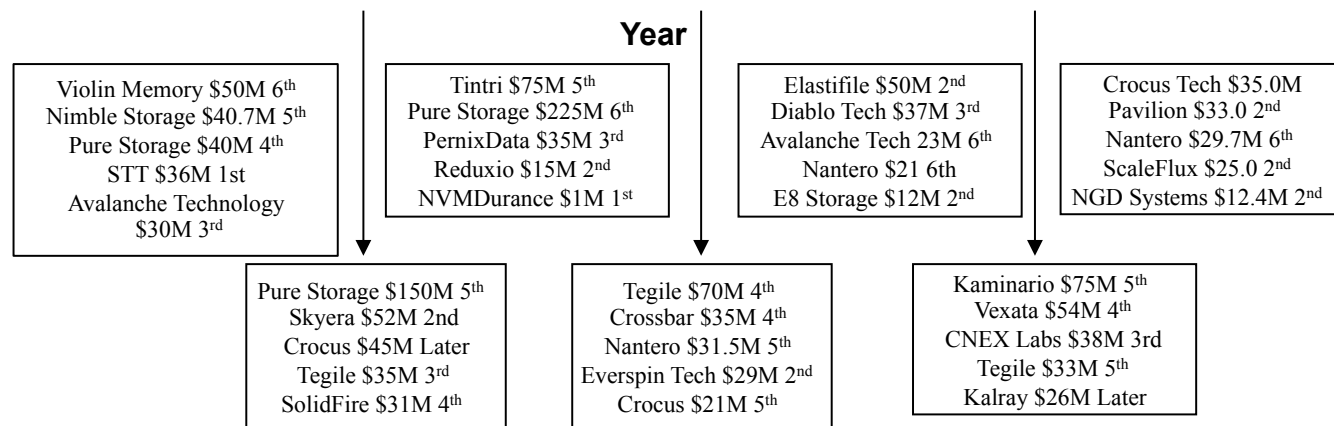
**Flash Memory Venture Funding
&
M&A Insights
John Rotchford, SASI**

August 8, 2018

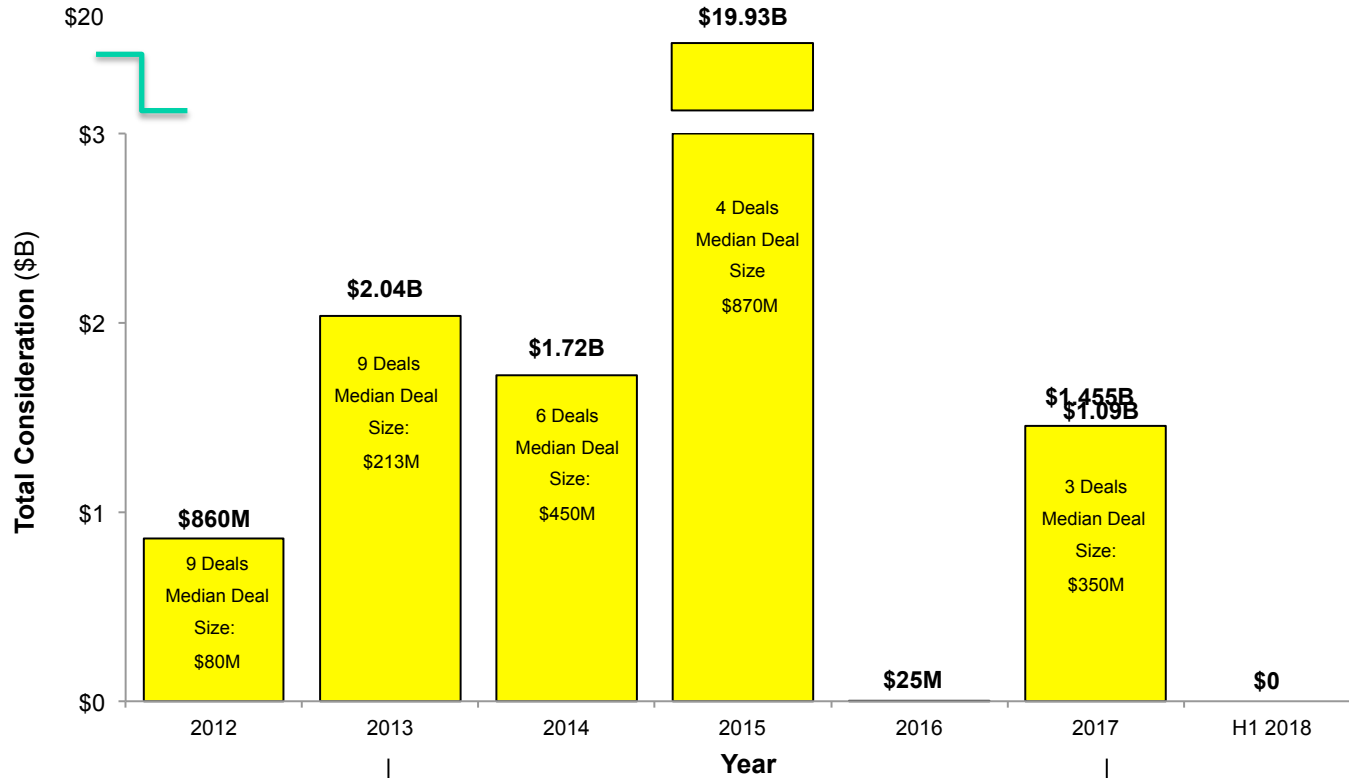
Flash Memory Venture Funding



Top Five Rounds



Flash Memory M&A Transactions



Top Deals

EMC/XtremIO \$430M
 IBM/Texas Mem Systems \$250M
 NetApp/CacheIQ \$90M
 SanDisk/FlashSoft \$70M

SanDisk/Fusion-io \$1.1B
 Seagate/LSI \$450M
 EMC/DSSD \$150M

Nutanix/PernixData \$25.3M
 Pivot3/NexGen Stg
 Kingston/Imation

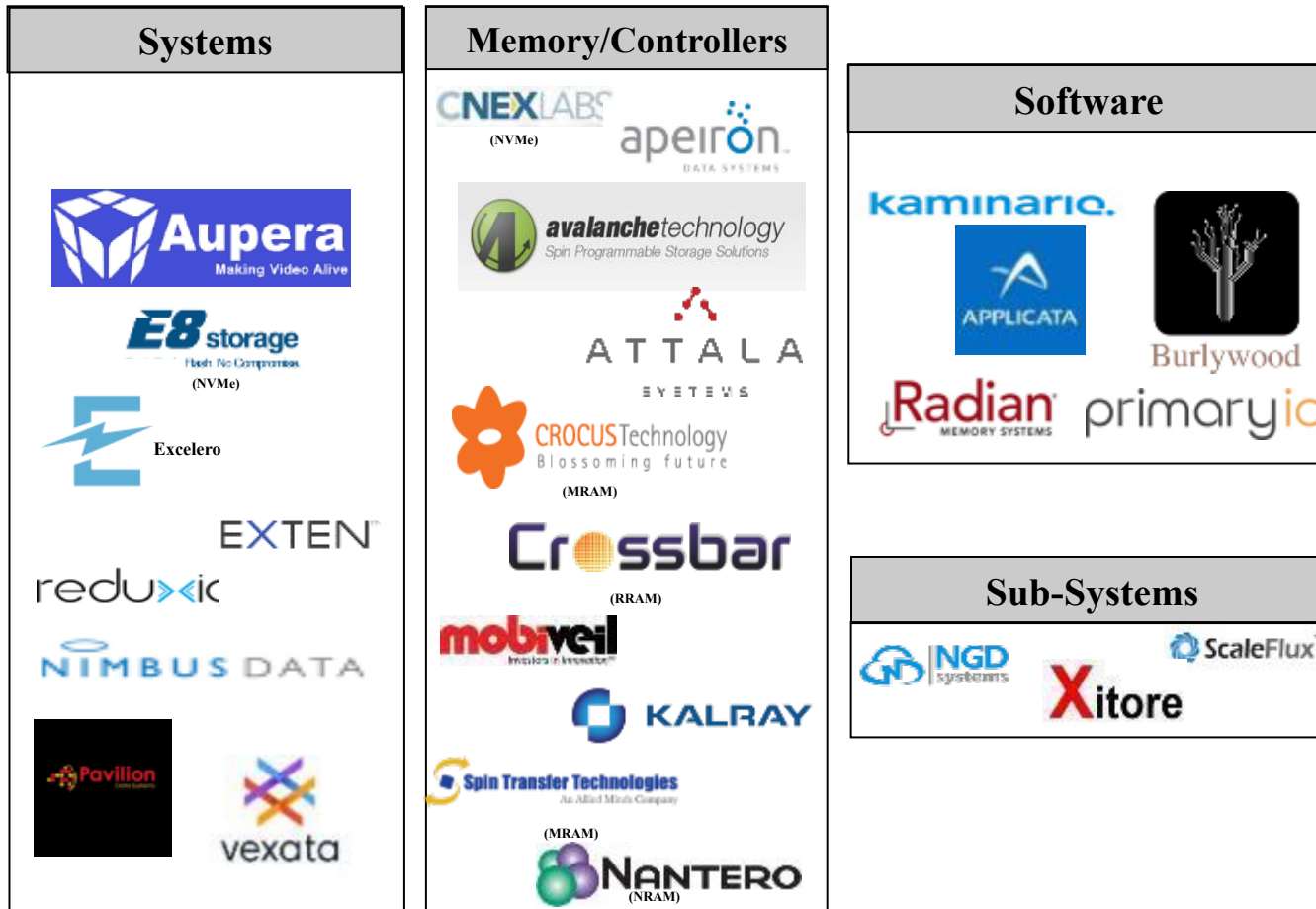
No M&A

WD/Virident Systems \$645M
 Cisco/WhipTail \$415M
 WD/STEC \$340M
 SanDisk/SMART Storage Systems \$307M
 Fusion-io/NextGen \$119M

WD/SanDisk \$19.0B
 NetApp/SolidFire \$870M
 Silicon Motion/Shannon Sys \$57.5M

HPE/Nimble Storage \$1.1B
 WD/Tegile \$350M
 Soros/Violin \$14.5M

Flash Memory Venture Market Map





Evaluator Group

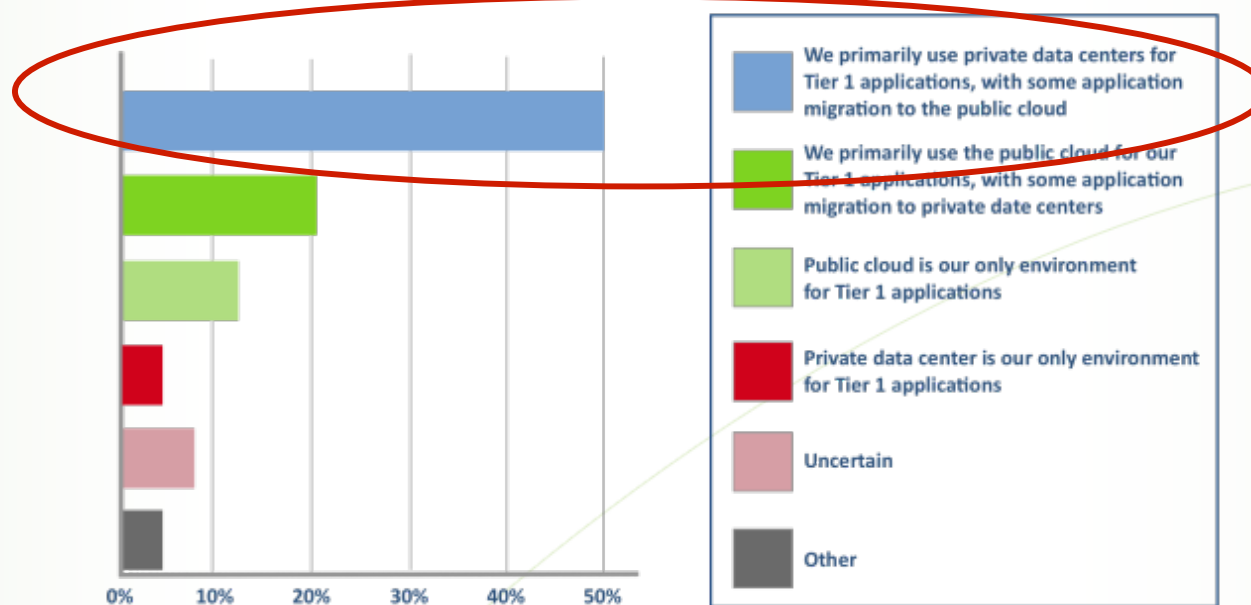
Enterprise and Solid State Adoption

Camberley Bates, Managing Director

@camberleyb

Tier 1 On and Off Premises

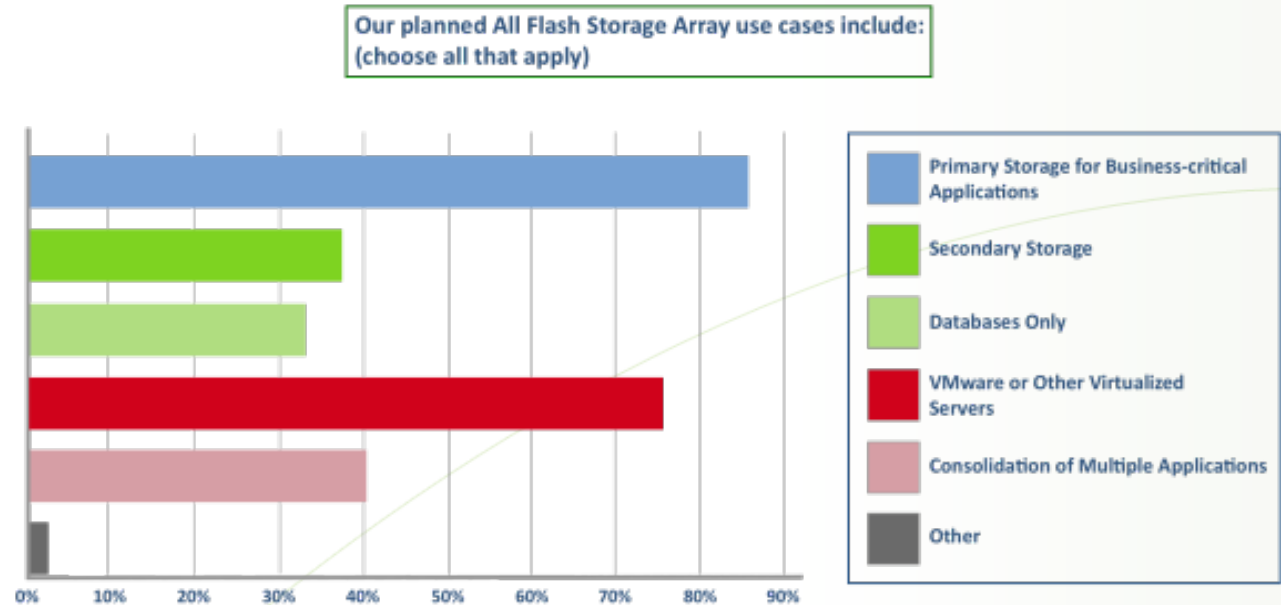
Which of the following statements best describes how you use public cloud for Tier 1 applications?



Evaluator Group "Enterprise Hybrid IT Storage Research, Aug 2018"

Solid State Storage Adoption, April 2018

- All Flash Systems used for 70 – 100% of Business Critical and Virtualized environments
- Arrays stay the preference over SDS, by over 2:1



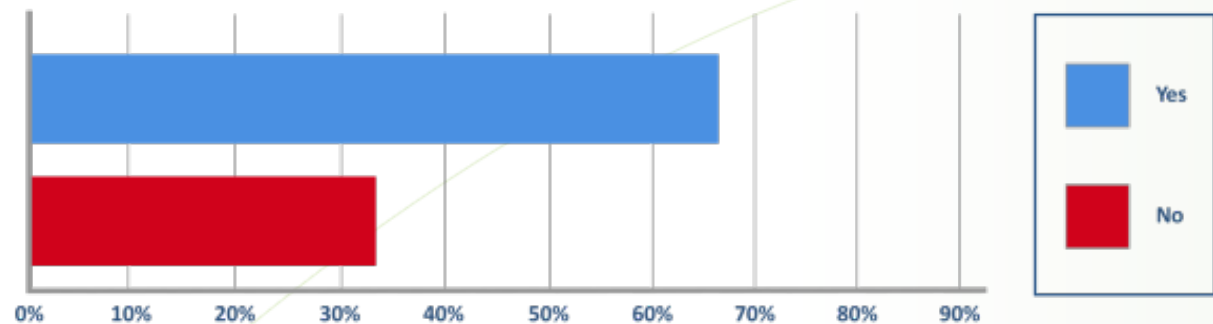
Evaluator Group “Solid State Adoption in the Enterprise, Apr 2018”

Enterprises Reduced Primary Storage Capacity

➤ Result of:

- Data Reduction Techniques
- Capacity Utilization
- Moving Inactive Data

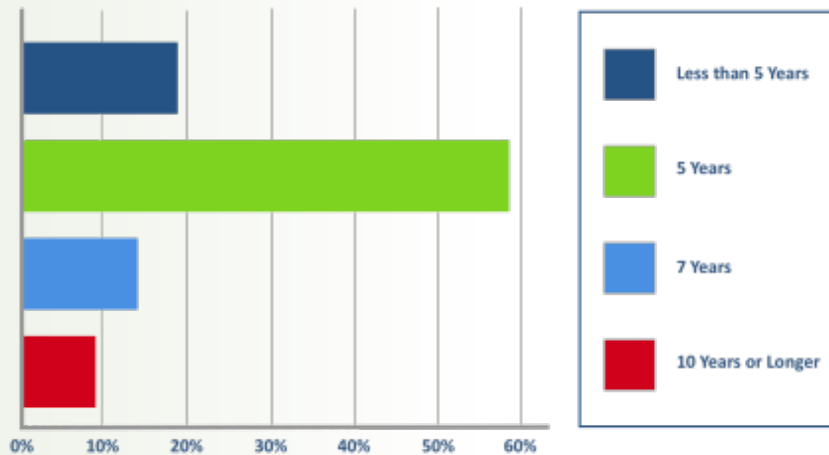
Were you able to reduce storage capacity when changing from disk to all Flash storage?



Evaluator Group "Solid State Adoption in the Enterprise, Apr 2018"

No changes yet, in Array Life

What do you expect the useful life to be of Flash devices (SSDs or Flash modules)?

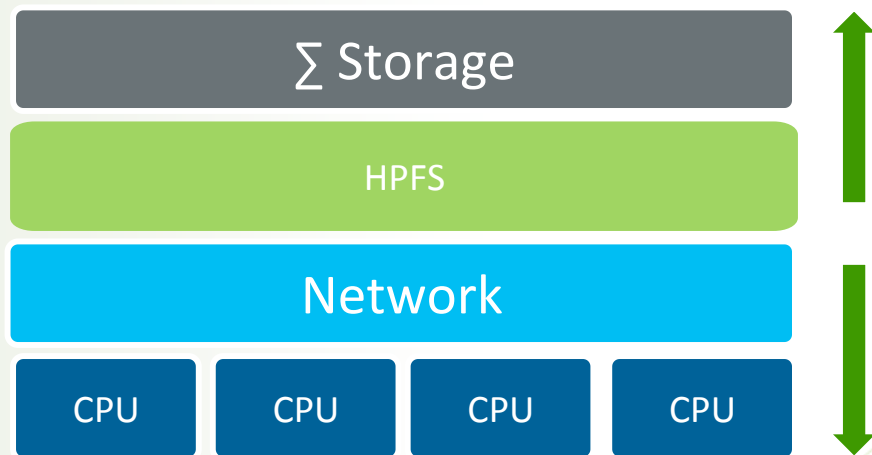


- Expect to see 7 year life – as accounting catches up or leases expire
- Requires matching warranties / support by vendors

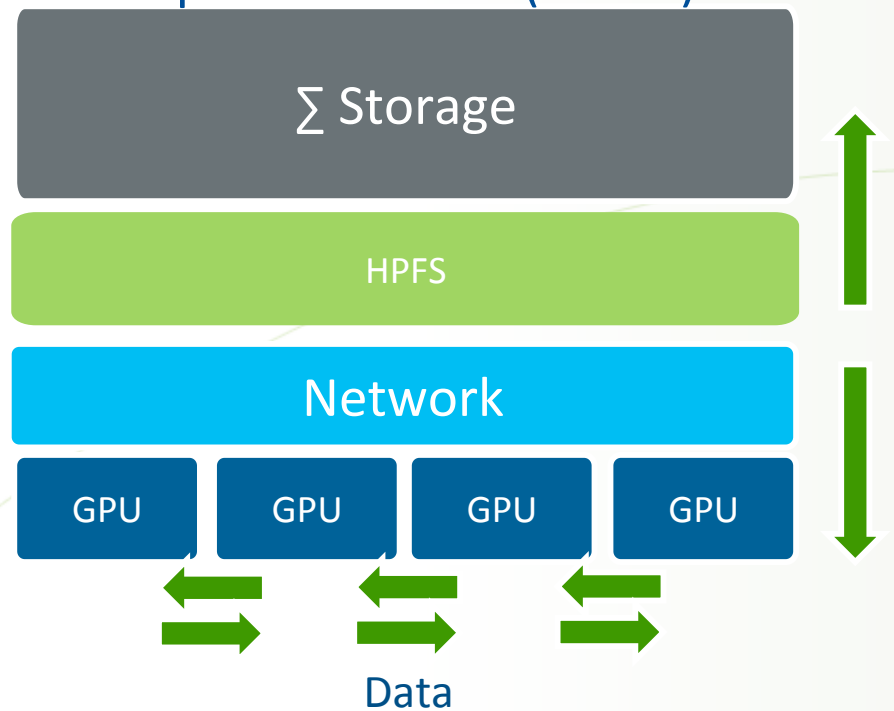
Evaluator Group “Solid State Adoption in the Enterprise, Apr 2018”

Flash - big player in HPC & AI Architectures

Traditional HPC, ML (N-S)



Expanded for DL (+ E-W)





**HURWITZ
& ASSOCIATES**
Insight to Action

Hybrid Cloud – Now the Mainstream – Is Spurring Flash Adoption

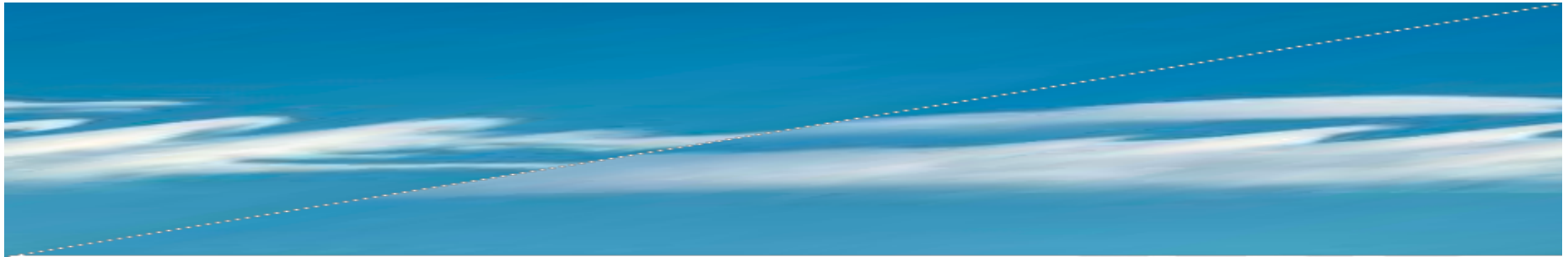
Jean S. Bozman
Vice President and Principal Analyst
Hurwitz & Associates

Hybrid Clouds: Driving the “Need for Speed”

- Hybrid clouds need fast data transfers, high-speed networks and flash storage
- Having fast, persistent storage will reduce processing time
- Processing more data at The Edge: sensors, medical imaging, audio and visuals/video



Cloud Migrations + Data Center Makeovers



- There's a Revolution in the IT Data Center
 - Breaking down aging IT silos
 - Consolidate, Simplify, Reduce
- Cloud-Native Services Are Growing
 - Cloud Service Providers (CSPs)/Hyperscale
 - Hybrid Clouds linking data centers and CSPs
 - Private Clouds Going Strong

Hybrid Clouds Will Tap Data at The Edge

- Sensor Data Generated at The Edge
- Integrating Data Across Many Environments
- AI and ML will Improve Storage Automation



Building Out: What's Next

- All-Flash Array Growth Will Continue
- New Network Fabrics Taking Shape
 - Leveraging NVMe to Achieve Faster End-to-End Data Transfers
- More Enterprise Apps Will Move to Cloud
- Security, SLAs Are Being Reinvented
- CyberSecurity Looms Large

Contact Information

Jean S. Bozman

Email: jean.bozman@hurwitz.com

Cell: 408-239-6795

Twitter: @jbozman

Emerging Memories and China Fabs

Tom Coughlin, Coughlin Associates

Jim Handy, Objective Analysis

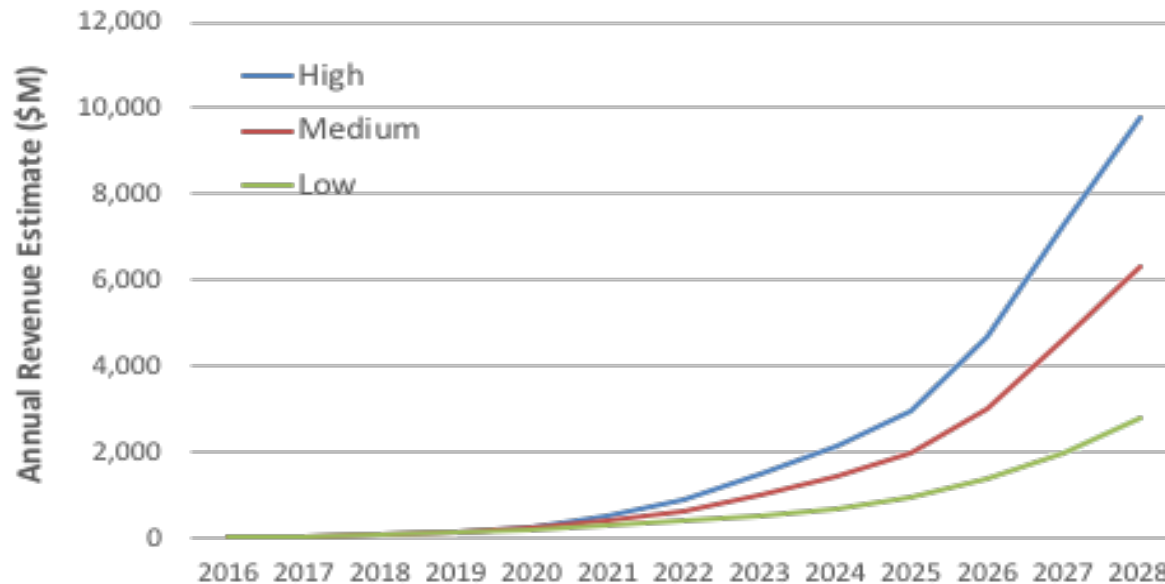
Emerging Memories are Poised to Explode

Tom Coughlin
Coughlin Associates
www.tomcoughlin.com

Copyright, Coughlin Associates, 2018



CHART OF HIGH, BASELINE AND LOW REVENUE ESTIMATES FOR EMERGING MEMORIES (\$M)

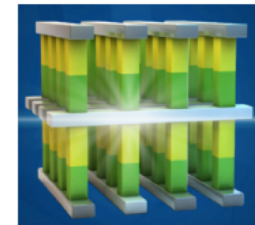
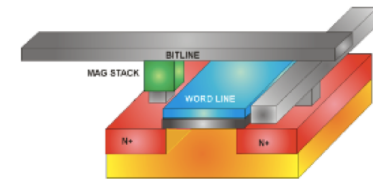


New Report on Emerging Memories

- Flash memory will remain a dominant solid-state memory several generations with all manufacturers having moved 3D flash.
- The 3D X-Point technology is poised to impact DRAM production while STT MRAM will impact SRAM, NOR and some DRAM.
- Resistive RAM (ReRAM) appears to be a potential replacement for flash memory sometime in the next decade.
- The memories addressed in this 161-page report, contain 31 tables and 111 figures, include PCM, ReRAM, FeRAM and MRAM Technology as well as a variety of less mainstream technologies.
- More information: <https://tomcoughlin.com/tech-paper>

EMERGING MEMORIES POISED TO EXPLODE

An Emerging Memory Report



COUGHLIN ASSOCIATES
San Jose, California
July 2018

© 2018 Coughlin Associates

1



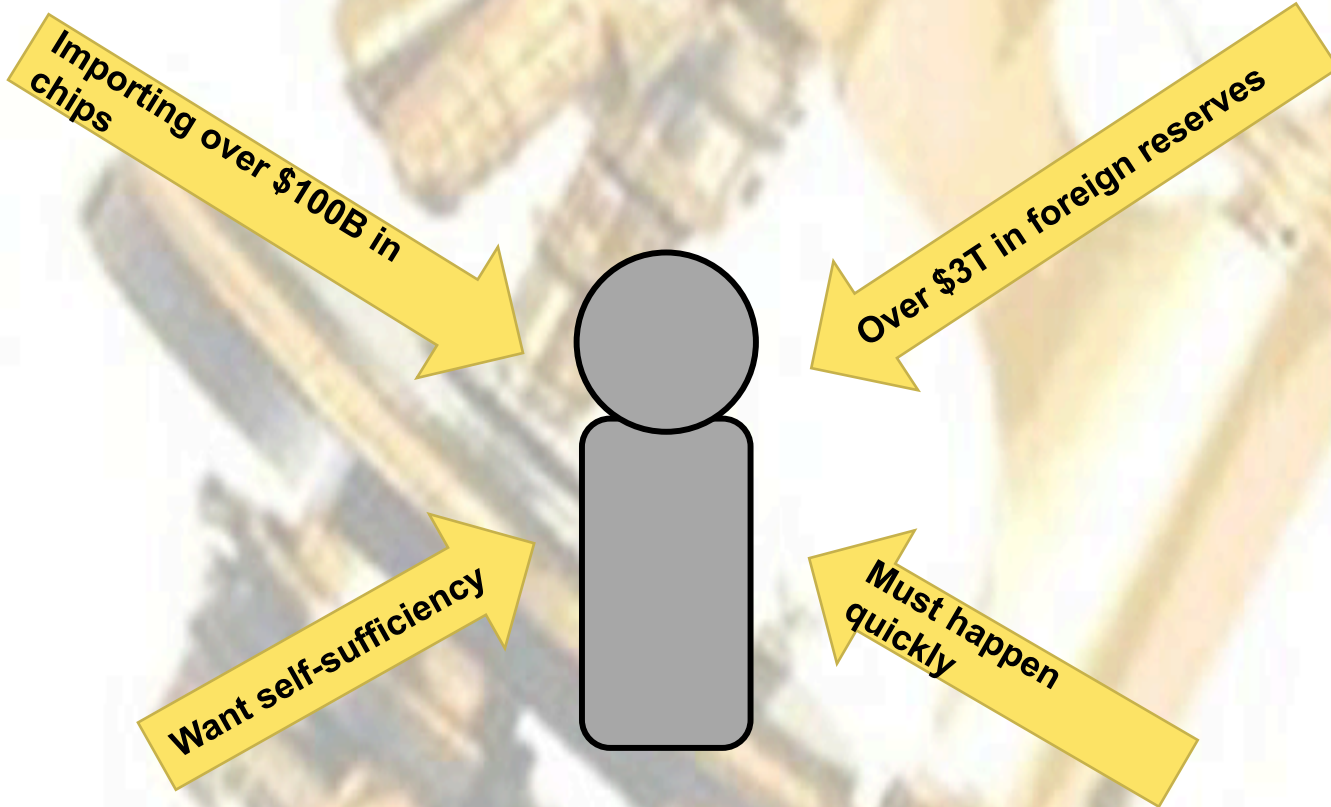
China's New Chip Thrust



Jim Handy

OBJECTIVE ANALYSIS

What Would You Do?



Getting China Into Memories

CCTV 13

Year	Outlook
2018	Mid-year NAND flash oversupply/collapse
2019	DRAM, then overall semiconductor collapse
2020	Second “Down” year. China production delayed
2021	China production real. Oversupply extended
2022	Demand catches up with supply. New shortage/ profits



中国经济的历史跨越

优化供给 中国制造迈向中高端

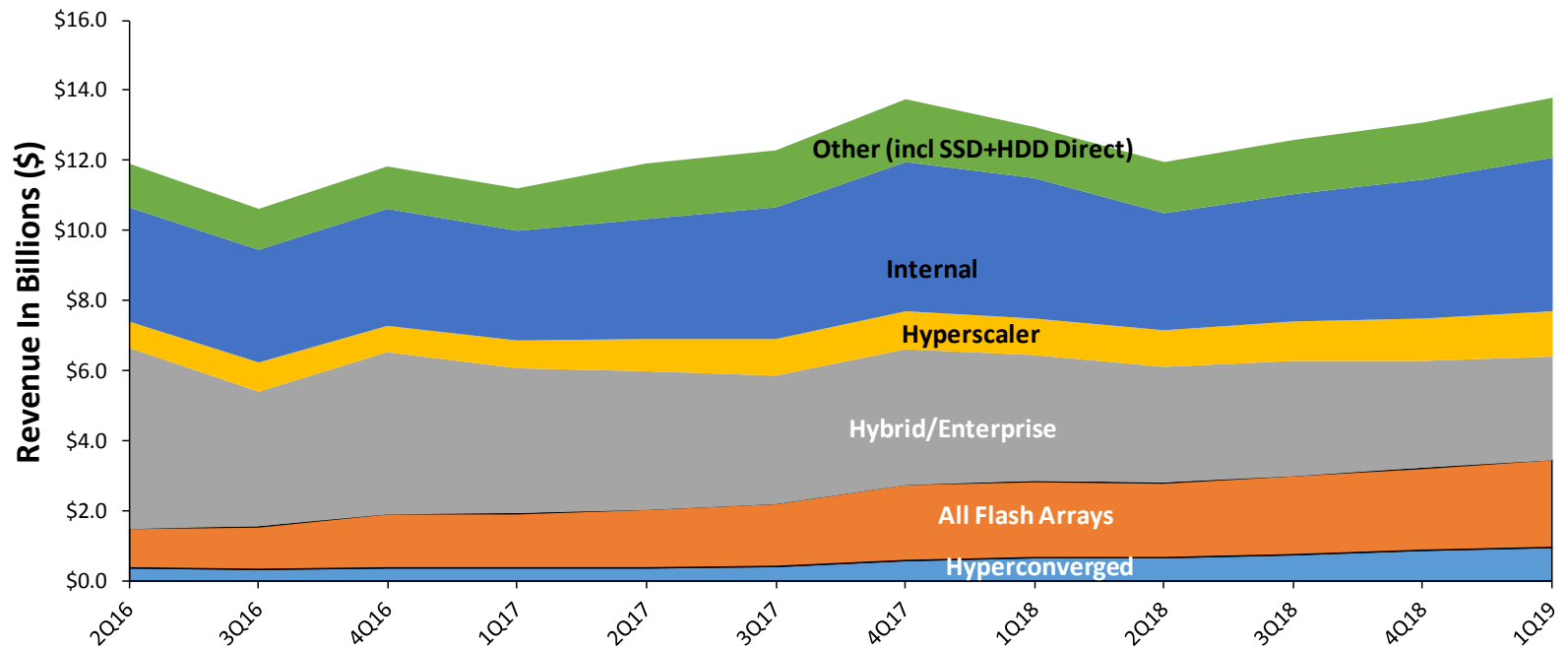
New Objective Analysis China Memory Report coming this month



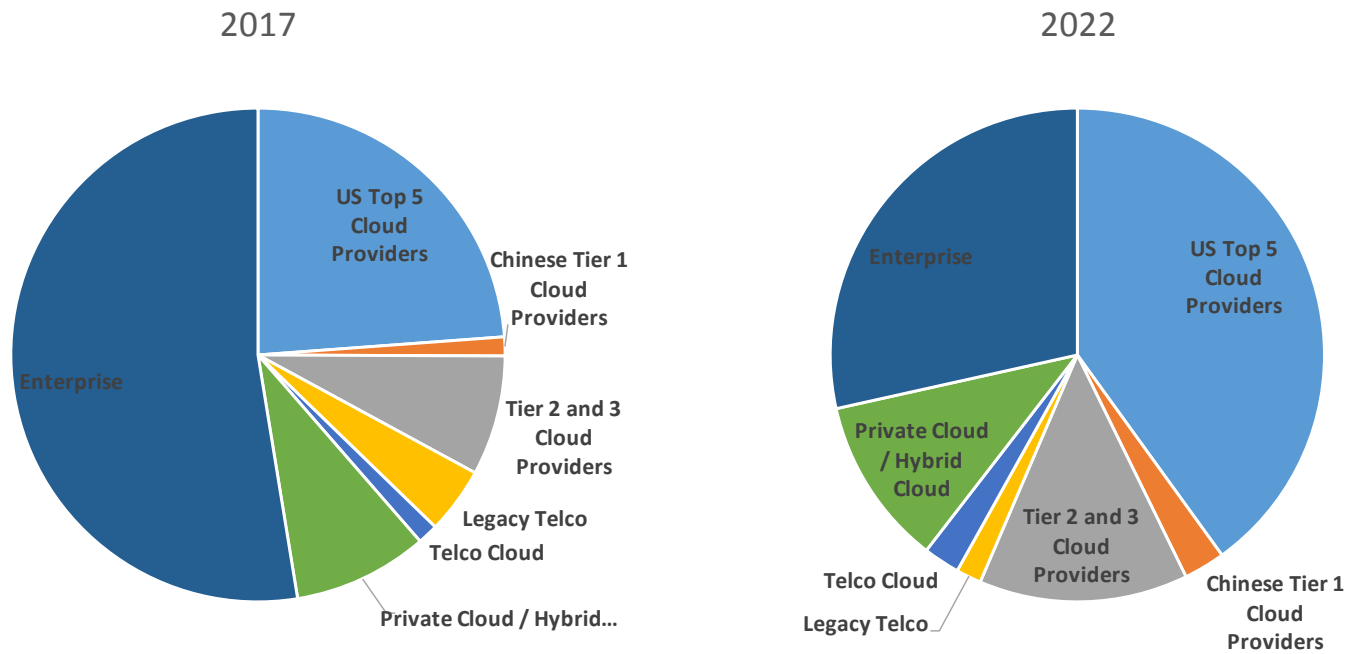
Storage Systems
Presentation at Flash Memory
Summit
Session MRES-201A-1, Aug 8,
2018 8:30 AM to 9:35 AM

Chris DePuy
chris@650group.com
+1 650-600-7105

Storage Systems: Equipment Type – Total (I+E)



Storage Systems: Customer Type – Total (I+E)

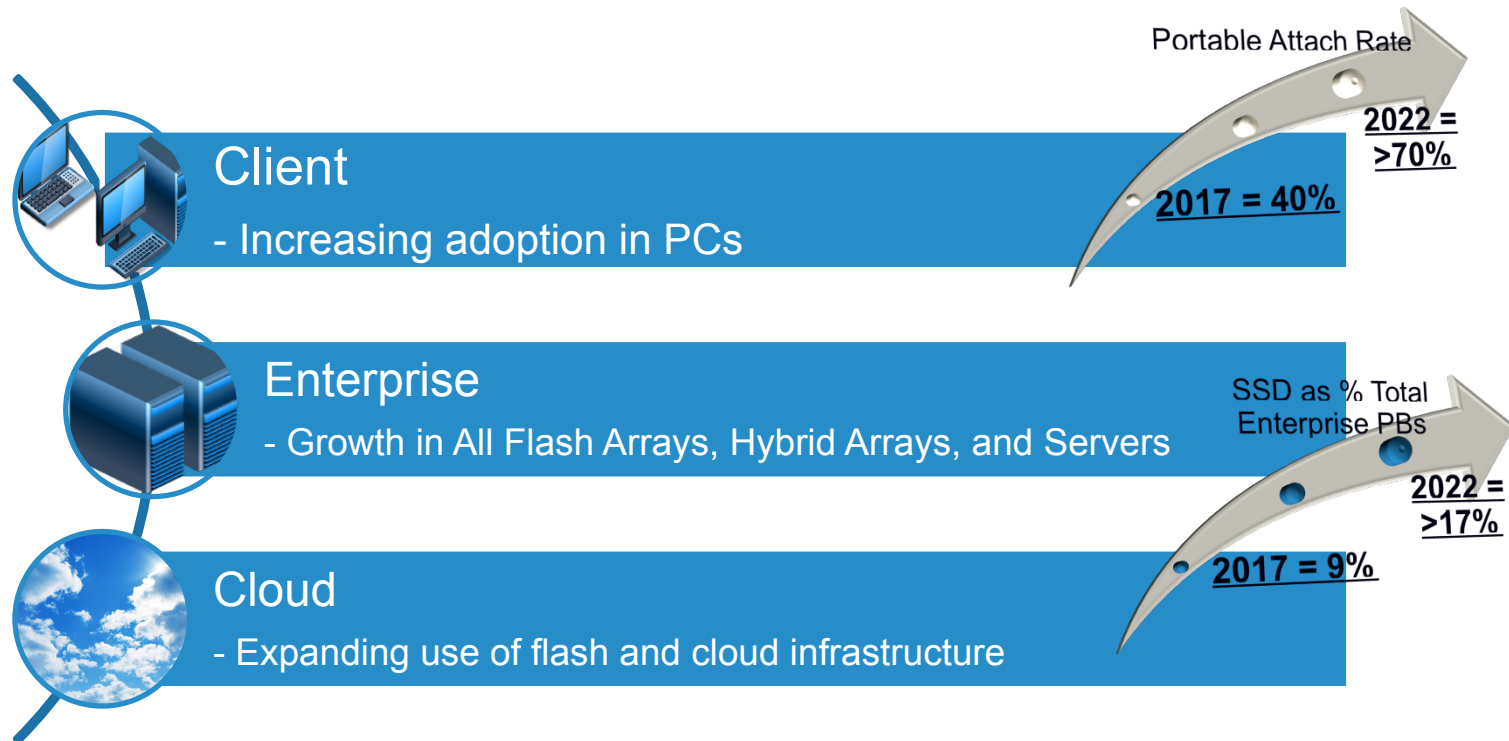




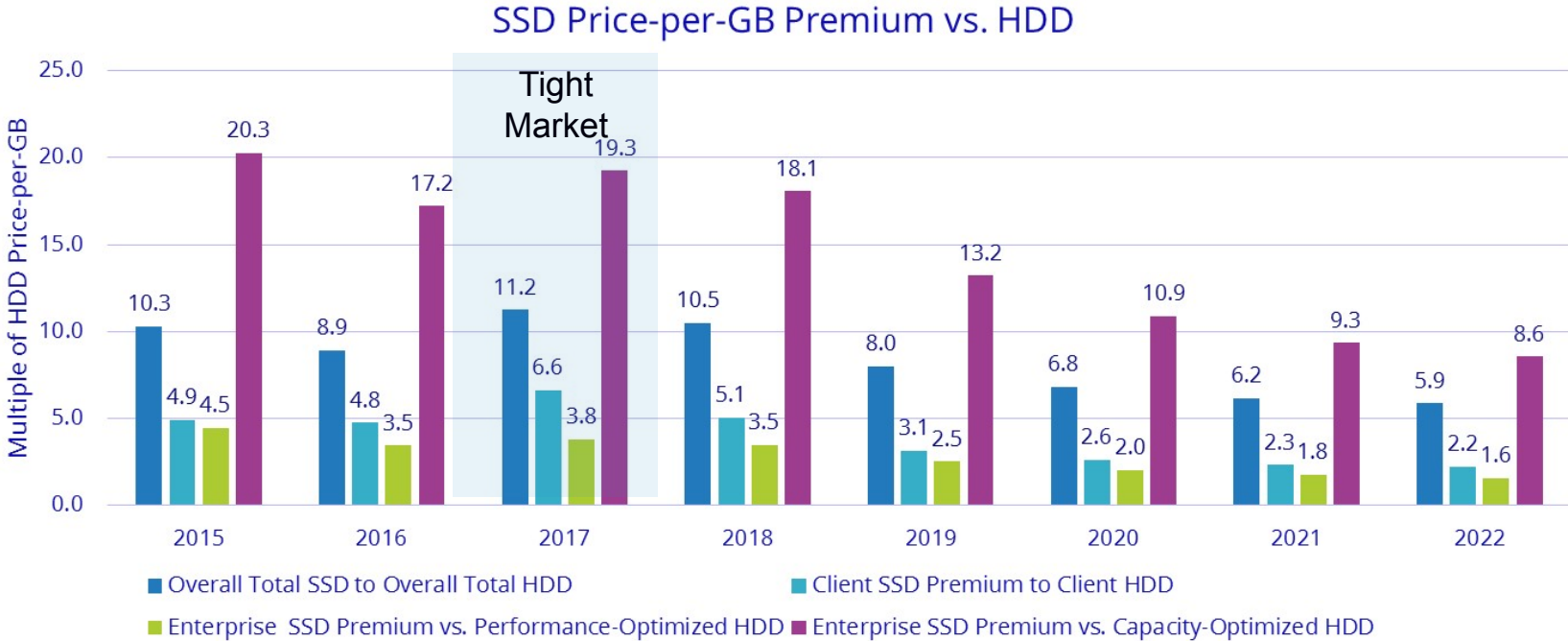
FMS 2018

Jeff Janukowicz
Research Vice President
IDC

Driving the Growth ...

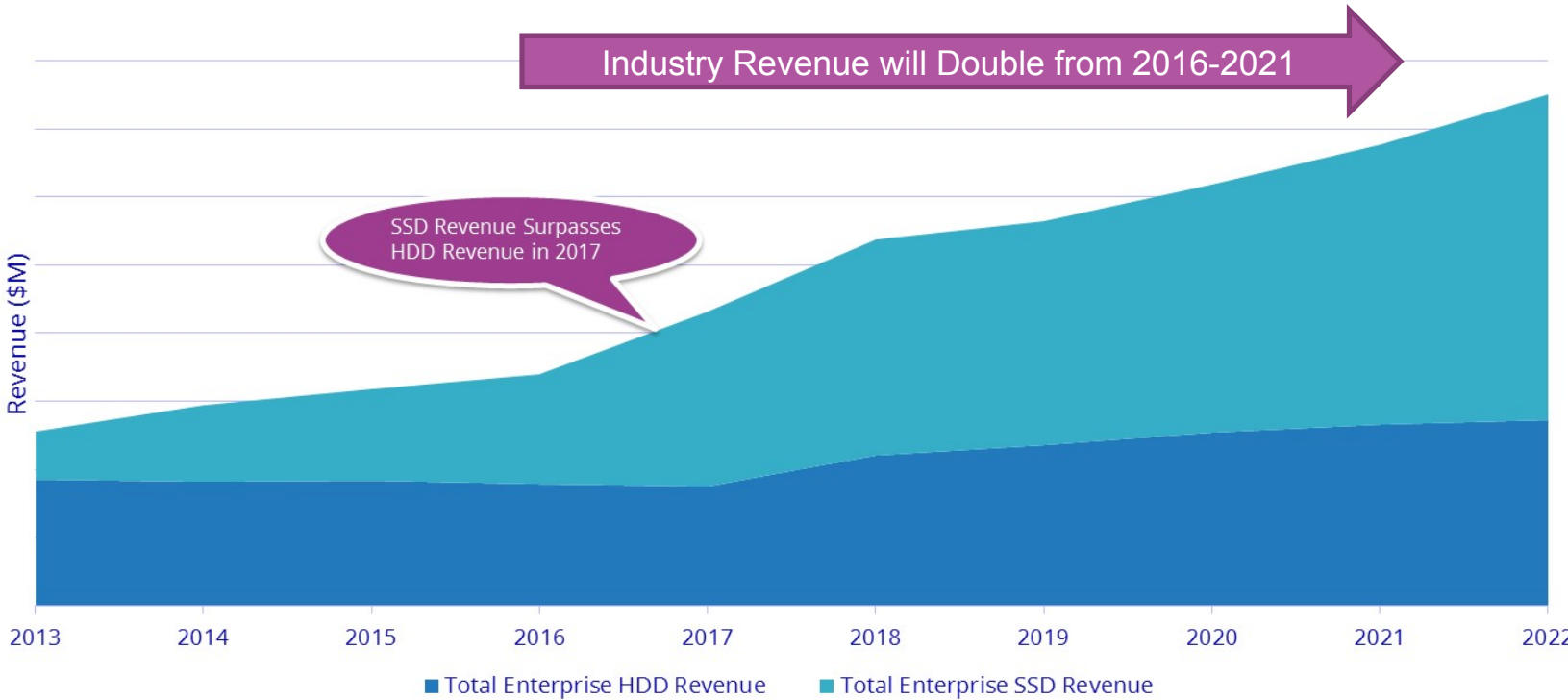


SSD Pricing Plays a Key Role in Adoption



Worldwide Solid State Drive 2017-2022 Forecast Update (May 2018) Doc #US42606818

Total Worldwide Enterprise HDD and SSD Revenue Forecast, 2013-2022



Worldwide Enterprise SSD and HDD Combined Market Overview, 2018–2022 (June 2018) Doc #US44076018

Worldwide SSD Unit Forecast 2017-2022



Worldwide Solid State Drive 2017-2022 Forecast Update (May 2018) Doc #US42606818





Q & A