



Update

Enabling Technologies and Semiconductors: May 9, 2016

Nina Turner
John Rydning
Soo-Kyoum Kim

Jeff Janukowicz
Robert Sorensen
Earl C. Joseph, Ph.D.

IN THIS UPDATE

This IDC update presents:

- Highlights from IDC's *Worldwide Solid State Drive Forecast, 2016-2020*
- Highlights from IDC's *Worldwide Hard Disk Drive Forecast, 2016-2020*
- Highlights from IDC's *Worldwide Hard Disk Drive Market Shares, 2015: Big Market Shifts in 2015, Yet Little Change in Market Share*
- Highlights from IDC's *The Changing Face of Memory Technologies: New Technologies Drive New Opportunities – And Create New Problems*

Storage Mechanisms: Solid State Storage Technologies

Solid State Drives Continue on Path to Become More Broadly Used

The following is an excerpt from *Worldwide Solid State Drive Forecast, 2016-2020* (IDC #US40422516, forthcoming).

This IDC study presents an updated outlook at the solid state drive (SSD) market through 2020. The SSD industry dynamics associated with 2015 and the end-device forecast changes are aggregated, analyzed, and applied to IDC's long-term SSD forecast in terms of units, revenue, and petabytes for each consumption category of SSDs (client, enterprise, and commercial).

Solid state drives are continuing on a path to become a more broadly used, ubiquitous storage technology across IT markets. The 3rd Platform market dynamics such as the overall desire for more efficient and faster access to data will continue to favor the adoption of SSDs. IDC expects greater adoption to continue in all segments over the forecast period when coupled with market segment dynamics and technology trends associated with SSDs.

In this forecast iteration, pricing once again played a key factor influencing the outlook as SSD price elasticity underpins many assumptions motivating SSD adoption. The current supply/demand balance outlook in the NAND industry is driving NAND flash pricing lower over the forecast period.

Storage Mechanisms: Disk

Worldwide Hard Disk Drive Unit Shipments Reduced

The following is an excerpt from *Worldwide Hard Disk Drive Forecast, 2016-2020* (IDC #US41223716, forthcoming).

The scope of this forecast includes hard disk drives (HDDs) shipped worldwide for use in PC and enterprise systems, in personal and entry-level storage (PELS) devices, in video surveillance systems, and in consumer electronics products, as well as HDDs shipped to global distributors or HDDs sold through retail channels for system upgrades.

Worldwide HDD unit shipments have been reduced significantly compared with the prior worldwide HDD market forecast update published in 4Q15. Market and competitive storage technology dynamics are changing rapidly, and these factors are being reflected in this iteration of the worldwide HDD forecast. Dynamics negatively impacting worldwide HDD unit shipments through 2020 include:

- Aggressive SSD pricing is accelerating the transition from HDDs to SSDs in the PC market.
- PC buyers increasingly are discovering that thin, lightweight detachable tablets are a compelling option compared with traditional portable PCs, especially as detachable tablet price points decline.
- The PELS market is feeling the effects of saturation in terms of the installed base of PC users owning a PELS device, elongating PELS device replacement cycles, and expanding use of cloud storage as an alternative to an on-premise PELS device.

Enterprise market demand for HDDs is more complex and nuanced than the other HDD markets. Yet, for HDD suppliers to realize enterprise market revenue growth beyond 2016, it will require a concomitant shift by enterprise HDD customers to expect and accept slowing enterprise HDD price-per-gigabyte declines.

Worldwide HDD Market Impacted by Transition to 3rd Platform in 2015

The following is an excerpt from *Worldwide Hard Disk Drive Market Shares, 2015: Big Market Shifts in 2015, Yet Little Change in Market Share* (IDC #US41223616, May 2016).

The worldwide HDD market was impacted noticeably by the transition to the 3rd Platform in 2015. Worldwide HDD unit shipments and revenue declined year over year, mostly as a result of weak HDD demand from PC customers. Overall HDD petabyte shipments did increase year over year in 2015, but only at a 1.7% year-over-year growth rate.

After several decades of mergers, acquisitions, or companies simply giving up the effort to manufacture and sell hard disk drives profitably, the HDD industry's final stage of consolidation occurred in 2015 when the PRC Ministry of Finance and Commerce (MOFCOM) allowed Seagate to fully assimilate its purchase of Samsung's HDD business and WD to fully integrate its acquisition of HGST (with a few time-bound conditions). The HDD industry has followed a near textbook example of evolving into the "rule of three" industry structure as set forth by Sheth and Sisodia (in 2002).

The HDD industry is in the midst of a prolonged segment shift, where a progressively higher percentage of overall HDD industry revenue, unit shipments, and petabyte shipments will be derived from the enterprise market segment each year. As this transition ensues, the enterprise market becomes an even higher priority for HDD suppliers in terms of revenue and petabyte market share and contribution to profitability for each company.

Storage Mechanisms: Solid State Storage Technologies; Enabling Technologies: PCs and Servers

Forces in Market and Technology Bring About Some Drastic Changes in the Memory Field

The following is an excerpt from *The Changing Face of Memory Technologies: New Technologies Drive New Opportunities – And Create New Problems* (IDC #US41212215, May 2016).

This study shows that myriad market and technology forces are aligning to bring about some drastic changes in almost every sector of the memory field, and these changes will have a deep and abiding impact on the way that computer systems – particularly HPC systems – are designed, built, and used in the coming years. Some of these changes will offer up new opportunities for faster, more effective data storage and movement, while others will almost certainly bring about some anguish as most of these new technologies carry with them some – and in more than a few cases, significant – design and use complexities.

A number of forces at play today are driving exploration into myriad new types of memory devices. The two main drivers are the looming scaling wall and the need for the holy grail of memory – a storage-class memory: a device that bridges the gap between fast and long-lived DRAMs with the nonvolatility of NAND devices to keep up with the performance requirements of the microprocessor. In detail:

- The scaling wall is the result of the need to put more memory cells on a chip of a fixed area. As DRAM increases in storage capacity, the size of the capacitors – the storage buckets that hold the charge of each bit of memory that signifies either a one or a zero – needs to consume less chip real estate. However, simply shrinking the area that a capacitor takes up results in increased bit error rates: as the capacitor gets smaller, the number of electrons that it can hold goes down, reducing the absolute signal strength between a stored one and a zero.

LEARN MORE

Related Research

- *IDC's Worldwide Solid State Drive Taxonomy, 2016* (IDC #US41191816, April 2016)
- *IDC's Worldwide Hard Disk Drive Taxonomy, 2016* (IDC #US41176416, April 2016)
- *Worldwide Solid State Storage Quarterly Update: 4Q15 Summary* (IDC #US40422616, March 2016)
- *Worldwide HDD and SSD 2016 Top 10 Predictions* (IDC #US40978316, February 2016)
- *Worldwide Solid State Drive Forecast Update, 2015-2019* (IDC #US40676815, December 2015)
- *Worldwide Hard Disk Drive Forecast Update, 2015-2019* (IDC #US40635615, December 2015)
- *Western Digital Cements Its Long-Term Position as a Key Storage Supplier for the 3rd Platform* (IDC #259877, October 2015)
- *Market Analysis Perspective: Worldwide Solid State Storage Technologies, 2015* (IDC #259056, September 2015)

Contact Us

- For more information on semiconductors for tablets, contact Michael Palma at mpalma@idc.com or 650-350-6246.
- For more information on DRAM and NAND flash memory, contact Soo-Kyoum Kim at skim@idc.com or +82-2-551-4382.
- For more information on semiconductors for cloud and mobile infrastructure, contact Abhi Dugar at adugar@idc.com or 650-350-6456.
- For more information on semiconductors for computing devices, contact Shane Rau at srau@idc.com or 650-350-6437.
- For more information on semiconductors for wireless communications, contact Les Santiago at lsantiago@idc.com or 650-350-6488.
- For more information on the Semiconductor Applications Forecaster, contact Nina Turner at nturner@idc.com or 650-350-6405.
- For more information on hard disk drives and/or hard disk drive components, contact John Rydning at jrydning@idc.com or 651-213-1000.
- For more information on solid state storage technologies, contact Jeff Janukowicz at jjanukowicz@idc.com or 908-213-0494.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

Global Headquarters

5 Speen Street
Framingham, MA 01701
USA
508.872.8200
Twitter: @IDC
idc-community.com
www.idc.com

Copyright Notice

This IDC research document was published as part of an IDC continuous intelligence service, providing written research, analyst interactions, telebriefings, and conferences. Visit www.idc.com to learn more about IDC subscription and consulting services. To view a list of IDC offices worldwide, visit www.idc.com/offices. Please contact the IDC Hotline at 800.343.4952, ext. 7988 (or +1.508.988.7988) or sales@idc.com for information on applying the price of this document toward the purchase of an IDC service or for information on additional copies or Web rights.

Copyright 2016 IDC. Reproduction is forbidden unless authorized. All rights reserved.

