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Storage-class memory will be the clear go-to market for emerging non-volatile memory in 2021


LYON, France – July 28, 2016: Emerging NVM sales are still moderate: Yole Développement (Yole) announces a US$53 million market in 2015. According to the “More than Moore” market research and strategy consulting company, this market is limited to niche markets due to the limited density available.

“Higher density products’ introduction have been delayed by MRAM pioneers such as Everspin, Crocus and Avalanche,” explains Yann de Charentenay from Yole; And he adds: “Moreover, Micron/Intel delayed their PCM sales to 2017.”

The emerging NVM market in 2015 was thus considerably lower than the dominant volatile DRAM and non-volatile Flash memory businesses, which had combined revenues of almost US$80 billion in 2015. However, the global emerging NVM market will soar from US$53 million in 2015 to US$4.6 billion by 2021, exhibiting an impressive growth of +110% per year. These results are part of the new report from Yole, entitled “Emerging Non-Volatile Memory 2016”. Under this new analysis, the consulting company describes why and how emerging NVM technologies will be increasingly used in various markets. The key market segments identified by Yole’s analysts are: enterprise storage SCM; client SCM; low-power IoT & wearable; MCU smart card and other markets; mobiles devices; mass storage; and industrial, transportation, and consumer electronics.

In 2015, the Micron/Intel alliance presented a breakthrough stand-alone memory product called 3D Xpoint, developed in secret for many years, which uses PCM material instead of RRAM as the industry expected. Thus, after being down and out for a while, PCM made a big comeback in the emerging

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1 PCM : Phase-change memory
NVM\(^2\) race. This product has an amazingly high density for an emerging NVM (128 Gb), which is close to the latest NAND thanks to high node (20nm), a 3D crosspoint structure, and a good selector. Yole expects PCM will have the largest emerging NVM market share by 2021, thanks to its prominent promoters (Micron/Intel), which have sufficient influence to create a new SCM\(^3\) category using 3D Xpoint in the memory hierarchy. Indeed, creating a new memory category is a sea-change that will require numerous hardware and software developments by all memory ecosystem players. And while there is no general agreement, many experts believe DRAM sales will decrease due to SCM’s increased use. For this reason, many incumbent players, especially DRAM ones, have postponed their SCM product introduction in order to extend their DRAM profits, which over the last several years have been very high.

“SCM will be the clear go-to market for emerging NVM in 2021,” announces Yann de Charentenay. “SCM will be adopted in enterprise storage and client applications, and later in mobile. SCM will greatly enhance systems’ speed and data protection, especially in data centers where traffic will explode in the coming years.”

Customers will use either PCM or RRAM for SCM Storage (S) type applications that require high capacity, and STTMRAM for SCM Memory (M) type applications where high endurance and speed are required.

In the stand-alone market mostly focused on SCM for the next five years, the big players’ technological choices are now quite clear: Micron/Intel have chosen PCM, SK Hynix and Sandisk/Western Digital have selected RRAM as the competitor to PCM for SCM applications, and Samsung seems also to favor RRAM thanks to its compatibility with the vertical 3D approach used for 3D NAND.

Substitution of 3D NAND by RRAM and DRAM by STTMRAM will commence very slowly before 2021, focused in niche applications where price is less sensitive. Indeed, incumbent technologies have found new solutions to further scale down their technologies, as has happened many times in the past.

Embedded MCUs often use eflash NVM technology, but this technology consumes lots of power and its scalability becomes cost-prohibitive at 28 nm node. With its recent scalability progress, emerging NVM will be increasingly used in low-power IoT & wearable, smart card, and other markets, first at 40 nm thanks to its lower power consumption, and then at 28 nm thanks to its competitive cost. The big question is, which emerging NVM to choose? Some early movers

\(^2\) NVM : Non Volatile Memory
\(^3\) SCM : Storage Class Memory
like Panasonic and SMIC have selected RRAM, while top foundries (TSMC, GF, Samsung) will propose STTMRAM in 2017 – 2018, and ST Microelectronics selected PCM for the 28 nm node in 2020. But many key players including Renesas, Infineon, Texas Instruments, MicroChip and Cypress have not yet officially chosen. Considering the trend toward STTMRAM among the foundries, Yole expects STTMRAM will lead the embedded market in 2021. However, thanks to its lower cost, RRAM/PCM could take a larger market share if it is selected by some players.

Discover a detailed description of this analysis on i-micronews.com, manufacturing reports section.
About Emerging Non-Volatile Memory 2016 report
The new storage-class memory (SCM) category will be the biggest emerging NVM market, with embedded MCU seeking emerging NVM for strategic differentiation.
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About the author:
Yann de Charentenay has worked for Yole Développement, the "More than Moore" strategy consulting and market research company, in the field of MEMS, materials and compound semiconductors since 2003. He has contributed to more than 60 marketing & technological analysis.
- Companies cited in the report:

Founded in 1998, Yole Développement has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole Développement group has expanded to include more than 50 collaborators worldwide covering MEMS, Compound Semiconductors, LED, Image Sensors, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics and Batteries & Energy Management.
The “More than Moore” company Yole and its partners System Plus Consulting, Blumorpho and KnowMade support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to develop their business.
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