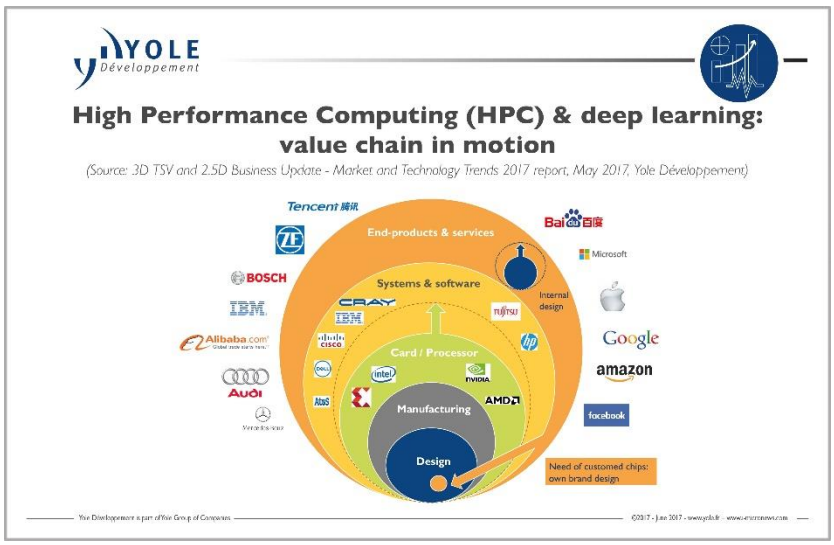

# FOR IMMEDIATE RELEASE:

## Artificial Intelligence: a new era of the advanced packaging industry

3D TSV and 2.5D Business Update - Market and Technology Trends 2017 – Yole Développement

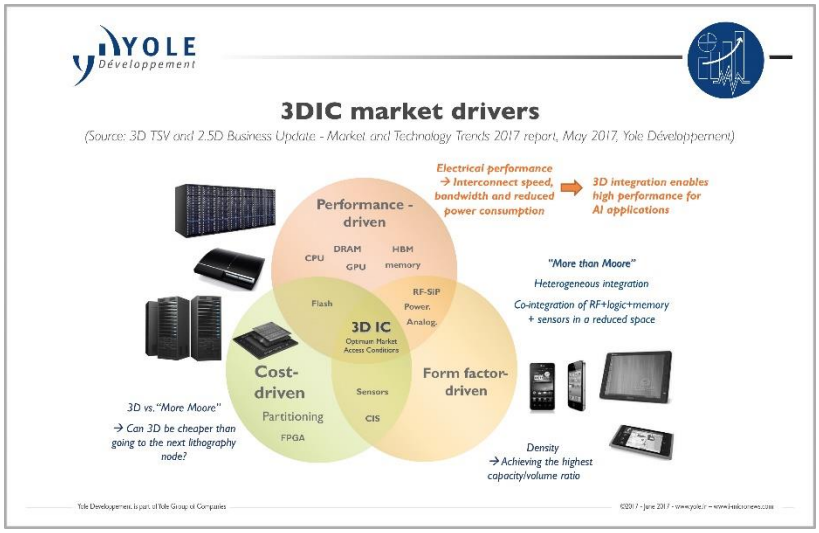
**LYON, France – 7 June 2017:** AI[1] is driving the development of 3D TSV and heterogeneous integration technologies. With its new 3D TSV & 2.5D business update report, Yole Développement (Yole), part of Yole Group of Companies investigates the advanced packaging industry and takes a closer look on the AI impact on this market. *"3D integration is clearly offering today unequalled performances suiting exactly the pressing needs of AI applications"*, comments **Emilie Jolivet, Technology & Market Analyst at Yole**.

Initially developed for niche markets including MEMS devices and memories for datacenters, 3D integration is entering in a new era. The world population increase, the exploding smartphones market, the development of new functionalities such as voice/image recognition… all these parameters directly contribute to the development of AI and deep learning solutions, all based on 3D integration technologies. AI is not a concept anymore but a reality that is skyrocketing the development of disruptive advanced packaging technologies.




This year, the "More than Moore" market research and strategy consulting company is moving a step forwards the applications side. Its advanced packaging & semiconductor manufacturing team investigates the industry evolution, taking into account promising sectors such as deep learning, the end-users' needs and required specifications for final systems. Yole's analysts combine their advanced packaging expertise and their knowledge of the different industries to perform up-to-date and innovative reports. The 3D TSV & 2.5D business update report is a good example, with a strong focus on the high-performance sector.

[1] AI: Artificial Intelligence




Why do we need 3D TSV solutions, especially in high performance applications?
According to Yole, benefits are numerous and are part of the major issues initially identified by the industrial companies. Bandwidth, latency and power consumption are the key words of these innovations… Emilie Jolivet from Yole details some below:

- When two chips or more are integrated on an interposer, distance between logic and memory is shortened which enables lower latency and lower power consumption.
- DRAM, based on a 3D TSV solution, is offering an unequalled bandwidth performance because of the ability of TSV solution to connect several layers of the device.
- Artificial intelligence and specifically deep learning mostly intensively using memory and computing also need 3D TSV approaches. Both applications are driving the demand of interposer and 3D memory cubes.

AI and deep learning, both part of the high performance applications segment are might be the most impressive applications. However, datacenter networking, AR/VR[2] and autonomous driving are not so far behind. Industrial companies progressively penetrate these market segments by developing dedicated approaches:

- Both 3D IC leaders, TSMC and Globalfoundries are involved in the development of new solutions focused on 3D SoC[3].
- Samsung introduced its interposer solutions in 2017, SPIL is developing its own 2.5D solutions
- STMicroelectronics is working on 3D interconnections and interposers for various applications including silicon photonics, datacenters….

In addition, companies like Intel, Nvidia are completely re-thinking their growth strategy: *"Major IC companies which missed the smartphone business clearly don't want to miss the AI revolution"*, comments Emilie Jolivet from Yole.
From their side, investors are part of the playground. Therefore, they all re-align their strategy to have product portfolio for serving AI/deep

[2] AR/VR : Augmented Reality / Virtual Reality
[3] SoC : System-on-Chip

learning needs. Datacenters, cloud computing, AI, autonomous driving are becoming key words for venture capitalists.

Yole's analysts are convinced of the added value of 3D integration technologies. AI and deep learning are new applications to consider but not only. AR/VR will be also part of the 3D integration future. And the latest announcement from AMD regarding its new Radeon Pro Vega graphic card dedicated to Apple's new iMac Pro is another step towards the computing applications™.

A detailed description of the 3D TSV and 2.5D Business Update - Market and Technology Trends 2017 is available on i-micronews.com, advanced packaging reports section.


**About 3D TSV and 2.5D Business Update - Market and Technology Trends 2017 report**

*3D integration, a leading-edge technology supporting high-performance applications - from imaging to artificial intelligence, an entire ecosystem in motion – This report has been performed by Yole Développement (Yole) part of Yole Group of Companies.*

**Companies cited in the report:**

Alibaba, ALLVIA, Altera (now part of Intel), Amazon, AMD, Amkor, ams AG, Analog Devices, Apple, ASE, ASET, Atos, Audi, Avago Technologies (now a Broadcom Limited company), Baidu, Besi, Boeing R&T, Bosch, Broadcom, Broadpak, Cadence, CEA-Leti, Cisco Systems, Cray, Dell, Dongbu HiTek, EPWorks, eSilicon, Facebook, FLIR, Forza, Fraunhofer, Freescale, Fujitsu, GalaxyCore, GlobalFoundries, Google, G-MEMS, HANA Micron, HD MicroSystems, Henkel, Hitachi Chemical, HPE, Huawei, SK Hynix, Ibiden, Inotera, IBM, IMEC, IME, Infineon, Intel, IPDIA, ITRI, InvenSense, JCAP, Juniper Networks, KAIST, Lenovo, LSI Corporation, Luxtera, mCube, MediaTek, Medtronic, Mercedes-Benz, Micron, Microsoft, Mitsubisho Materials, Mobileye, Movidius, Murata, NCAP, NEPES, Netspeed Systems, Northrop Grumman, Novati Technologies, NVidia, NXP, Omnivision, Oracle, poLight, PTI, Q-Tech, Qualcomm, Rambus, Raytheon, Renesas, Robert Bosch GmbH, Rudolph Technologies, Samsung, Sematech, Sensonor, Shinko Electric, Silex Microsystems, SiTime, Sony, SPIL, SPTS, STATSChipPAC (a JCET company), STMicroelectronics, SMIC, Synopsys, Tencent, Texas Instruments, Tezzaron, Toshiba, Tower Jazz, TSMC, Ultratech, UMC, UTAC, X-Fab, Xiaomi, Xintec, Xilinx, Xperi, ZF Friedrichshafen, and more…

**Author:**

Emilie Jolivet is a Technology & Market Analyst, in the Advanced Packaging and Semiconductor Manufacturing team, at Yole Développement the "More than Moore" market research and strategy consulting company. She holds a master's degree Applied Physics specialized in Microelectronics from INSA Toulouse. After an internship in failure analysis in Freescale, she took the position of R&D engineer for 7 years in photovoltaic business and co-authored several scientific articles. Strong for this experience, she graduated from a master in Business Administration at IAE Lyon and then joined EV Group as a business development manager in 3D & Advanced Packaging before joining Yole Développement in 2016.

**About Yole Développement – www.yole.fr**

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, RF Electronics, LED, Displays, Image Sensors, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Nanomaterials, Power Electronics and Batteries & Energy Management.

The "More than Moore" company Yole, along with its partners System Plus Consulting, PISEO, Blumorpho and KnowMade, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business.

- Consulting & Financial Services: Jean-Christophe Eloy (eloy@yole.fr)
- Reports: David Jourdan (jourdan@yole.fr)

**Yole Group of Companies - Press Relations & Corporate Communication: Sandrine Leroy (leroy@yole.fr)**

###