

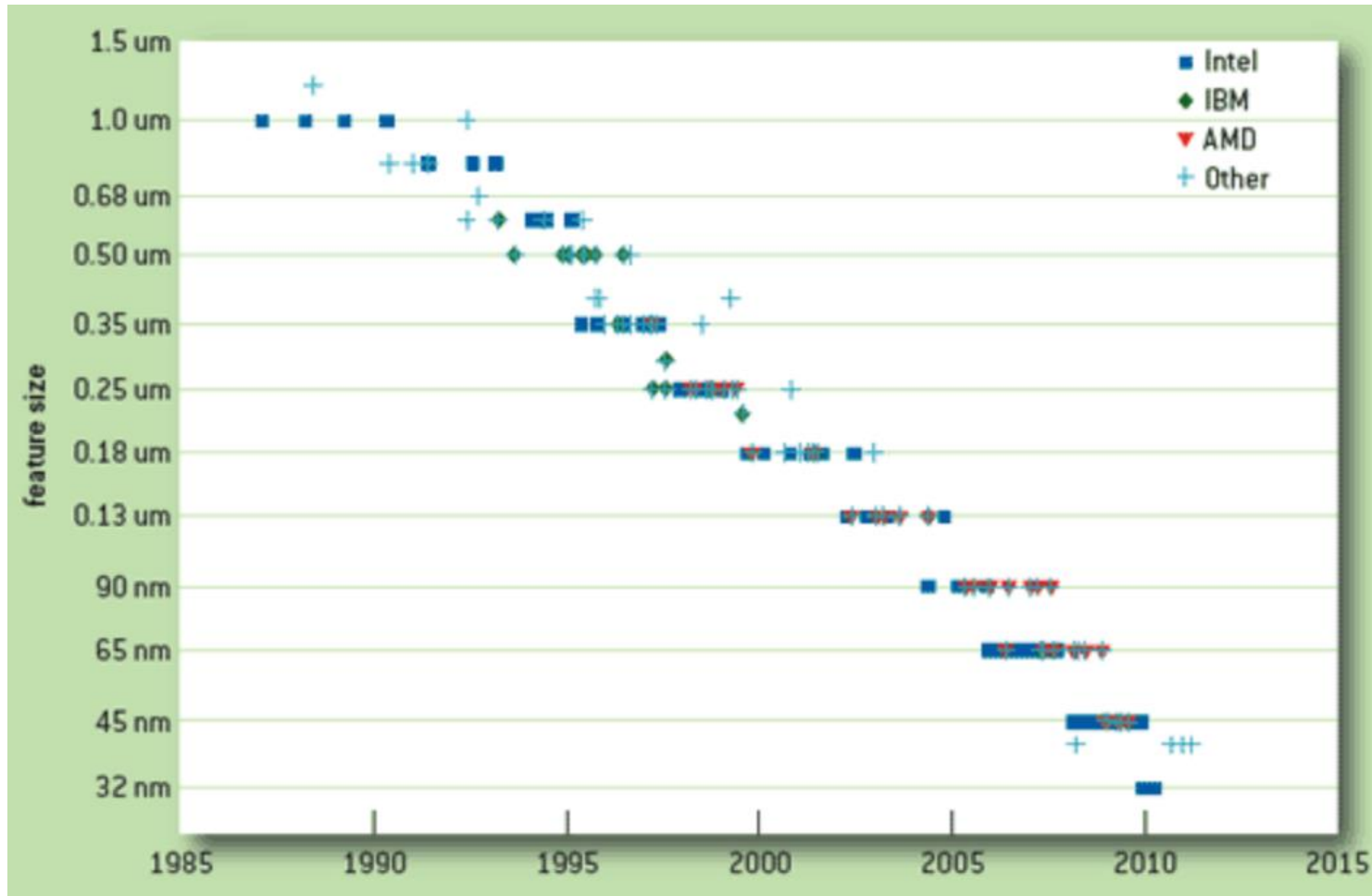
GPU TRENDS

Stephen Jones, NVIDIA

8th February 2018, UC Davis

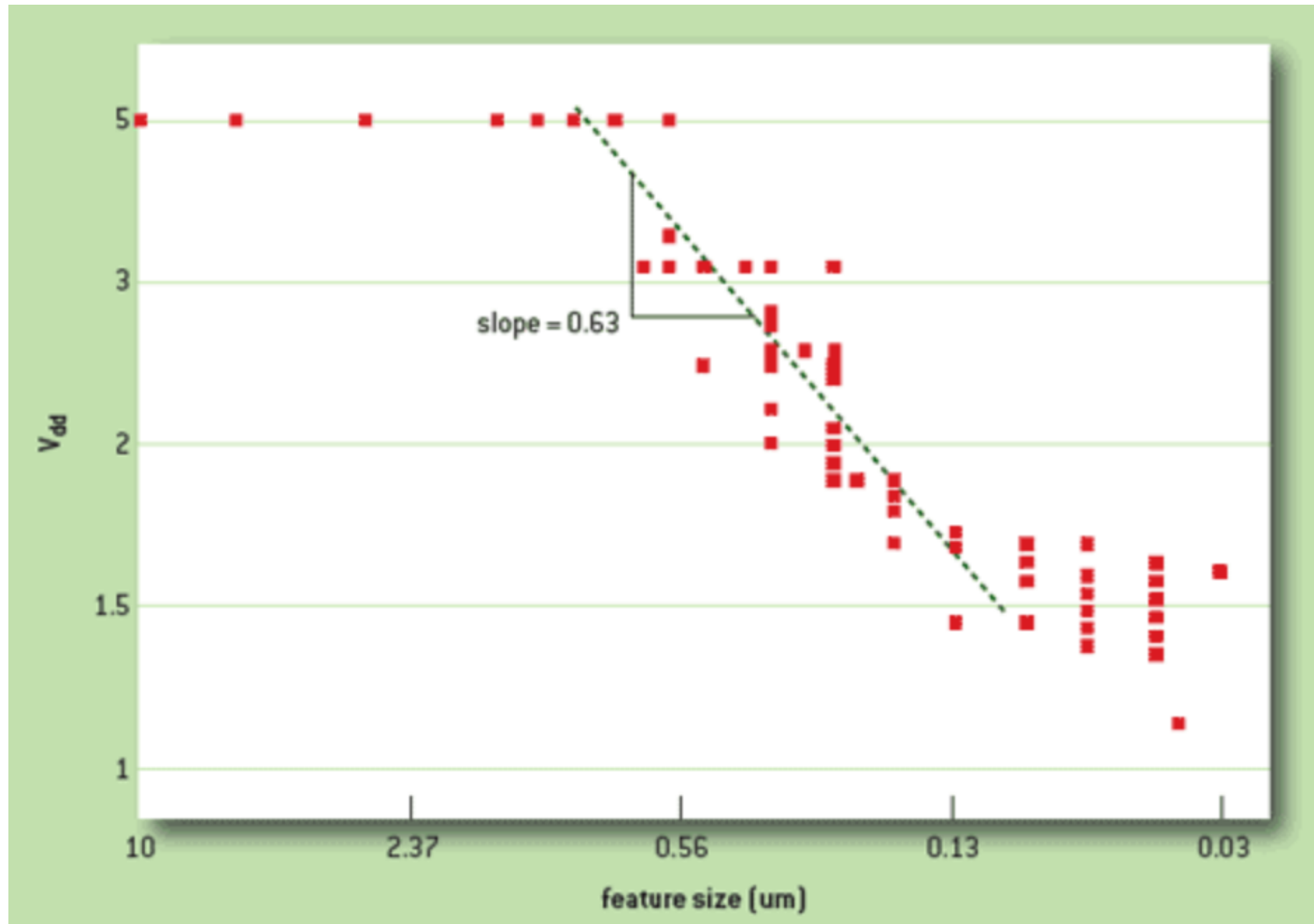


END OF MOORE'S LAW



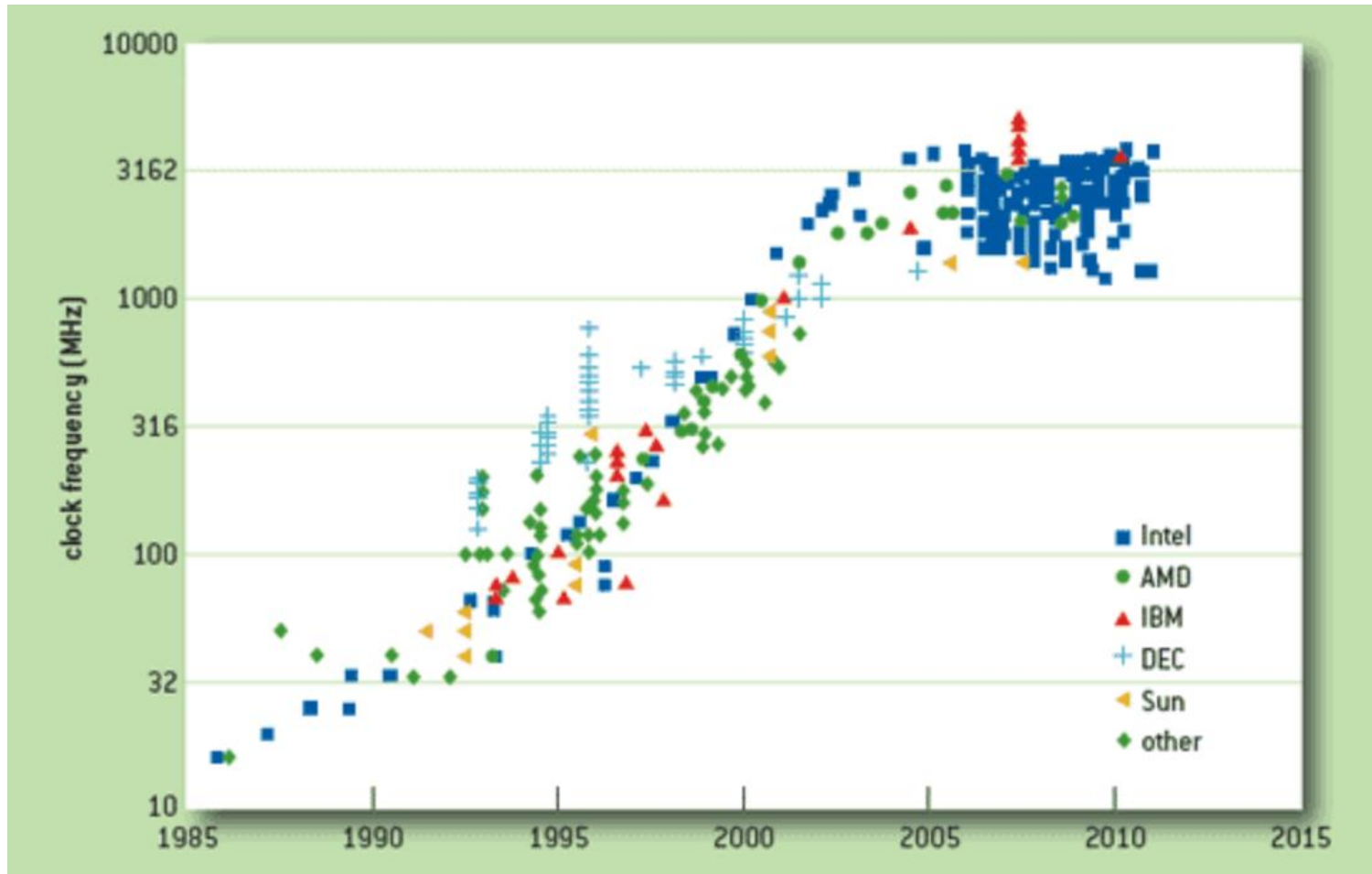
Source:
acmqueue
2012/04/06
Vol 10, issue 4

VOLTAGE VS. FEATURE SIZE



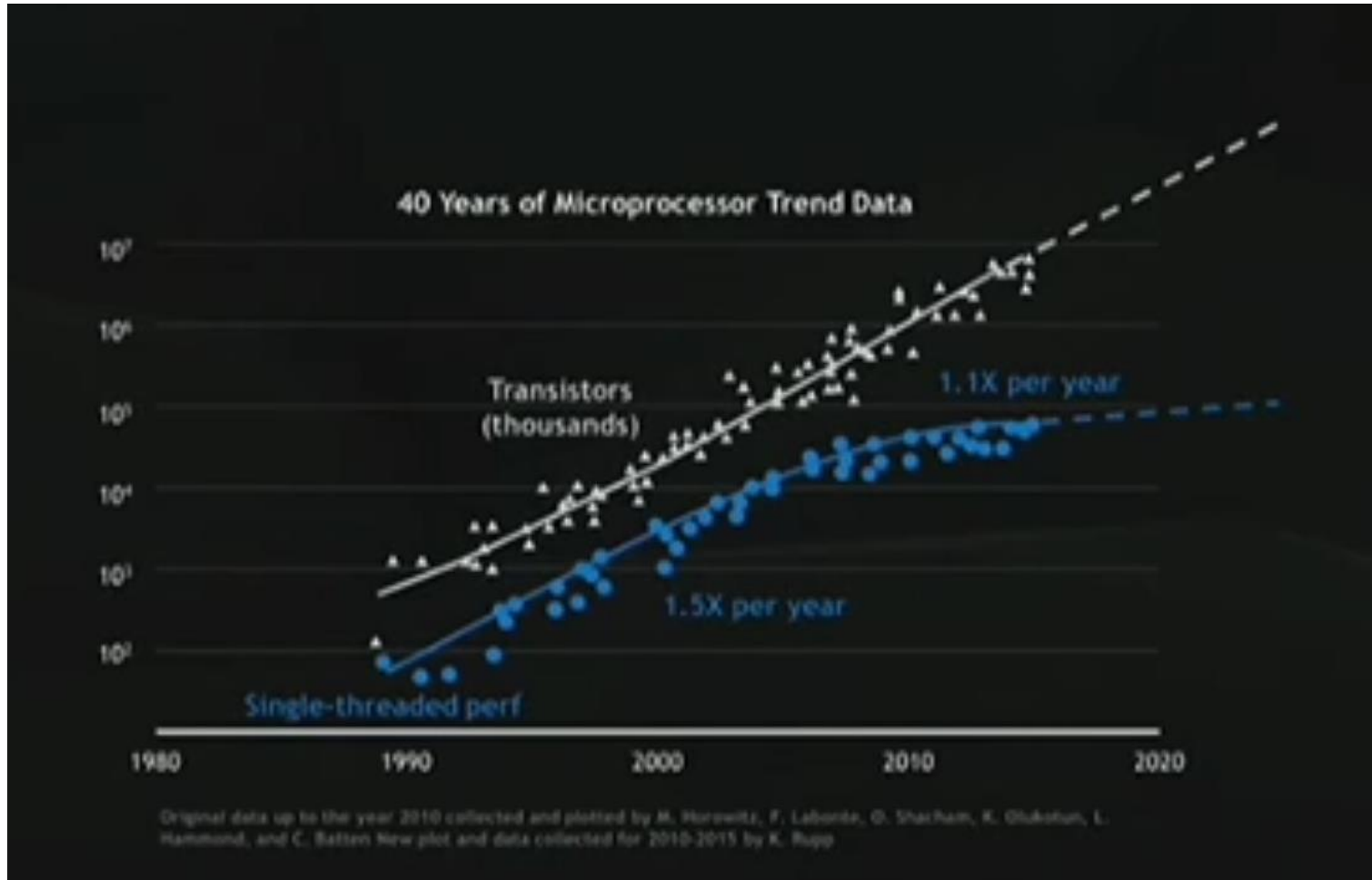
Source:
acmqueue
2012/04/06
Vol 10, issue 4

END OF DENNARD SCALING

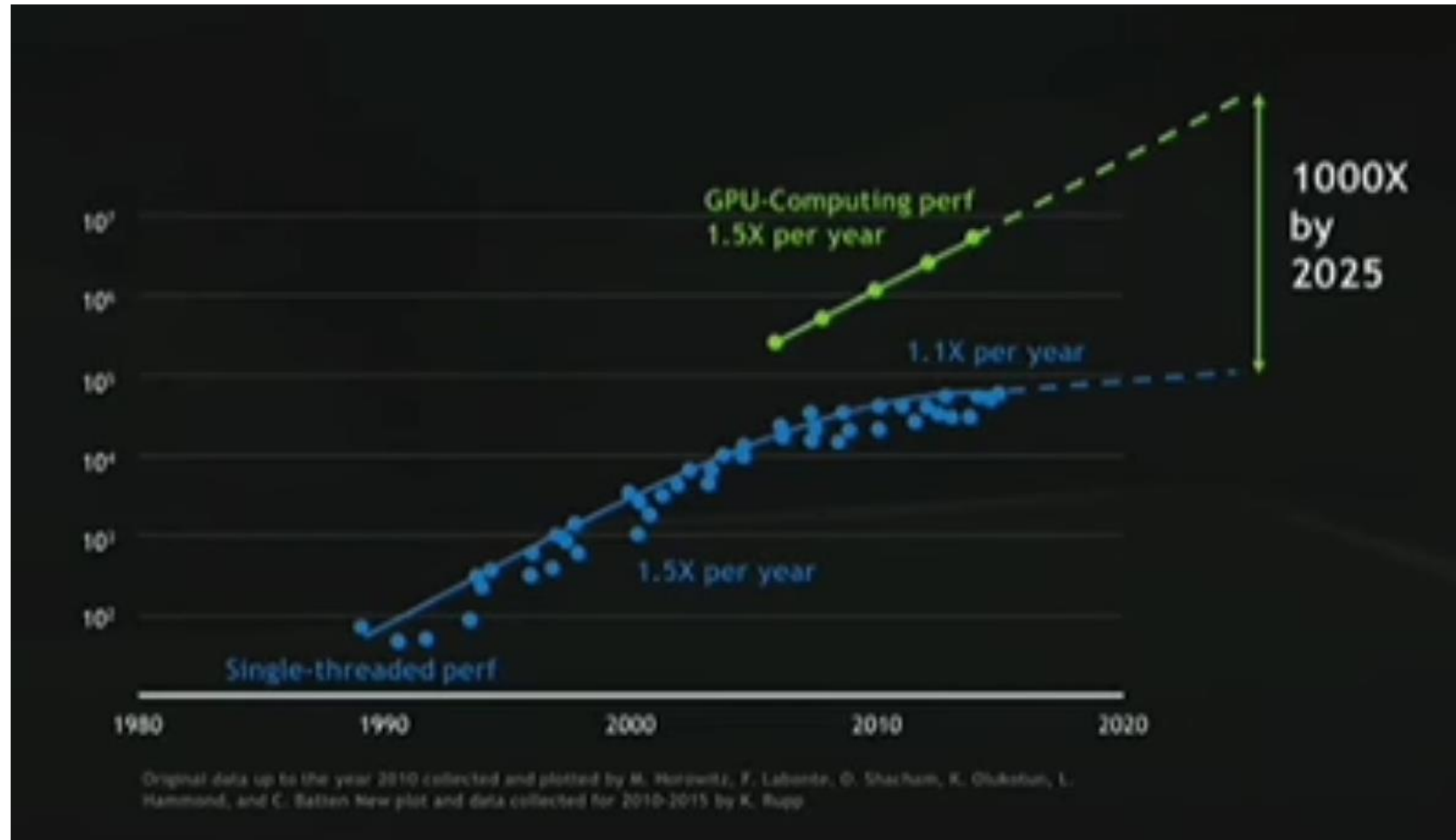


Source:
acmqueue
2012/04/06
Vol 10, issue 4

END OF MOORE'S LAW



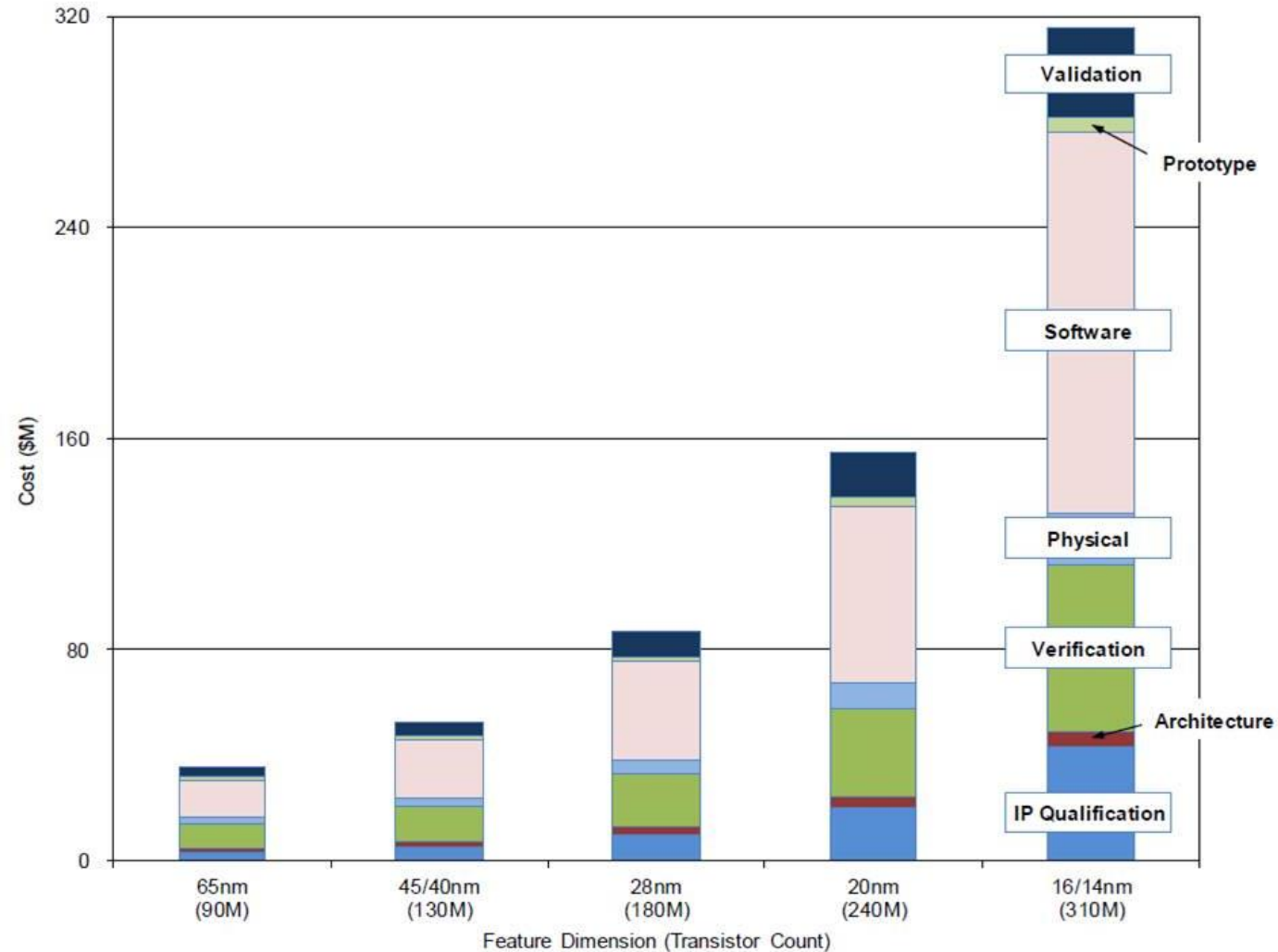
RISE OF GPU COMPUTING



SEMICONDUCTOR FEATURE SIZES

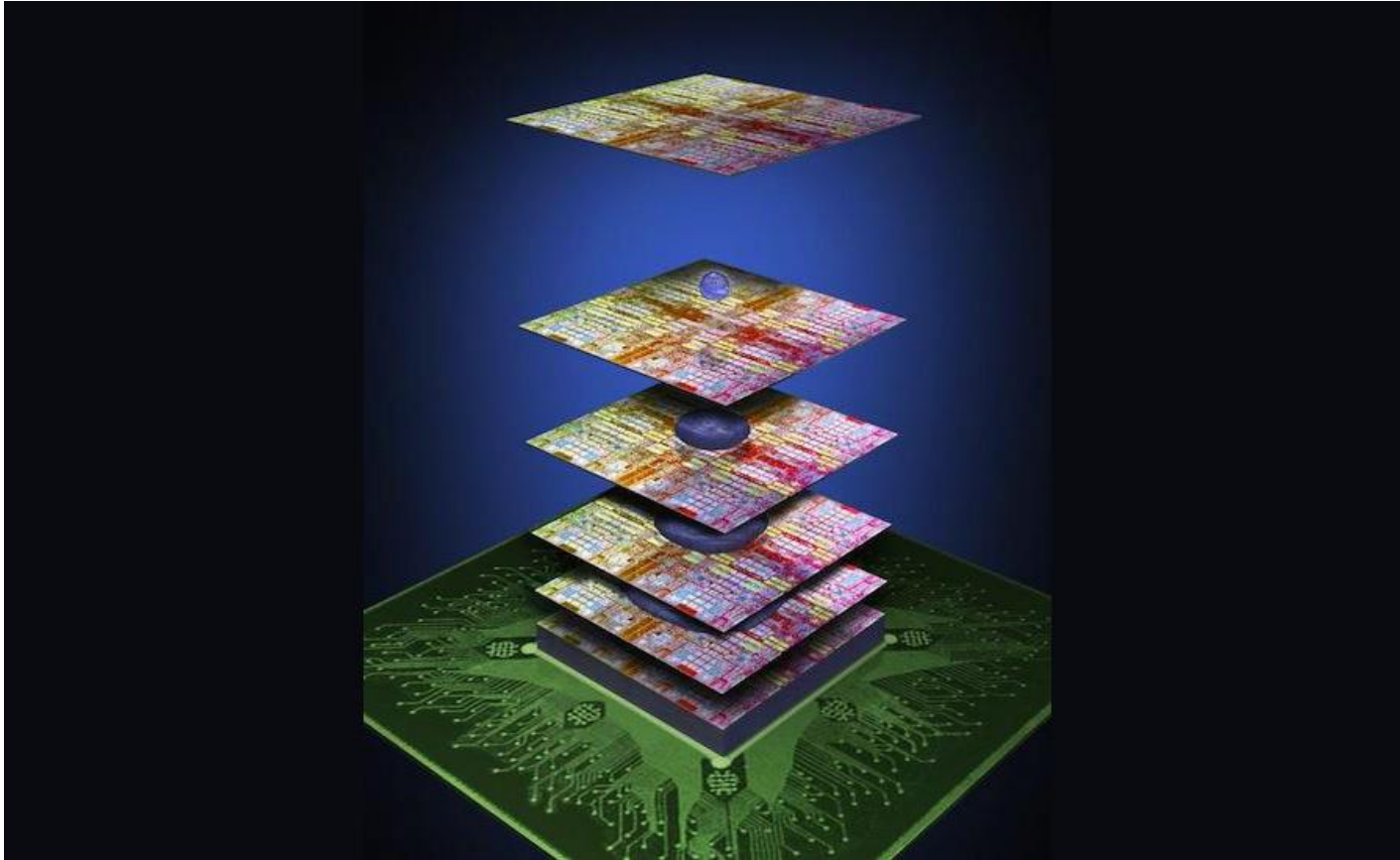
	32nm/28nm	22nm/20nm	16nm/14nm	10nm	7nm	5nm
Global Foundries	25	NA	17	NA	9.2 (2017?)	7.1 (2019?)
Intel	31	21	13	9.5 (2017)	5.9 (2020)	2023?
Samsung	27	20	17	12 (2016)	9.2? (2018)	7.1 (2020?)
TSMC	27	18	18	12 (2016)	9.2 (2017)	7.1 (2019?)

COST OF EACH NEW NODE SIZE



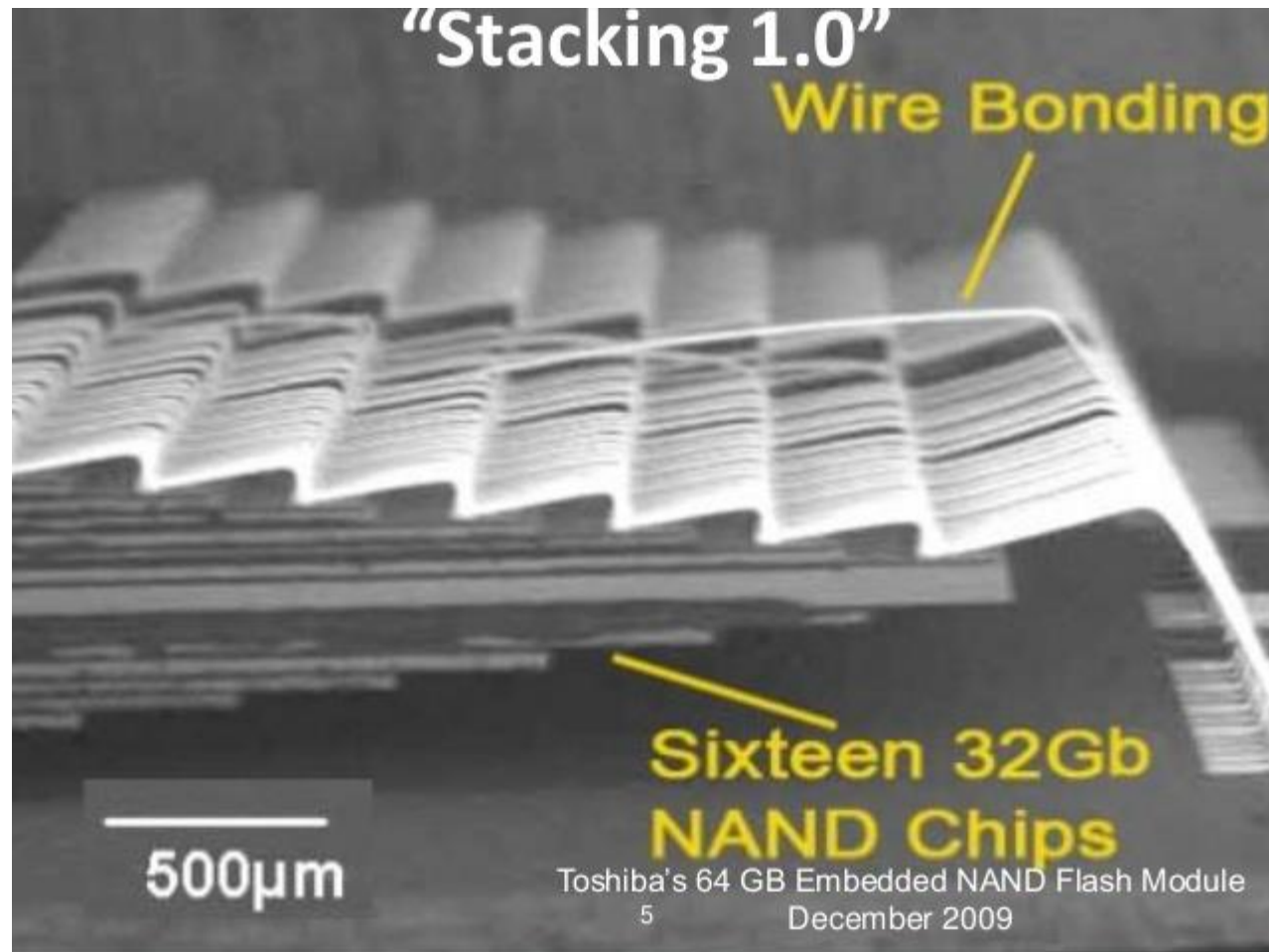
Source:
Semiconductor
Engineering
2014-03-17

3D STACKED DIES

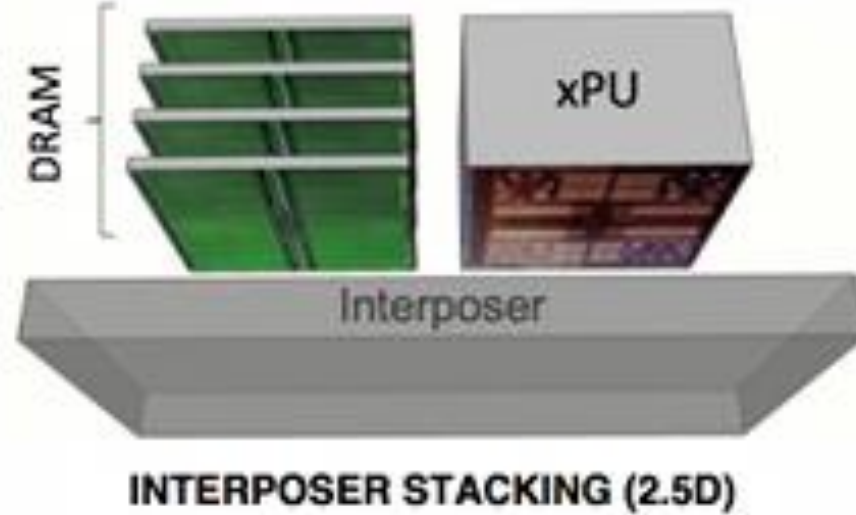
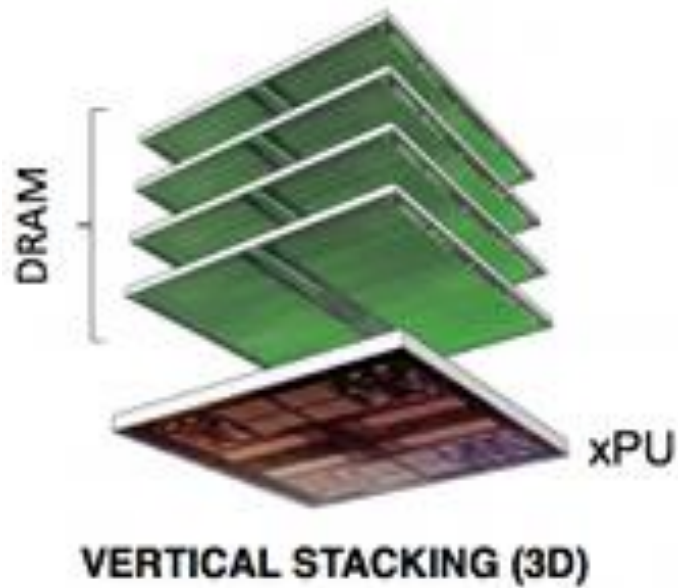


Source:
IBM

ACTUAL STACKED DIES

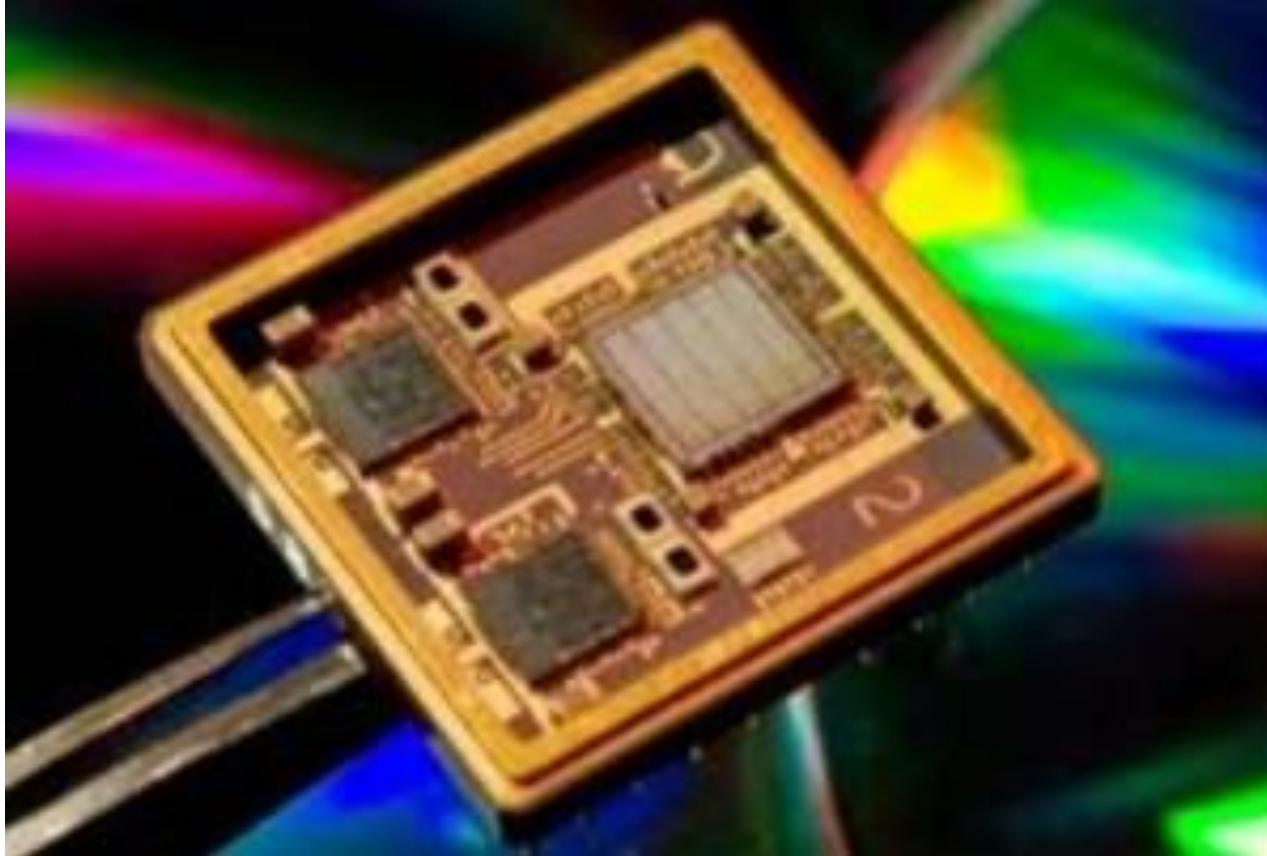


STACKING APPROACHES



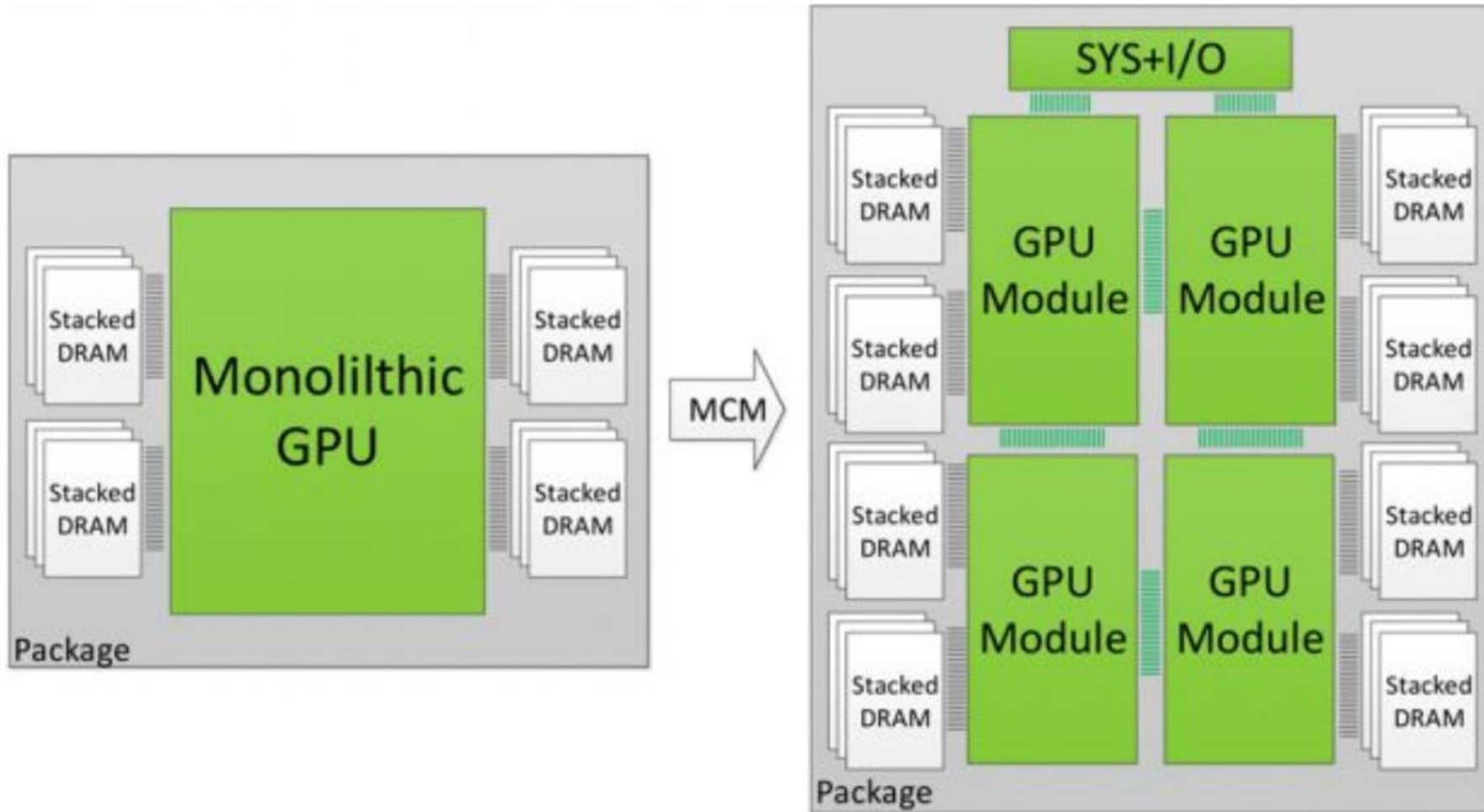
Source:
AMD

MULTI-CHIP MODULES

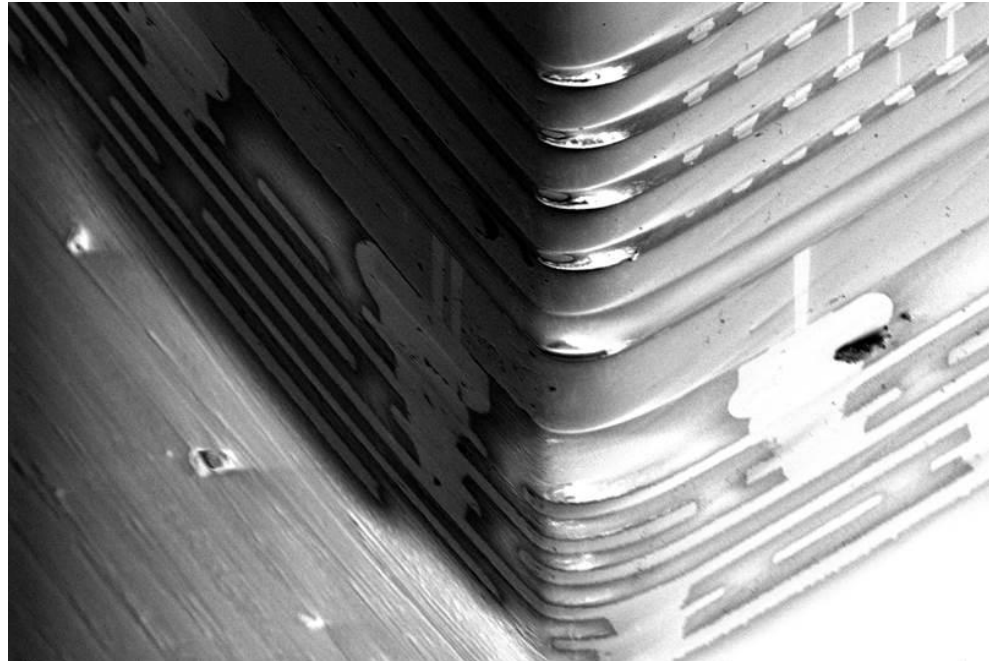


Source:
ES Components Blog
2015-03-19

GPU MCM



HBM2 STACK



DENSE NODE



Source:
Broadberry

DENSER NODE



DENSE SYSTEM



VOLTA NVLINK

300GB/sec

50% more links

28% faster signaling

