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Michael J. Miller is chief information officer at Ziff Brothers Investments, a private investment firm.

Miller, who was editor-in-chief of PC Magazine from 1991 to 2005, authors this blog for PC Magazine to share his thoughts on PC-related products. No investment advice is offered in this blog. All duties are disclaimed. Miller works separately for a private investment firm which may at any time invest in companies whose products are discussed in this blog, and no disclosure of securities transactions will be made.

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New Chip Advances Promise Boosted Battery Life

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By Michael J. Miller

A couple of chip-making announcements today herald important changes in the way processors will be produced in the future.

First, Taiwan Semiconductor Manufacturing Corp. (TSMC) and ARM said that TSMC has taped out the next generation ARM processor on its 16nm FinFET process. Secondly, Globalfoundries said it has demonstrated 3D chip stacking using a process known as Through-Silicon Vias (TSVs). The TSMC announcement shows that the foundry is on track to make FinFETs work and that ARM's 64-bit cores are progressing, while the Globalfoundries announcement points toward being able to speed connections between dies, enabling faster performance.

Most observers believe that the FinFET process, which involves using a vertical or 3D channel as opposed to the traditional planar transistor to pack more transistors on a chip while continuing to scale performance and power, is important for controlling transistor leakage. Thus it will make more power-efficient processors. That matters because I think we'd all like our phones and tablets to use less energy and have better battery life.

Intel was first to mass produce FinFET technology using its Tri-Gate technology, and currently uses this for making its 22nm Ivy Bridge chips. The Common Platform Group, consisting of IBM, Globalfoundries, and Samsung, recently said it is on track to manufacture FinFETs on its 14nm process in 2014 with large-scale production likely in 2015.

At a recent event, Globalfoundries said it has a simulation of a dual-core ARM Cortex-A9 core, while Samsung said it has created a tape-out of the ARM Cortex-A7, in both cases using their 14nm FinFET technologies.

TSMC, the world's largest independent manufacturer of semiconductors, had earlier said it too is going to be making FinFETs, in what it calls its 16nm process. (Like the Common Platform Group approach, this appears to involve a change in the front-end transistors, but keeps the back-end process at 20nm.) TSMC manufactures a large range of the processors used in today's products, including leading-edge processors from Qualcomm, Nvidia, Broadcom, and many others. Today's announcement said TSMC and ARM collaborated to optimize the Cortex-A57 for the FinFET process, using ARM's Artisan physical IP, TSMC memory macros, and various electronic design automation (EDA) technologies. The point of building these wafers is to tune the TSMC process and to get feedback as to how the FinFET

process interacts with the architecture