

ARM Cortex-A9 processor design, and another on Samsung's dual-core Exynos 5, based on the faster Cortex-A15.

As well as looking at history, their prediction about smartphones chips is based on benchmark results. They compared Samsung's 1.7GHz dual-core Exynos 5250, Nvidia's 1.3GHz quad-core Tegra 3 and Intel's 2.4GHz quad-core Core i7-2760QM -- which is a desktop chip, rather than a server chip.

The researchers said they found that ARM processors were more powerefficient on single-core performance than the Intel processor, and that ARM chips can scale effectively in HPC environments. On a multi-core basis, the ARM chips were as efficient as Intel x86 chips at the same clock frequency, but Intel was more efficient at the highest performance level, the researchers said.

In a battle between two ARM chips, the Nvidia Tegra 3 chip was compared to Samsung's Exynos 5250. The Exynos 5250 was 1.7 times faster than the Tegra 3 on single-core performance.

Hewlett-Packard recently launched its Moonshot server, which is based on Intel's low-power Atom server chip. ARM processors from Calxeda and Texas Instruments are expected to be used in future Moonshot systems. Dell has also built prototype ARM servers and is contemplating use of the low-power chips in supercomputers.

The BSC researchers point to weaknesses in ARM designs that may hold up their use in servers. Today's ARM chips are 32-bit designs, meaning the amount of memory they can address is limited. They also lack error correction technologies, have no network off-load chip, and do not use standard I/O interfaces.

ARM has announced a 64-bit design, however, and Calxeda, AMD and AppliedMicro are among the chip makers expected to ship 64-bit ARM chipsets with an array of I/O and networking features.

As the ARM server market evolves, the technical challenges will be resolved, according to the researchers, and increased competition could further drive down prices.

"Mobile processors have qualities that make them interesting for HPC," the researchers wrote, advising readers to "get ready for the change, before it happens."

BSC is also involved in <u>Project Mont-Blanc</u> and the <u>Axle Project</u>, which are efforts to develop supercomputers that combine the processing power of CPUs, graphics processors and other computing resources.

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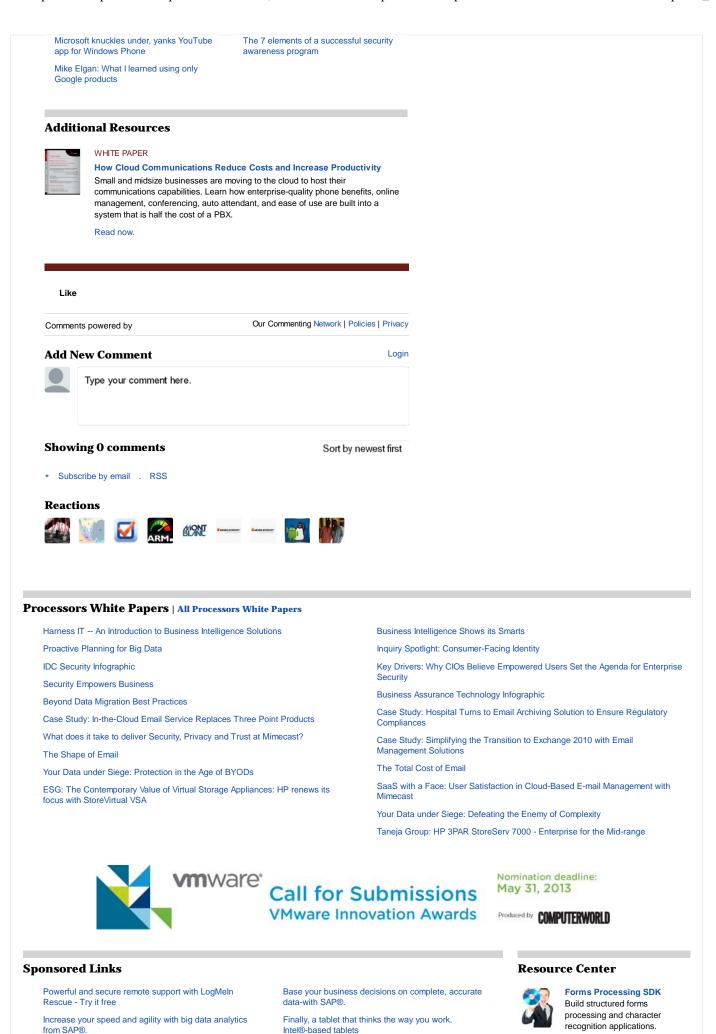
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