

# DatacenterAcceleration

Solid-state(ments) on accelerating enterprise applications

Lamont Wood

## The Speed of Memory to Come: DDR4



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A new form of DRAM is poised to give servers and desktops a big performance boost.

It's called DDR4, it amounts to the next generation of static DRAM, and it should be out next year, giving computers more throughput, higher memory densities, lower power consumption, longer battery life, and lower heat dissipation.

But that's about all we can say for certain at this point, says Jim Handy, analyst at [Objective Analysis](#), a semiconductor research firm in Los Gatos, Calif.

While the technical specifications for DDR4 were [recently finalized](#), there are no motherboards or chipsets on the market that support the new RAM, although such items are confidently expected to show up next year, supplied by Intel and other major suppliers. As for the system speeds and power consumption possible with DDR4, which offers twice the data transfer speed as the incumbent DDR3 chips, Handy says that will depend on the rest of a computer's circuitry. Meanwhile, the use of higher clock speeds may cancel out the lower power consumption, he warns.

[Other sources](#) explain that DDR4 will have a top speed at 3.2 giga-transfers per second, although it can be expected to eventually exceed that, just as DDR3 has exceeded its designed speed limit of 1.6 giga-transfers per second. DDR4 will consume 1.2 volts, compared to 1.5 volts for DDR3. The memory bus speed will start at 2,133 MHz, compared to 1,333 and 1,666 MHz for DDR3.

As for memory density, whereas 8GB is the largest chip seen in DDR3, the DDR4 version is [expected](#) to appear in 8GB and 16GB sizes.

Handy said:

*It will have applications in servers but the most obvious application is in games. Faster memory together with faster processors will make for smoother high-resolution graphics. That is where you will notice the most change. It won't make any noticeable difference for simple things like accounting or word processing.*

Fast memory can't help but boost the performance of hypervisors and the like, however.

Initially, the price will probably be about twice that of the current generation of chips, said Handy, but the price can be expected to fall within a matter of months until the price is equal to or less than the price of the current generation of DDR3 chips.

Certainly a new generation of RAM chips with a higher price [would not be unwelcome](#) for DRAM makers, who are suffering from low prices for DDR3 chips amid a stagnant PC market. Even the levels of RAM required for virtualization, as datacenters cut the numbers of actual servers by consolidating their functions onto virtual servers, are being readily filled by the supply of inexpensive DDR3 chips. Microsoft's Windows Server 2012 now supports 4 terabytes of RAM on a single machine, but customers are reportedly getting all the DDR3 chips they need without difficulty.

Then there's the question of what will come after DDR4. While DDR4 is an evolutionary step, drastic steps will be needed to achieve any further speed increases. So the next step is expected to be a so-called "hybrid memory cube" where the memory will be added directly to the processor chip. It will appear in three or four years and in most cases will not actually look like a cube, Handy says. Besides added speed, the big difference in this new packaging is that adding memory modules will no longer be possible -- you'll need a whole new cube.

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