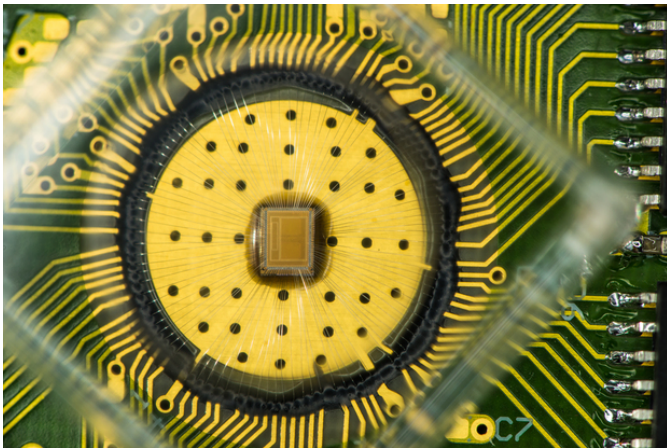


## IBM Makes Headway in Phase Change Memory

Written by Marco Attard  
20 May 2016

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IBM steps closer towards achieving the dream of combined datacentre memory and storage as it figures out a means of storing 3 bits in a single Phase Change Memory (PCM) cell, 50% more than the two-bit version last seen in 2011.



PCM combines memory and storage through chalcogenide, a glass-like metal alloy able to change between 2 stable states-- amorphous (without a clearly defined structure) and crystalline (with structure)-- through the application of heat. The technology is actually similar to re-writable Blu-ray Discs, with each state showing either low or high electrical conductivity. The result is able to store data when switched off (unlike DRAM), and is able to respond to data requests in less than 1 microsecond.

However exploiting such properties for universal memory is difficult, and requires sophisticated technologies with names such as "drift-immune cell-state metrics" and "drift-tolerant coding and detection schemes." Which is why IBM's managing to store 3 bits per cell within a 64K is a breakthrough, even more so when the device can handle 1 million endurance cycles.

"Phase change memory is the first instantiation of a universal memory with properties of both DRAM and flash, thus answering one of the grand challenges of our industry," Big Blue says. "Reaching 3 bits per cell is a significant milestone because at this density the cost of PCM will be significantly less than DRAM and closer to flash."

Taking advantage of PCM also requires CAPI (Coherent Accelerator Processor Interface), a protocol leveraging on the low latency and small access granularity of PCM running on a POWER8-based server.

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IBM thinks PCM will hit large-scale availability in at least 2-3 years, but since it does not actually make memory it will need a partner such as SK Hynix, who already collaborated with the company on PCM in the past.

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