HPI Hardware Update - November 2015

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Summary

- Oracle's M7 architecture comes with hardware-supported database decompression and acceleration
- HP and SanDisk partner to develop ReRAM, a type of non-volatile memory
- Oracle tries to convince customers using IBM's Power architecture to switch to Intel
- Western Digital about to acquire SanDisk for $19 billion
- SGI announces UV300-RL for Oracle Databases

Oracle releases more details about Sparc M7 architecture

Oracle has now released more details about their upcoming Sparc M7 processors. Each processor has 32 cores, clocked at 4.1 GHz each [SP1]. With the second generation of the Bixby interconnect, it allows for up to 16 sockets with 8 TB of RAM in total [SP2]. The machine can be operated with all sockets running the same system or with parts of the system divided in "physical domains", supporting independent execution of multiple systems [SP3].

For database applications, the processor features eight so-called Database Accelerators (DAX) and additional in-line decompression engines. With these, common column store operations can be executed in parallel and off-core, allowing the general-purpose CPUs to continue with other work. A DAX supports selects, scans, extractions (tuple reconstructions), and "translations" (perhaps dictionary mappings?) for joins. Results are written into the shared L3 cache and can then be used by the requesting core. Prior presentations claim 10x performance gains and 170 billion scanned rows per second [SP4]. These features can also be used by independent developers [SP2].

Additionally, new security features called "Silicon Secured Memory" are to reduce the impact of programming errors such as buffer over- and underruns and thus help against data corruption and attacks [SP5].

M7 machines are available for sale since November 2 [SP6].

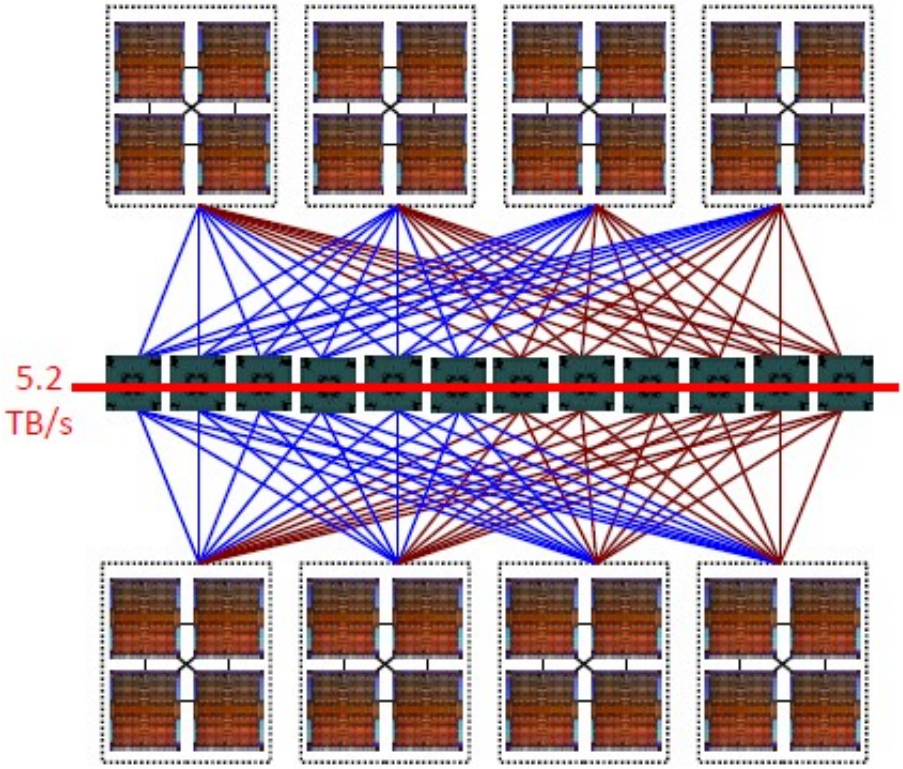

Figure 1: Oracle M7 Layout with 8 sockets [SP2]

HP and SanDisk form partnership for Non-Volatile Memory (NVM)

Now competing with Intel's and Micron's 3D XPoint technology, HP and SanDisk have announced their own cooperation for developing the next generation of memory technologies [NV1]. Built using Resistive RAM (ReRAM) technology, their version of NVM is said to "be up to 1,000 times faster […] and offer up to 1,000 times more endurance than flash storage" [NV2]. This is in the same range as Intel's and Micron's technology.

HP is interested in NVM as a building block of their planned platform "The Machine", which will have multiple processing units (GPUs, CPUs, accelerators, …) built around a universal memory pool. Originally, so-called Memristor memory was planned to be used in the platform, but was removed from the roadmap in June 2015 [NV4]. Rumors are that HP's and SanDisk's new technology is a continuation of that work [NV5].

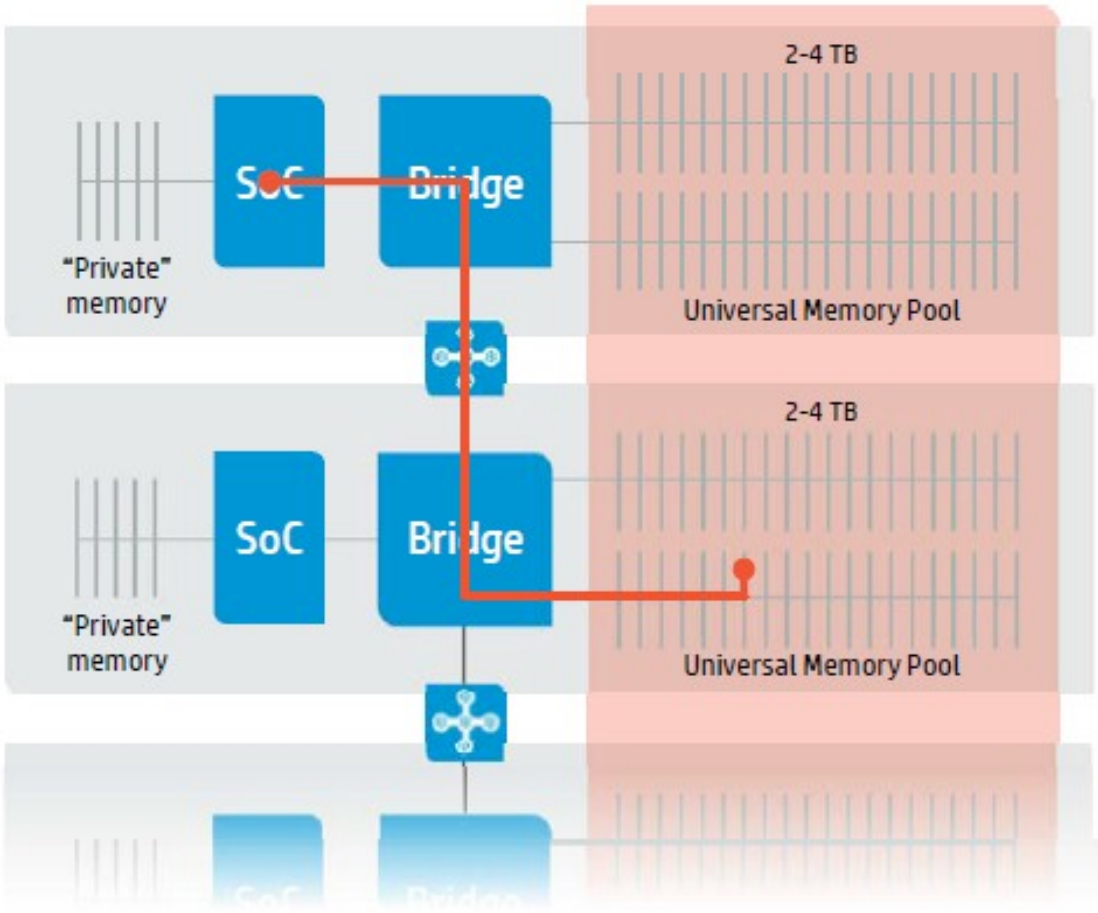

Figure 2: Memory Layout of HP's "The Machine" [NV3]

Newsflash

- Parallel to launching its new M7 platform, Oracle is trying to convince customers using IBM Power hardware to switch to Intel CPUs. Jointly funded with Intel, the "Exa Your Power" program provides free PoCs migrations and consulting [NF1]. Currently, around two thirds (200,000 customers) of Oracle installations use Intel processors [NF2].
- Western Digital is about to acquire SanDisk (see above) for $19 billion [NF3]. With this acquisition, WD will be the second-biggest SSD producer, producing 14% of the market (first is Samsung with 45%) [NF4].
- Similar to their UV300H system for SAP HANA, SGI revealed a system targeted at Oracle databases [NF5]. It supports up to 32 sockets with up to 24 TB (same as UV300H, which is SAP-certified for 20 sockets and 15 TB) [NF6, NF7]. Other databases, such as MySQL and Microsoft SQL Server are being considered by SGI as well [NF8].

References

[SP1] http://www.infoworld.com/article/2997552/processors/oracle-just-made-its-biggest-sparc-announcement-since-buying-sun.html
[SP2] http://www.nextplatform.com/2015/10/28/inside-oracles-new-sparc-m7-systems/
[SP3] http://www.oracle.com/technetwork/server-storage/sun-sparc-enterprise/documentation/sparc-t7-m7-server-architecture-2702877.pdf
[SP4] http://www.icde2015.kr/media/slides/Oracle%20Database%20in-Memory%20ICDE%202015.pptx
[SP5] https://community.oracle.com/docs/DOC-932216
[SP6] http://www.infoworld.com/article/2997552/processors/oracle-just-made-its-biggest-sparc-announcement-since-buying-sun.html

[NV1] http://www.theregister.co.uk/2015/10/12/sandisk_and_hp_partner_to_counter_xpoint/
[NV2] http://www.eetimes.com/document.asp?doc_id=1328018
[NV3] http://www.nextplatform.com/wp-content/uploads/2015/08/future-systems-hp-machine-memory-pool.jpg
[NV4] http://www.hpcwire.com/2015/06/11/hp-removes-memristors-from-its-machine-roadmap-until-further-notice/
[NV5] http://arstechnica.com/gadgets/2015/10/hp-and-sandisk-join-forces-to-finally-bring-memristor-like-tech-to-market/

[NF1] https://www.oracle.com/corporate/pressrelease/exa-your-power-102515.html
[NF2] http://www.nextplatform.com/2015/10/28/inside-oracles-new-sparc-m7-systems/
[NF3] https://www.sandisk.com/about/media-center/press-releases/2015/western-digital-announces-acquisition-of-sandisk
[NF4] http://www.fool.com/investing/general/2015/10/28/did-western-digital-corp-overpay-for-sandisk-corpo.aspx
[NF5] http://www.enterprisetech.com/2015/10/26/sgi-oracle-partnership-bears-in-memory-fruit/?utm_source=feedly&utm_medium=rss&utm_campaign=sgi-oracle-partnership-bears-in-memory-fruit
[NF6] https://www.sgi.com/products/servers/uv/uv_300rl.html
[NF7] https://www.sgi.com/products/servers/uv/uv_300h.html
[NF8] http://www.nextplatform.com/2015/10/26/sgi-targets-oracle-in-memory-on-big-iron/