There will always be an interplay between architecting a software system and the hardware this system runs on. This interplay is particularly evident in data management, and has always fascinated me personally and inspired me in my research. Therefore, I have made this the theme of this bulletin, which David Lomet graciously asked me to put together.

In the past half century, the storage hardware scene has been fully dominated by magnetic disk and tape; both of which depend on physically moving parts. Recently, solid state storage has gained advantages over these magnetic technologies. NAND flash, in particular, has combined the technological ability to adhere to an aggressive silicon scaling road map with impressive economies of scale, fuelled by the worldwide adoption of digital photography and other multimedia consumer electronics devices. It is now being rapidly adopted in the performance-sensitive part of the data storage market, highlighting the constraints that magnetic technologies were imposing on data management solutions, especially regarding high random access latency, but also concerning energy efficiency. NAND flash, however, is just one of the technology contenders in this space, which is known as "Storage Class Memory" (a concept originating from IBM Research). This special issue examines the question which storage hardware technologies are on the future road map, and what would be their consequences for future data management systems.

The direct trigger for pursuing this particular topic in this issue was the excellent keynote that Evangelos Eleftheriou gave at the sixth International Workshop on Data Management for Modern Hardware (DAMON) at SIGMOD/PODS 2010 in Indianapolis, USA. This keynote talk was very well-attended and well-received and covered in detail the road maps of magnetic tape, magnetic disk, a host of solid state technologies. All this information, and more, you find now written up in the introductory paper. Conclusions are that a Storage Class Memory (SCM) will emerge as the storage hardware of choice for performance-critical applications, but that magnetic technologies are not dead; in fact, a healthy future for tape is to be expected. Phase Change Memory (PCM) could dominate the SCM segment in the medium- or long-term.

Complementing the opening piece, which focuses exclusively on the hardware road map, I invited contributions from data management researchers who had worked on exploiting modern storage hardware:

- Three papers contain results on data management on NAND flash. Bernstein et al describe the Hyder system, which argues for purely log-based approach to provide transactional storage for high-performance distributed systems. The team of authors from HP Labs describe work on FlashScan/FlashJoin, and introduce new ideas for spilling merge-algorithms; showing that with flash one can avoid multiple passes to magnetic disk. The combined Intel/EPFL team summarise their work on using cheap flash for logging, and introduces new work in supporting mixed OLAP/OLTP workloads. The idea is to direct OLTP modifications to a delta structure maintained on flash, which OLAP queries merge quickly using a new Materialized Sort-Merge (MaSM) algorithm.

- Two papers in this issue look at the software consequences of technologies beyond flash: the IBM team outlines its vision on Storage Class Memory and in particular Phase Change Memory, and the Korean team looks at the particular attractions of Phase Change Memory and in-page logging.

- The final paper, by the original authors of the best-paper-award-winning uFLIP benchmark (at CIDR 2009), investigates the energy efficiency of current Solid State Drives (SSDs); showing that remarkable difference exist, which can only be brought to light using an experimental approach.

Let me hereby thank all authors for their efforts, and express my hope that you will enjoy reading the resulting material.