SUPERCOMPUTER EDUCATION & RESEARCH CENTRE
INDIAN INSTITUTE OF SCIENCE

Distinguished Speaker Seminar

Title : Implications of Storage Class Memories (SCMs) on Software and Hardware Architectures

Speaker : Dr. C. Mohan
IBM Almaden Research Center

Venue: SERC Auditorium

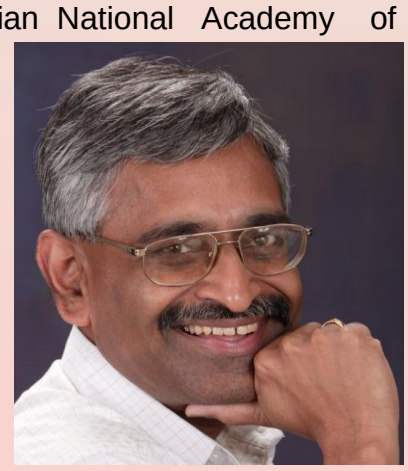
Date & Time : Thursday, Feb. 2, 2012, 2.30 pm

Abstract:

Flash memories have been in widespread usage for a while but they have had some performance and reliability problems which have made them unsuitable for long term storage of traditional database data. A new class of memory called Storage Class Memories (SCMs) are emerging which are built using different technologies than flash devices. SCMs overcome many of the shortcoming of flash devices while approaching the cost of flash memories. SCMs fall in between DRAM and traditional disk storage along many dimensions (performance, cost, energy usage, ...). As a result, large SCM-based memory systems will be built. While main memory database management systems (MMDBMSs) companies like TimesTen and SolidDB have been around for a while, those companies have been acquired recently by Oracle and IBM, respectively. SCMs will permit the sizes of databases managed by MMDBMSs to be very large while being cheaper than those using only DRAMs. SCMs may be viewed as disks or as memory from an architectural perspective. Depending on the viewpoint, the implications on DBMS architectures will be very different. Some preliminary ideas on usage of a small amount of non-volatile memory realized by using battery-backed DRAM was presented in a paper design called Safe RAM in VLDB 1989. Technology has evolved tremendously in 2 decades and it is time for us to revisit system architectures. In IBM Research, we have been working on multiple projects to understand the implications of SCMs on software and hardware architectures in general and on DBMS architectures in particular. Traditional locking, recovery, storage management and query processing ideas would need to be extended to take advantage of SCMs. In this talk, I will discuss what we have learnt from our investigations and what needs to be further explored.

Biography:

Dr. C. Mohan joined IBM Almaden Research Center (San Jose, California) in 1981 where he worked until May 2006 on a number of topics in the areas of database, workflow and transaction management. From June 2006, he worked as the IBM India Chief Scientist, based in Bangalore, with responsibilities that relate to serving as the executive technical leader of IBM India within and outside IBM. In February 2009, at the end of his India assignment, Mohan resumed his research activities at IBM Almaden. Mohan is the primary inventor of the ARIES family of recovery and concurrency control methods, and the industry-standard Presumed Abort commit protocol. He was named an IBM Fellow, IBM 's highest technical position, in 1997 for being recognized worldwide as a leading innovator in transaction management. In 2009, he was elected to the US National Academy of Engineering (NAE) and the Indian National Academy of Engineering (INAE). He received the 1996 ACM SIGMOD Innovations Award in recognition of his innovative contributions to the development and use of database systems. In 2002, he was named an ACM Fellow and an IEEE Fellow. At the 1999 International Conference on Very Large Data Bases, he was honored with the 10 Year Best Paper Award for the widespread commercial and research impact of his ARIES work which has been widely covered in textbooks and university courses. From IBM , Mohan has received 2 Corporate and 8 Outstanding Innovation/Technical Achievement Awards. He is an inventor on 34 patents and was named an IBM Master Inventor in 1997. Mohan works very closely with numerous IBM product groups and his research results are implemented in numerous IBM and non- IBM prototypes and products like DB2, MQSeries, WebSphere, Informix, Cloudscape, Lotus Notes, Microsoft SQLServer and System Z Parallel Sysplex. He has been on the advisory board of IEEE Spectrum and an editor of VLDB Journal, and Distributed and Parallel Databases. Currently, he is a Steering Council member of IBM 's Software Group Architecture Board, and a member of the IBM Academy of Technology. In the past, he has been a member of IBM 's Research Management Council (RMC), IBM 's Technical Leadership Team (TLT), IBM India's Senior Leadership Team, and the Bharti Technical Advisory Council. He is on the Academic Senate of the International Institute of Information Technology (IIIT) in Bangalore. Mohan received his PhD in computer science from the University of Texas at Austin in 1981. In 2003, he was named a Distinguished Alumnus of IIT Madras from which he received a B.Tech. in chemical engineering in 1977. Mohan is a frequent speaker in North America, Western Europe and India, and has given talks in 35 countries. More information can be found in his home page at http://www.almaden.ibm.com/u/mohan/



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