MILESTONES

Background

As flash manufacturers continue to pack more bits onto ever smaller storage cells, the endurance (wear-out) issue for NAND flash storage becomes an ever greater issue. This trade-off between memory cost per GB and endurance means that the endurance problem is never really solved – endurance improvements simply reduce the cost of the flash.

NAND flash chips are used in many devices, including Solid State Disks (SSDs), laptops, tablets, mobile phones, GPS devices, USB drives and flash memory cards.

NVMdurance

NVMdurance provides software that is proven to make flash memory last longer by extending the intrinsic endurance of the NAND flash. This means that to the host device or controller, the flash appears to simply last longer before ever they use additional techniques (like powerful error correction) to further extend its life. This is what is unique to NVMdurance - Non Volatile Memory endurance, NVMdurance.

Milestones

1999 – 2001	▪ Joe Sullivan (then at Analog Devices, Limerick, Ireland) works on extending life of NOR flash memory ▪ Preliminary work describes how varying parameters can achieve great life extension (AKA endurance)
2001 - 2008	▪ Joe teams up with Conor Ryan (then at University of Limerick) ▪ NOR work formalized and papers published “automating the discovery of parameters by testing flash in specially constructed hardware” ▪ They are approached by NAND flash manufacturers seeking to apply the technology ▪ Joe and Conor establish that, due to the much higher complexity of NAND, substantial changes and highly sophisticated software is required
2008 – 2011	▪ Joe and Conor form company, Evolvability Ltd, to do consulting work on extending NAND flash endurance ▪ Several different software approaches taken ▪ Scalable NAND test hardware is developed ▪ Patenting process begins
2012	▪ Joe and Conor secure funding and support from NDRC (Ireland) ▪ New approach developed that uses a combination of hardware testing, software simulation and Machine Learning ▪ Fully autonomic, online controller for SSDs designed ▪ Tom Burniece and Pearse Coyle provide consulting services to commercialize technology
2013	▪ First experiments show a 10-fold gain in endurance ▪ “Most Innovative Technology” award at Flash Memory Summit, the key annual industry event in Santa Clara, California ▪ Venture spun out of NDRC early, with $300,000 VC seed funding from New Venture Partners (NJ, USA) and NDRC ▪ NVMdurance formed; Pearse Coyle joins as CEO, Tom Burniece as Commercial Director ▪ Paid commercial trials commence
2014	▪ Further impressive results achieved with NAND flash devices of multiple vendors ▪ 2nd round of Seed Funding secured - $700,000, Enterprise Ireland and ACT Venture Capital join existing investors
2015	▪ Altera (now part of Intel) alliance announced - NVMdurance becomes part of FPGA offering to SSD controller market ▪ David Eggleston, GLOBALFOUNDRIES joins board as non-executive director ▪ Significant revenue advances secured
2016	▪ $2.5M Series A funding round announced ▪ Team grows to 10 people