Working with sub 25nm MLC in Enterprise

Going Beyond the Media
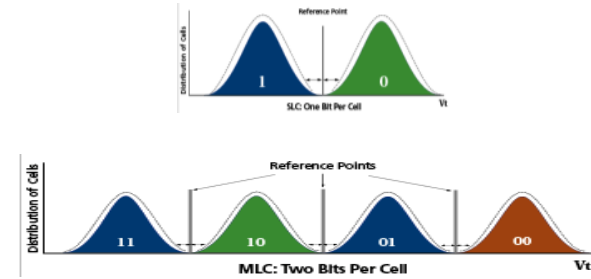
Scott Shadley

Sr. Product Marketing Manager – Enterprise SSD

Agenda

- A brief look back at MLC technologies

- The difference between eMLC and eSSD

- Stopping the Cycle count focus

- Matching the right MLC Media with the need

- What is next on the NVM Enterprise Horizon

A Brief History Lesson

- **Many Classes of NAND exist today**
  SLC, MLC, cMLC, eMLC, TLC…

- **eMLC = Endurance not necessarily Enterprise**
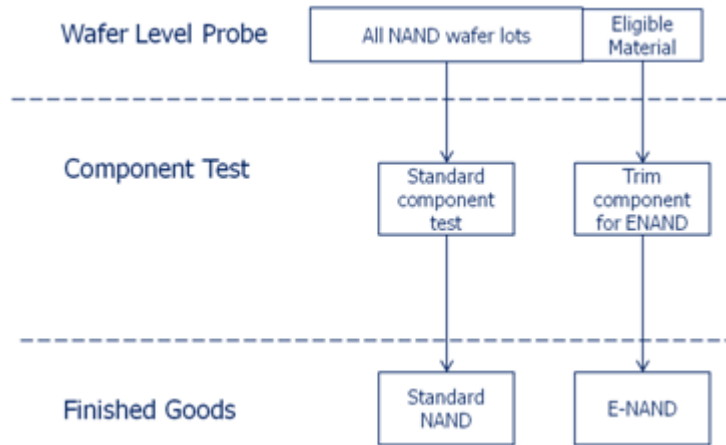
A one time trim change to tProg is not enough anymore for eSSD

- **Wafer binning helps, but more is needed**
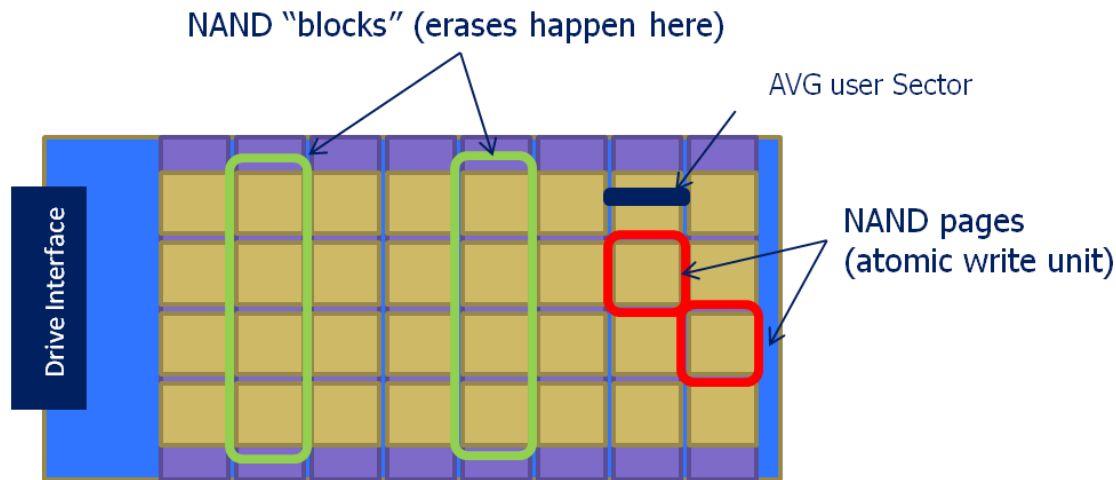
How eMLC becomes an eSSD

- There are many ways to "spin" an SSD
  - Ref Design, ODM, 3rd Party, Organic
- eMLC NAND cannot define the eSSD alone
  - Over provisioning, Data path, Power backup
  - Garbage collection, Wear leveling

*Even these features are not enough to work*

Working in a Sector based environment
Blocks and Pages complicate and dictate

There will always be a need to deal with disparity …and it is only going to get worse!
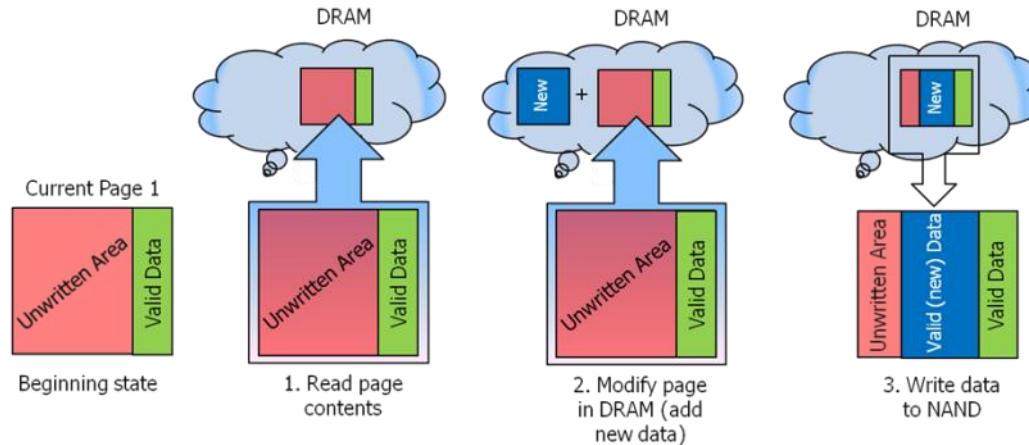
The Read Path

- Not surprisingly, FW is king over NAND

  - Working with NAND is more than just SMT now

- Features that require NAND expertise and ownership

- A desire for making NAND always provide good data

Adjusted read
point due to wear

Fresh of out Box
read point

V_t
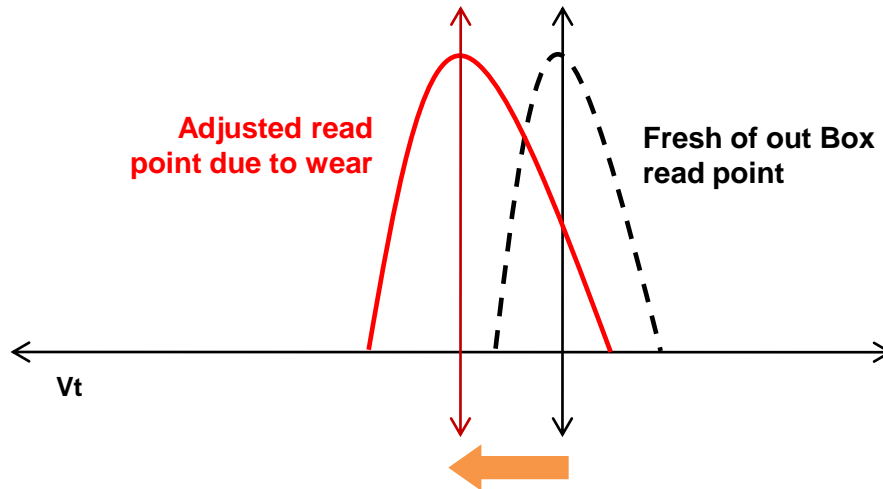
The Program Path

- ## Making certain to ensure data is Non-Volatile

- ## Using technology tools to minimize Write Amplification and unnecessary wear

- ## Provides Longer life, regardless of media

Beyond Cycle Count
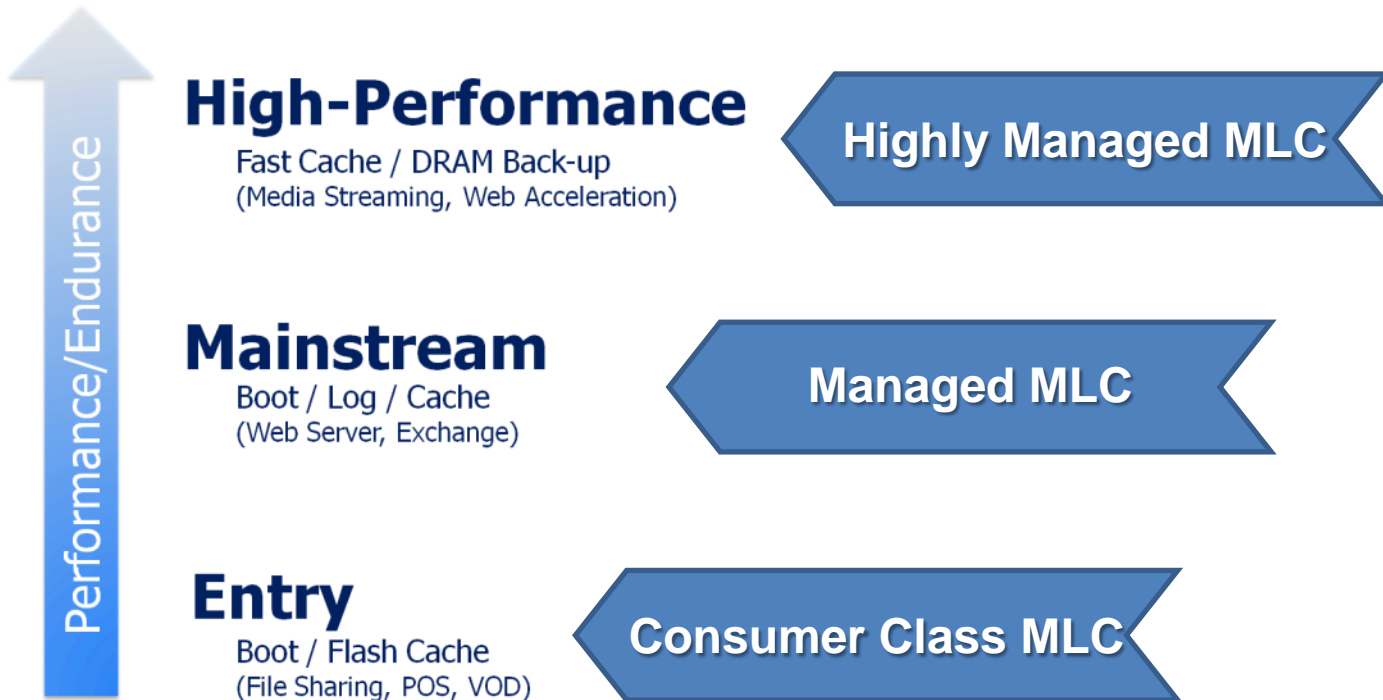
- 3K, 30K, 100K – More is better, BUT…

- Misused data management will still leave your drive short on life
- Having all the right "Band-Aids" is key…

Choosing the Right SSD

- More and more choices are available
- Ensure the right Price/Performance

Performance/Endurance

High-Performance
Fast Cache / DRAM Back-up
(Media Streaming, Web Acceleration)

Highly Managed MLC

Mainstream
Boot / Log / Cache
(Web Server, Exchange)

Managed MLC

Entry
Boot / Flash Cache
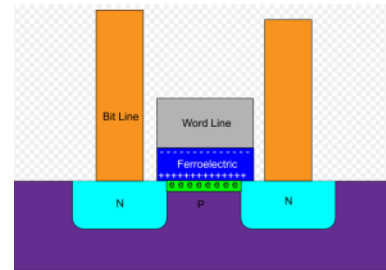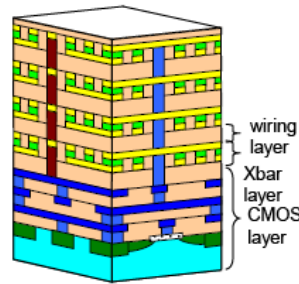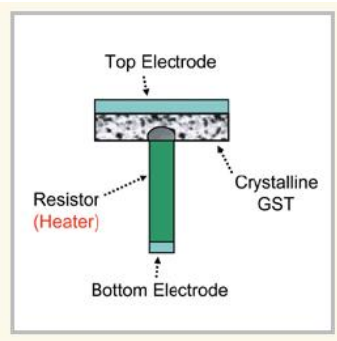(File Sharing, POS, VOD)

Consumer Class MLC

A Preview: "Event Horizon"

Next Great SSD Technology…

- Sooner than we all realize, NAND needs help

- What are the choices?
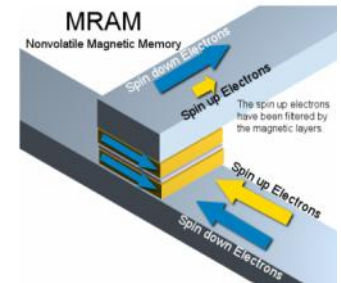
- Who is leading the pack?

Micron mass-produces Phase Change Memory

HP's faster-than-flash memristor at least TWO years away

Everspin Technologies Enables Spin-Torque MRAM Ecosystem

Defining the Future of eSSD

- "Off the shelf" is no longer valid for eSSD

- Working with new technologies NOW is core

- Owning the process is key

- Beyond the "Final Frontier"

Brief Review

- eMLC does not make an eSSD

- Raw media solutions are not enough today

- Controller technologies will rule the future

- NAND has legs left, but technology is coming

- Ownership of media & organic design is key!

Scott Shadley

- Sr. Product Marketing Manager, NAND Solutions Group (NSG), Enterprise SSD Products, Micron Technology, Inc.
- Facilitates Marketing efforts for Micron Enterprise SSD adoption and creation of new products to meet the growing market need
- 6 year history focused in Enterprise SSD Development
- 15 years in Semiconductor Design and Development
- Earned a BS degree in Electrical Engineering - Device Physics from Boise State University
- Earned a MBA in Marketing from University of Phoenix