Choose the Right NAND Flash Solution for Your Embedded Application

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Agenda

- Embedded Market Overview
- Key Applications
- NAND Solutions
- Feature Comparison
- Conclusion

Embedded Market Trends

Automotive

Transition to a mobile living space; fully connected with autonomous driving

V2V/V2I communications

Accelerated adoption of new technologies

Industrial Multi-Market

Internet of Things (IoT) driving smarter connected devices

Distributed data analytics and storage

Adoption of mobile and PC derived platforms

Consumer

Adoption of UHD/4K expands across applications

Wearable applications are booming

Increased mobility and smaller form factors

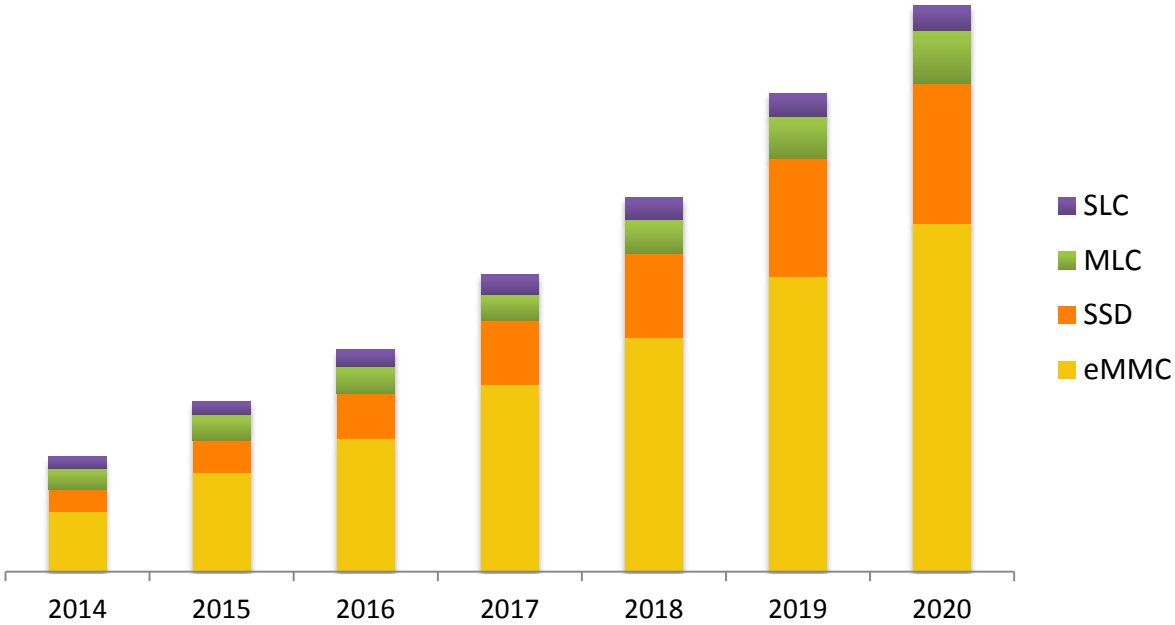
Connected Home

Smarter homes for entertainment, security, and energy management

Traditional set-top box (STB) market faces competition from over the top (OTT) and cloud-based networks

Rapid growth into developing countries

Embedded Nand Market



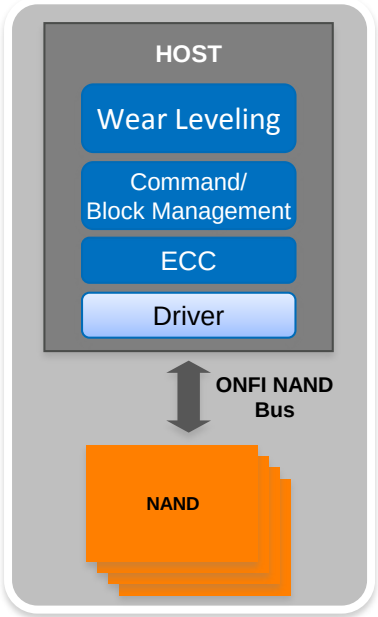
Source: Micron Marketing

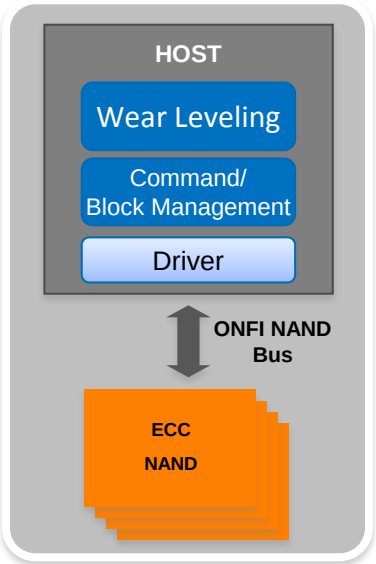
Discrete vs. Managed NAND

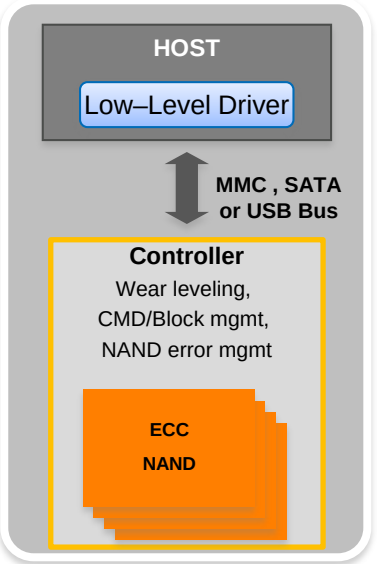
Discrete NAND
SLC, MLC, TLC

ECC FREE
Serial NAND, EC^{2}NAND

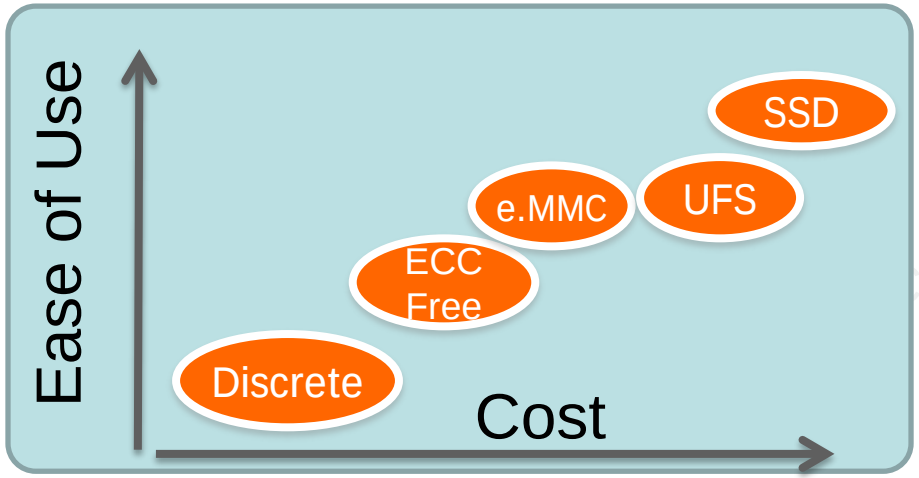
Managed NAND
SSD, e.MMC, eUSB, CF

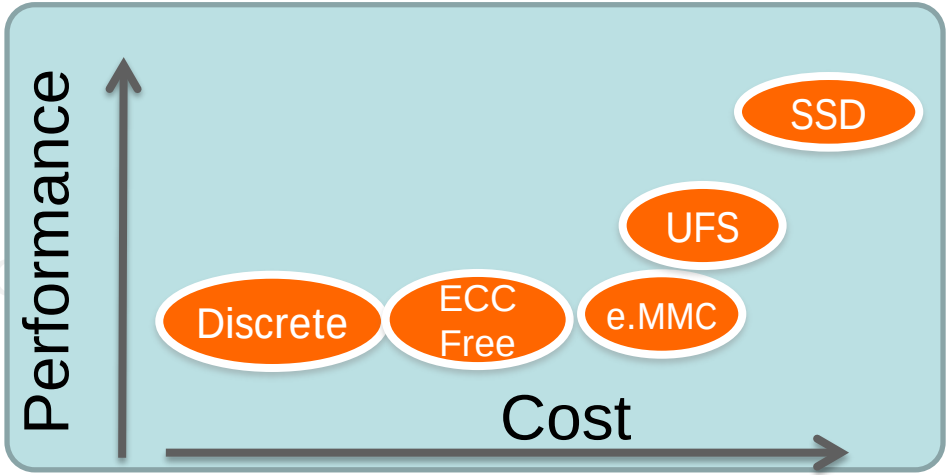






NAND Solution Comparison

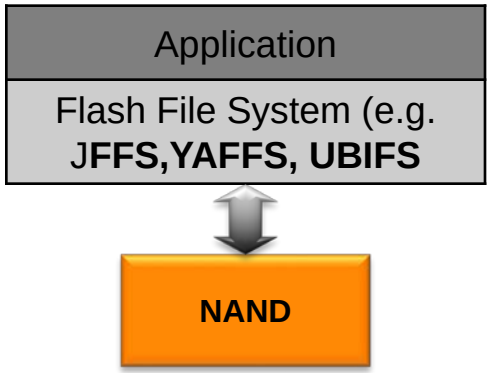




- Managed NAND easy to design but more expensive
  - uC and package adders (MCP, caps) large portion of BOM cost vs. discrete NAND at low densities
- Discrete NAND can achieve similar/higher performance vs. e.MMC with optimized software

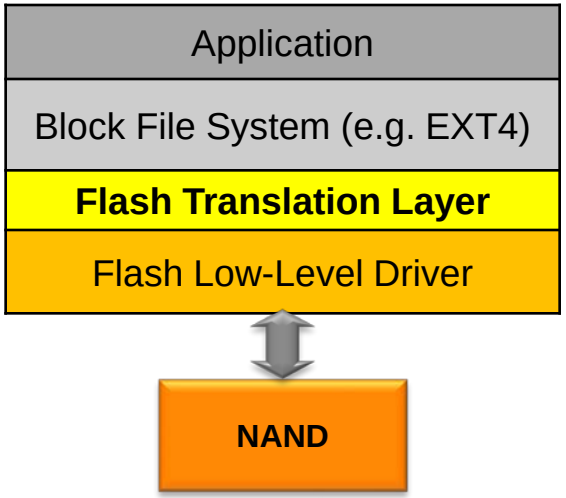
Discrete Nand Software Options

NAND FS



Flash wear leveling, bad block management, power loss managed by file system

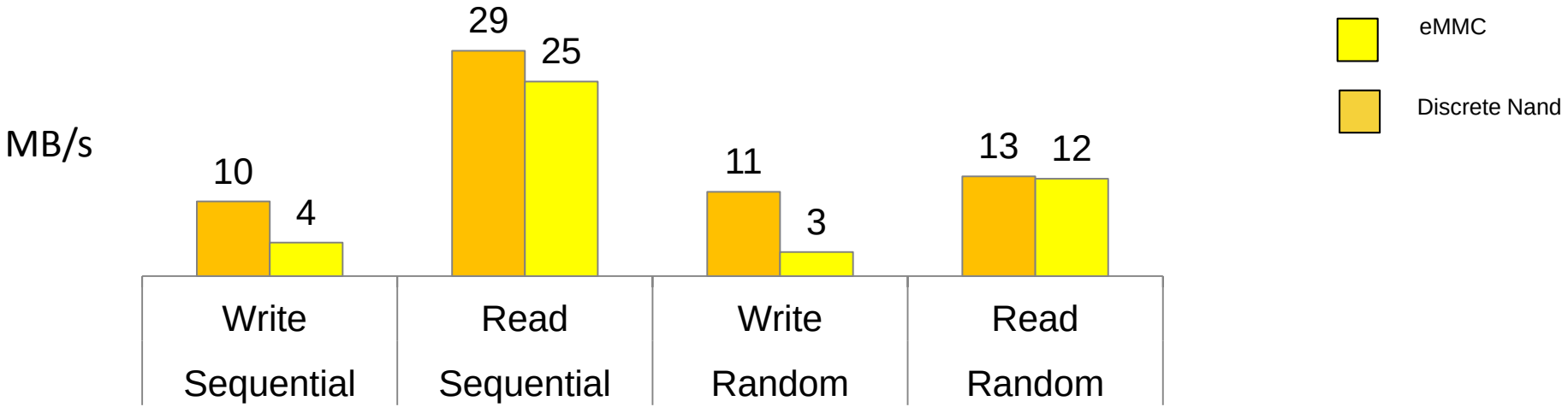
Block FS



Requires FTL and LLD

Same software stack for managed and discrete NAND

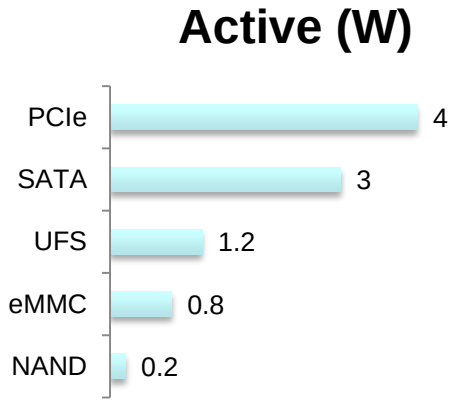
Performance

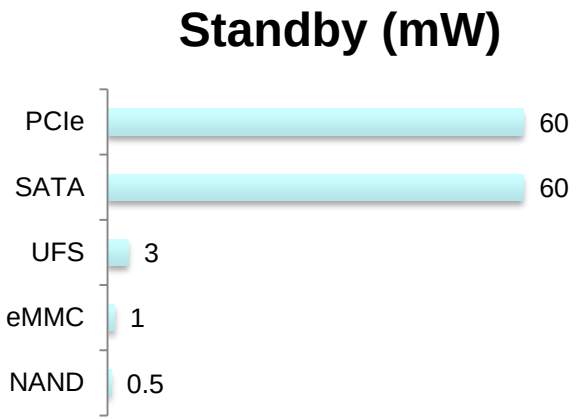


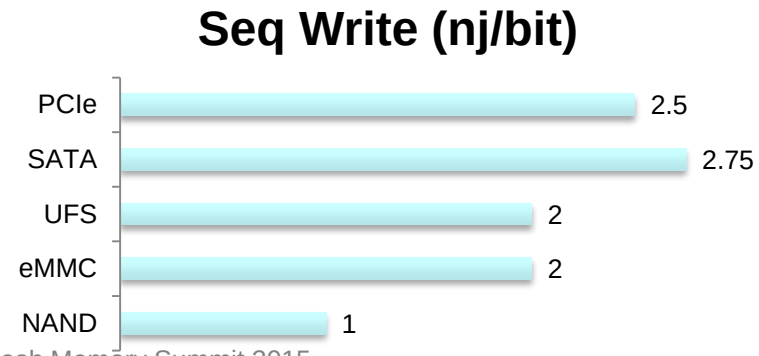
- Comparable performance between discrete NAND and eMMC if software is optimized and host can manage ECC

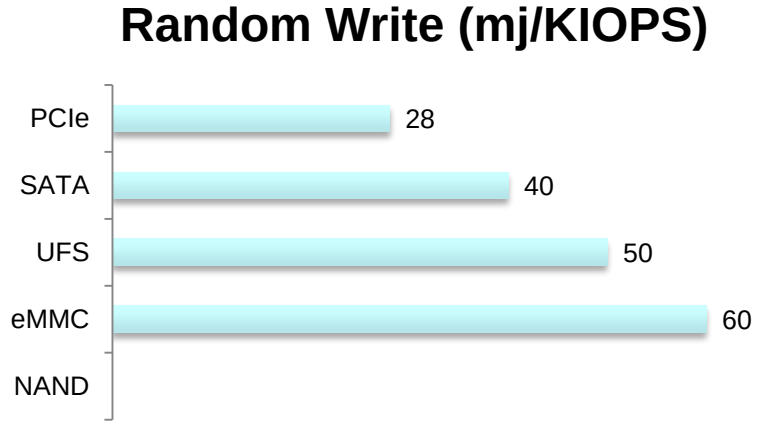
Based on Amlogic M8 Platform; 50 MHz async mode
Sequential Performance @ 128K chunk size and Random Performance @ 4K chunk size

Power Consumption



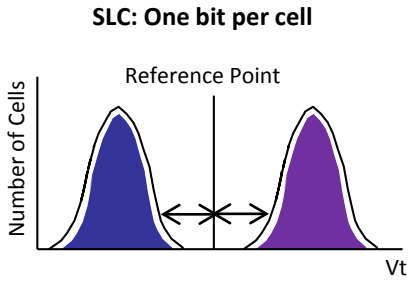


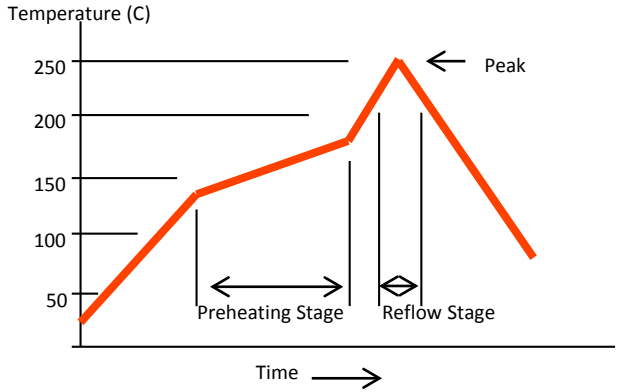




Reliability Considerations

- Power Loss Recovery
- SLC mode
- Reflow Data retention





Summary

- Discrete NAND is a good option for cost-sensitive applications
- Managed NAND is better for ease of design/time to market
- Discrete NAND performance is equal to managed NAND if software is optimized
  - Robust power-loss protection, SLC mode, and reflow capability needed to use discrete NAND