Mobile Storage: Trends for Tomorrow

The Advent of UFS (Universal Flash Storage)

Vandana Venkatesan
Aug. 2011

Mobile Storage – What's Different?

POWER

Quad-Core CPUs
Multi-tasking
Larger screens
Longer Standby

RESPONSE

INSTANT ON → INSTANT PLAY

SIZE

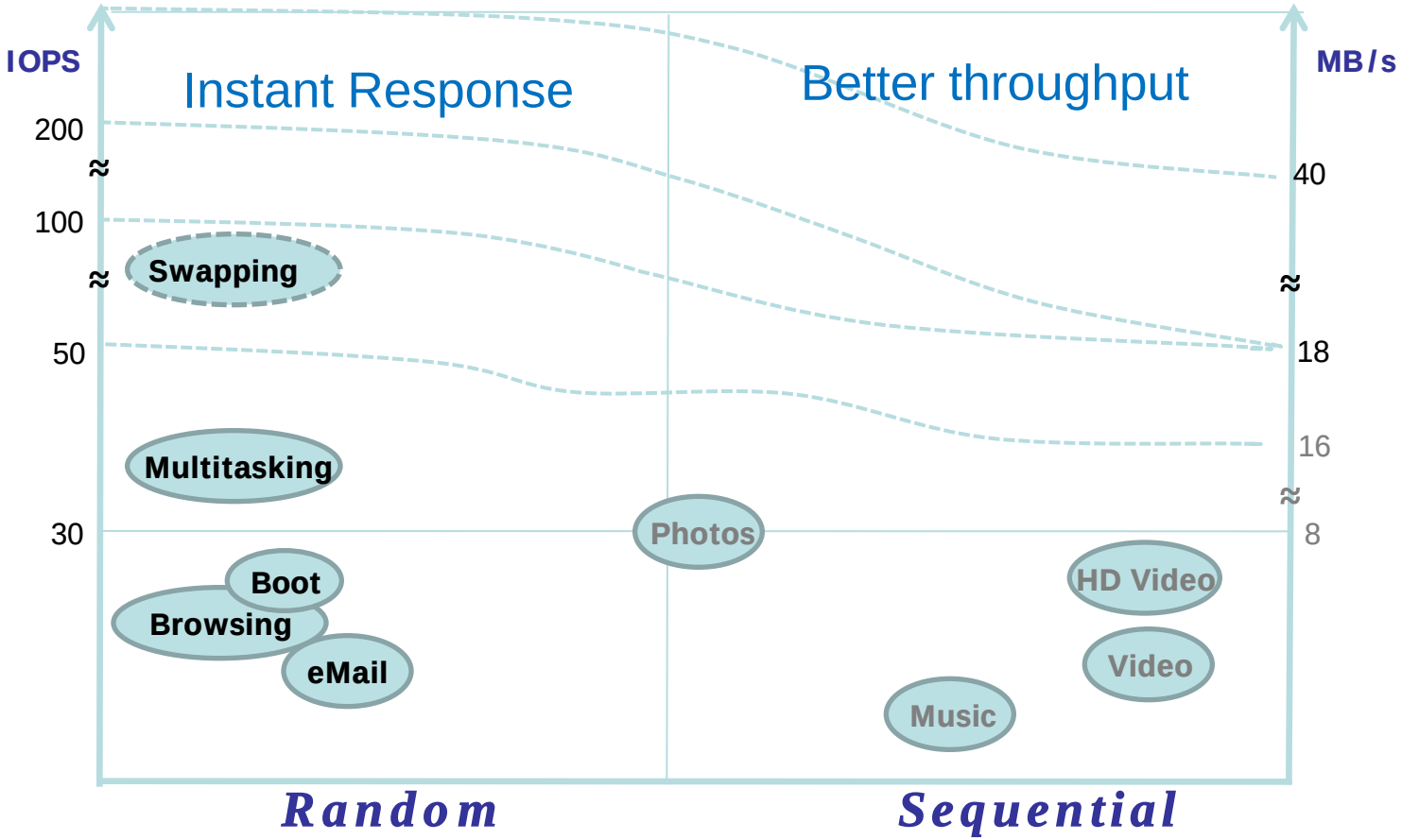
Smaller package
Z-height is key

SECURITY

New security challenges

Mobile storage has its own unique requirements

Performance Needs – A Closer Look



Random IOPS is key in a multi-tasking mobile environment

Mobile-centric Storage

Booting
Partitioning

Flash-centric
Security
Data integrity

Future expandability
Serial interface
Command queuing
Device-level partitioning

JEDEC defines UFS as the next generation mobile storage spec

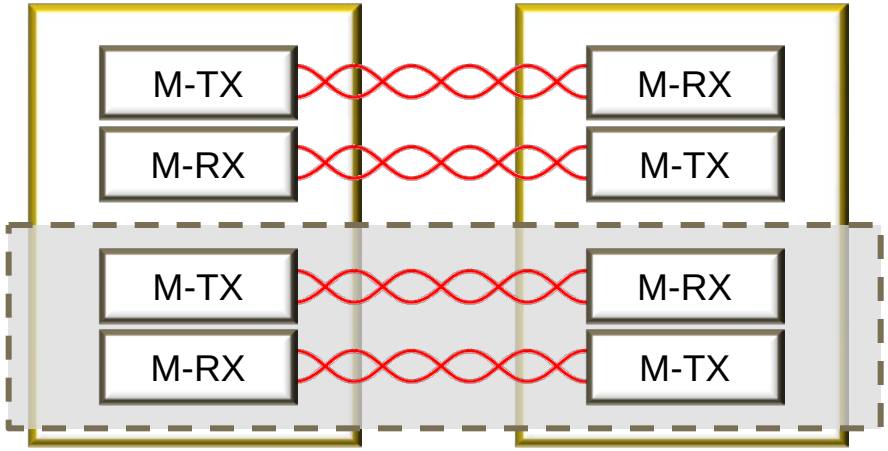
UFS – what's new?

Serial	• Low-power serial interface • MIPI standard: M-PHY
Queuing	• Multiple command queuing • Command prioritization
Partitioning	• Device-level partitioning • "Enhanced" partition for performane & reliability

UFS = Mobile-centric eMMC features + more!

UFS – serial interface

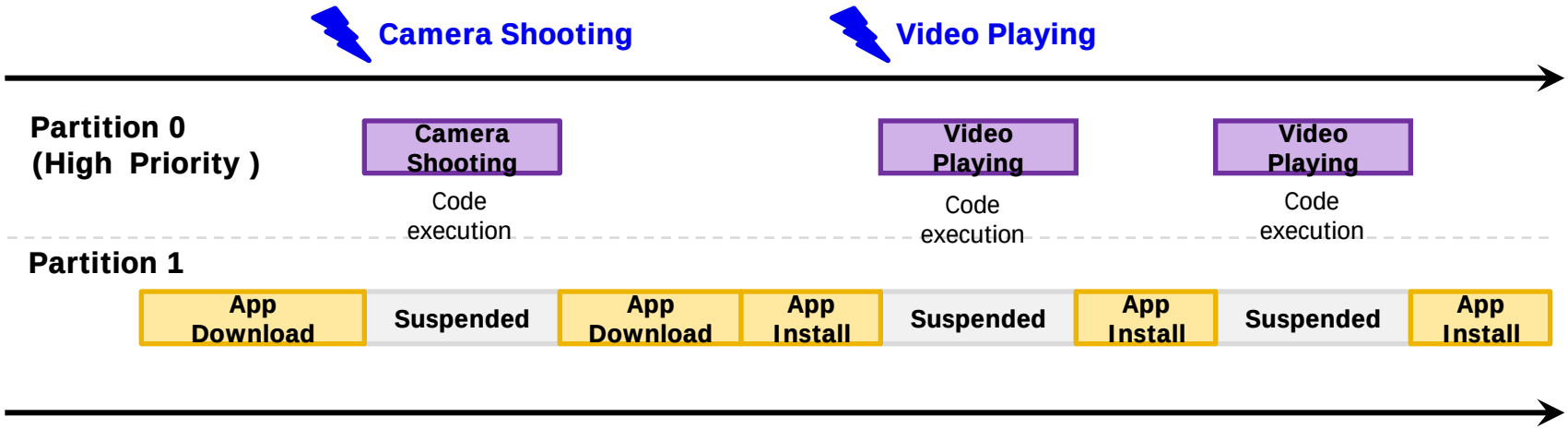
- Throughput up to 3Gbps, going to 6Gbps with multi-lane
- Async data transmission suitable for multi-processing
- Low power sleep mode with PLL off



Standard serial protocol offers performance at low power

UFS – intelligent command queuing

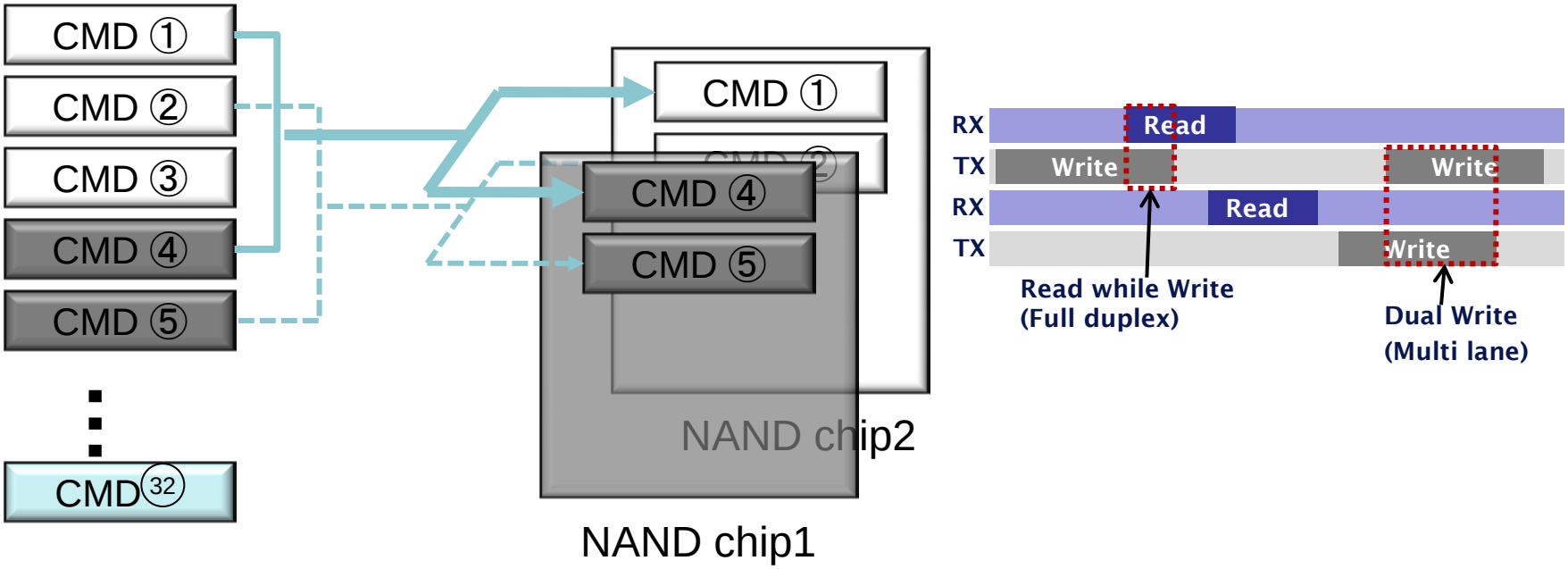
- Simultaneous command queuing within and across queues
- High-priority queues for high-priority tasks
- Flexible command sequence control



Instant response for better user experience

UFS – more NAND-friendly

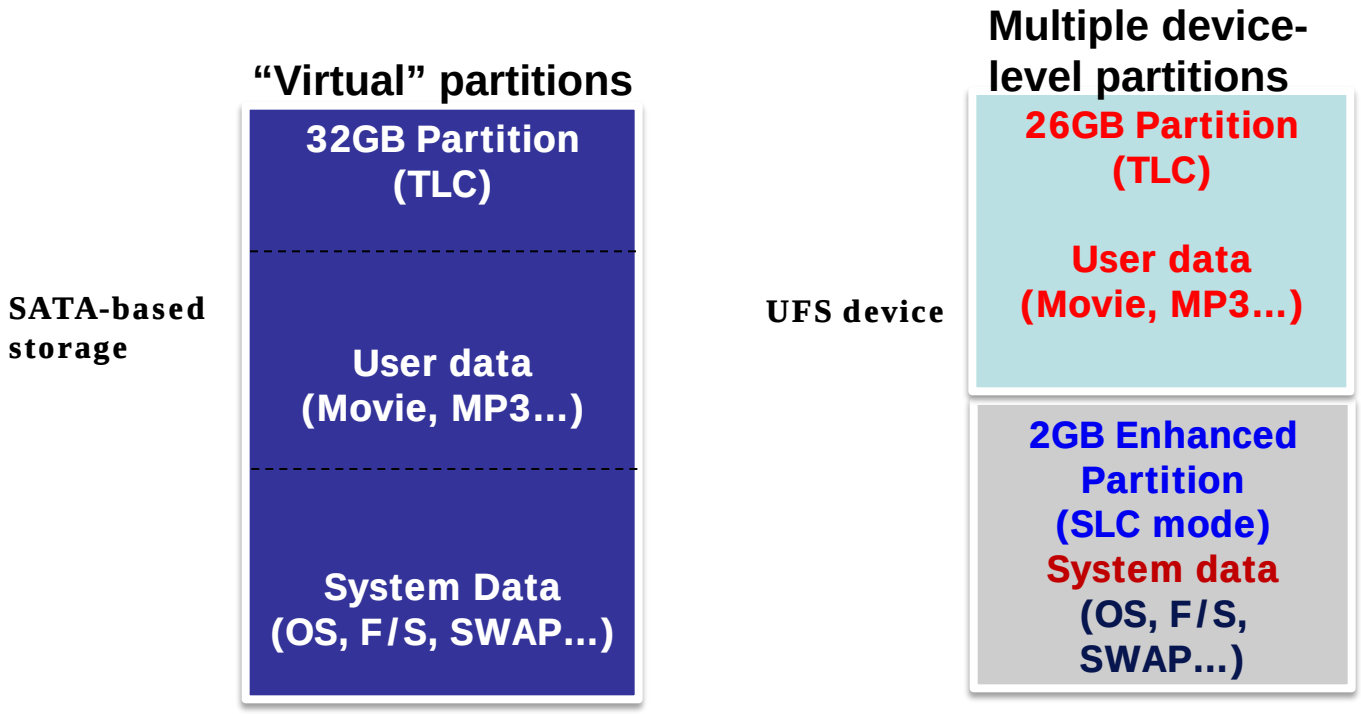
- Spec tailored for Flash-based storage
- Full utilization of interleaving across NAND channels and ways
- Read-while-write and dual write across multiple lanes



Better throughput through better NAND utilization

UFS – partitioning offers flexibility

- Partitioning at device level offers more control
- “Enhanced” partition feature carried over from eMMC spec
- Prioritization at partition level



Managing NAND endurance and performance better

Flash Memory SUMMIT

Ready to go to market in 2013 mobile devices!