SMR: Moving to Greener Pastures

Seagate's effort to vitalize SMR into more generic environments

SEAGATE

Adrian Palmer | MSST 2015

SMR – Shingled Magnetic Recording

What we know, and what we don't knowS

Needs work!

- ✔ **Mass rotating media storage**

- ✔ **Forward-Write only**

- ? **ZBC/ZAC zones partitioning drive**

- ? **DM vs HA vs HM**

- ? **Requires new thinking of IO patterns**

- ! **Requires massive stack changes**
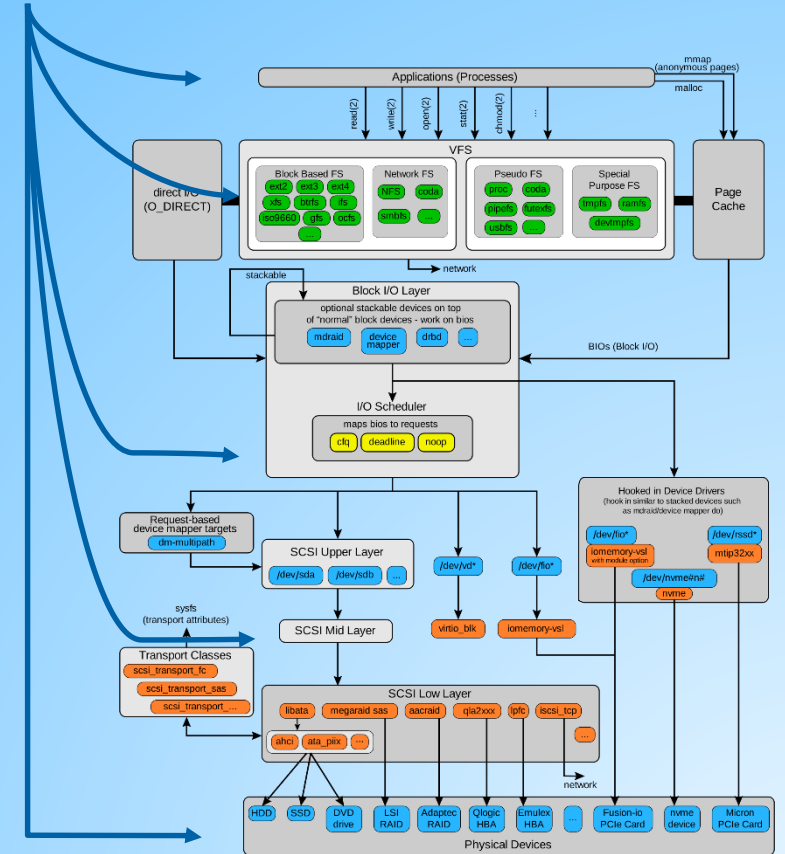
Flash, but with Slower speeds

Flash

- **Sequential Write**

- **Erasure Blocks**

- **ERASE (Blocks)**

- **FTL – Virtualize LBAs**

- **TRIM (individual LBAs)**

SMR

- **Sequential Write**

- **Zones**

- **No lengthy Erase operation**

- **Drive Managed Architecture**

- **RESET_WRITE_POINTER (Zone)**

IO Stack support

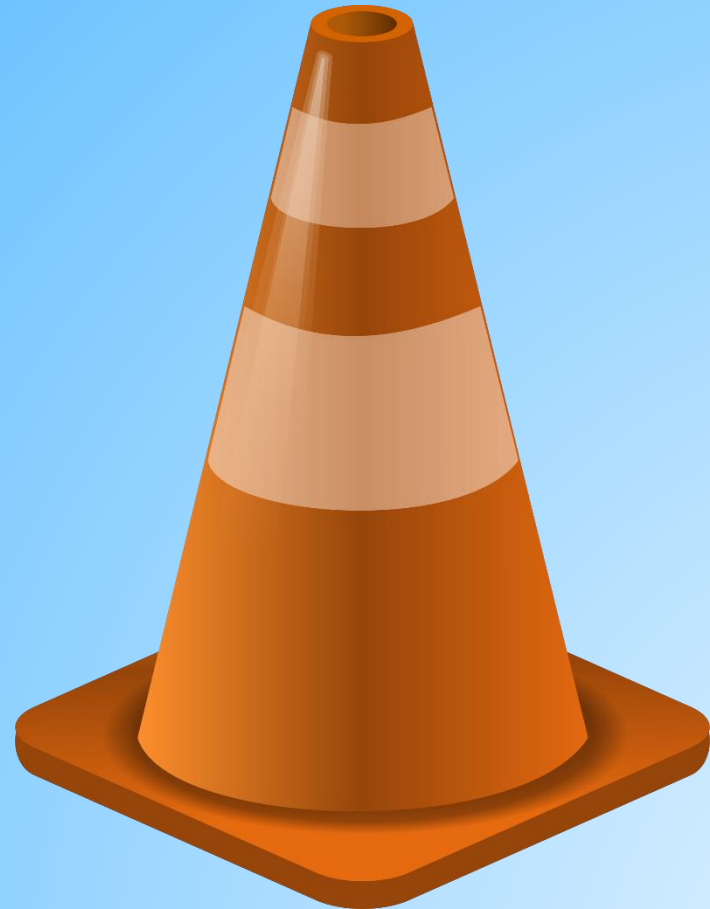Changes REQUIRED for generic use

Host responsible for translation layer

In drive: ZAC/ZBC zone information

In kernel: new ATA/SCSI commands

In FS: new allocation and IO management

In RAID: new compositions requirements

Seagate's Open Source Contributions

SMR Friendly File System - SMRFFS

Kernel IO Stack

- ZAC/ZBD aware reference design

FS

- EXT4 reference design

Device Mapper

- ZAC/ZBD aware RAID/JBOD solution

For more information…

ask questions!

Email

- adrian.palmer@seagate.com

Clone

- https://github.com/Seagate/SMR_FS-EXT4

Talk with me

- Adrian Palmer