



**SDC** 

STORAGE DEVELOPER CONFERENCE

SNIA  SANTA CLARA, 2017

# **By the Book: Open Source Reference Implementations for Key SNIA Terminology**

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# Motivations

- ❑ This journey began in a Data Protection BoF
- ❑ Then a desire to draw from the SNIA Dictionary
  - ❑ The best dictionary of its kind
  - ❑ Mildly dated thanks to years of authority
- ❑ Then DPCO Governing Committee participation

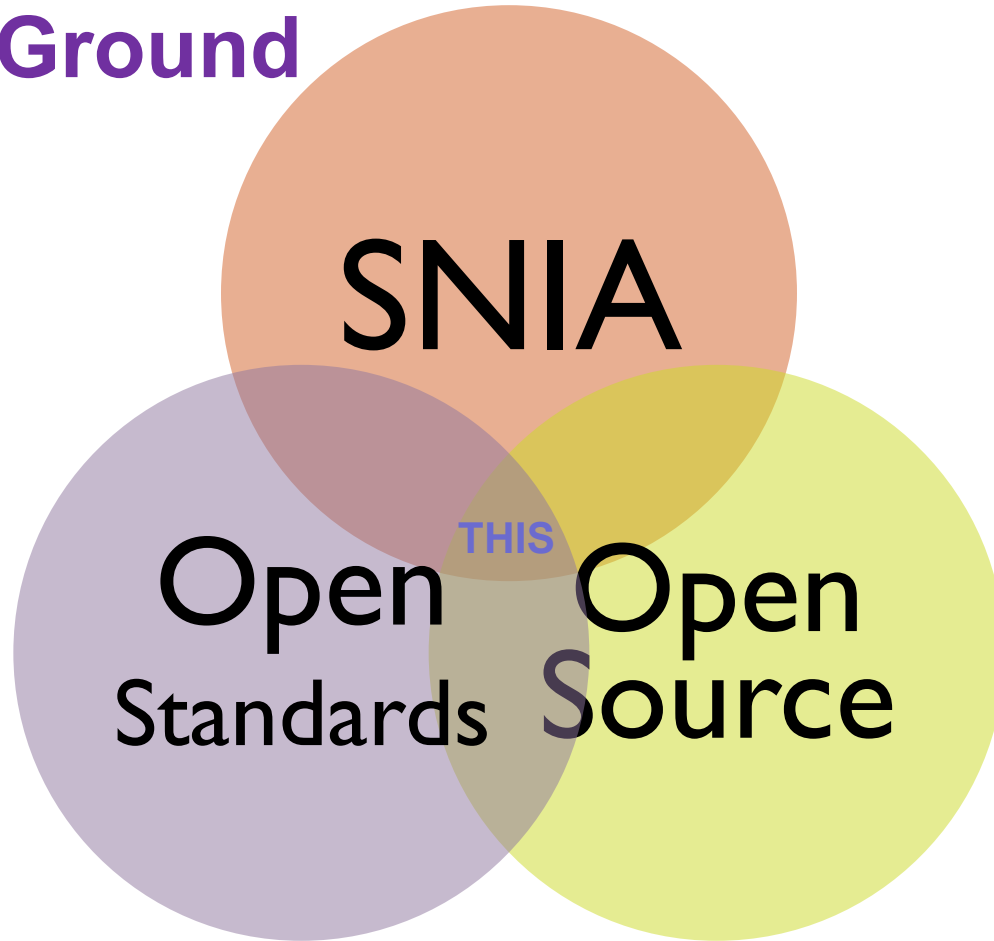


# Challenges

- ❑ Balance Vendor Authority with Vendor Neutrality
  - ❑ Vendors produce many de facto standards
- ❑ Industry authority beyond SNIA projects
  - ❑ SNIA produces open standards
- ❑ License the results for maximum adoption



# Common Ground



# Perfect Example: SNIA NDMPv4

- ❑ Network Data Management Protocol
- ❑ [www.snia.org/ndmp](http://www.snia.org/ndmp)
- ❑ Vendor originated
- ❑ Open standard
- ❑ Permissively-licensed v4 implementation (of 5)
- ❑ Freely available



# Open Standards are Everywhere

- ❑ VendorNAS 2.0!
  - ❑ NFS!
  - ❑ iSCSI!
  - ❑ FibreChannel!



# Open Standards are Everywhere

- ❑ VendorNAS 2.0!
  - ❑ RFC 1813!
  - ❑ RFC 3720!
  - ❑ RFC 3643!
- ❑ Shifts the discussion to Standards Conformance of Reference(able) Implementations



# Open Source is Everywhere

- ❑ Majority of non-Microsoft storage platforms
  - ❑ FreeBSD
  - ❑ Illumos
  - ❑ GNU/Linux
- ❑ POSIX environments
- ❑ *Enterprise-proven reference implementations*





# Vendor Motivations

- ❑ Validated standards compliance should be synonymous with standards delivery
- ❑ Either failing to comply with a standards or extending a non-extensible standard is failure
- ❑ Not a desirable point of distinction
- ❑ Shared code is usually interoperable code



# By the Book...

- ❑ RAID 0, 1, 5, 6
  - ❑ FreeBSD `graid` ( 8 )
  - ❑ GNU/Linux `mdadm` ( 8 )
- ❑ RaidZ
  - ❑ Illumos, FreeBSD, GNU/Linux `zpool` ( 8 )
    - ❑ Replication, rebuild, latency, throughput...



# By the Book...

- ❑ iSCSI
  - ❑ FreeBSD CTL
  - ❑ Illumos SCSI Target Mode Framework
  - ❑ GNU/Linux `open-iscsi`
- ❑ NFSd
  - ❑ Virtually every Unix distribution, by definition



# By the Book...

- ❑ FibreChannel
  - ❑ FreeBSD, Illumos and GNU/Linux Drivers
- ❑ Various Erasure Coding Implementations
- ❑ Most Networking Protocols
- ❑ Increasingly Web Content Accessibility Guidelines (WCAG) for Applications



# My Work: Replication Taxonomy

- File

  - `rsync` ( 8 )

  - `unison` ( 8 )

- Block

  - OpenZFS send

- Object...



# My Work: Replication Taxonomy

- ❑ Understand the problem before addressing it
- ❑ Block vs. File vs. Object
- ❑ Active vs. Passive
- ❑ Asynchronous vs. Synchronous
- ❑ Point-in-time vs. Batch
- ❑ Primary-Backup vs. Multi-Primary...



# Eyes on the Prize

- ❑ SNIA Linear Tape File System (LTFS)
- ❑ SNIA NDMP
- ❑ SNIA Swordfish
  - ❑ [snia.org/forums/smi/swordfish](http://snia.org/forums/smi/swordfish)
  - ❑ [swordfishmockups.com](http://swordfishmockups.com)
- ❑ Watch for the DPCO Data Protection WP



# Calls to Action

- ❑ NDMP, OpenZFS, bhyve Hypervisor are all vendor contribution
- ❑ Ever-present motivations to upstream, broad “thaw” regarding actually doing it
- ❑ Identify what standards-based technologies outside or inside your core functionality may qualify for upstreaming.







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**Discuss**

**Thank You!**

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