



SMB3 in a Blended File Protocol Family

Rounding out your File Service Platform

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January 2019
SNIA SDC EMEA



ASK QUESTIONS!



**IF I CAN'T ANSWER 'EM, SOMEONE
HERE PROBABLY CAN.**



Quick Introductions





Introductory esquenessism

Me:

- Samba Team Elder
- SMB Wizard with...



WEKA.io

The opinions expressed are my own and not necessarily those of my employer, my colleagues, my spouse, my spirit familiar, the Internet Voices, or the monster in the closet.



Introductions

Me:

- I've written a bunch of important SMB stuff (mostly out of date now)
- These days, I integrate SMB with Distributed File Systems







Introductions: SMB

Who is this SMB Anyway?

SMB is **S**erver **M**essage **B**lock

SMB has a long and and varied history,
all the way back to PC-DOS and IBM.





SMB History

What are SMB1, SMB2, and SMB3?

SMB1: The Original

- ❖ Created in the early 1980's by IBM
- ❖ Further development by 3Com, IBM, Intel, and Microsoft
 - For PC-DOS, MS-DOS, and OS/2
 - Dialect updates released with Operating System Updates
- ❖ Ported to Windows NT
 - Final Dialect! "NT LM 0.12"





SMB History

What are SMB1, SMB2, and SMB3?

SMB2: Introduced with Vista!

- ❖ An Entirely New Protocol
 - 1/4th as many message types
 - No DOS or OS/2 Baggage
- ❖ Similar Design
 - Familiar to SMB1 Developers
- ❖ Silently Negotiated
 - Users neither knew nor cared





SMB History

What are SMB1, SMB2, and SMB3?

SMB3: Marketing Upgrade!

- ❖ An SMB2 Dialect; not a new Protocol
 - Originally planned as 2.2
 - Message structures are the same
- ❖ Adds Speed, Scalability, Reliability
 - RDMA
 - Multichannel
 - Persistent Handles
 - Scale-out & Failover Clusters





SMB is a Network Transport

SMB is Infrastructure

- A Reliable, Scalable, Authenticated, Signed, Sealed, Network Connection
 - Remote Procedure Call (RPC)
 - Remote Shared Virtual Disk (RSVD)
 - Block I/O for Storage Spaces Direct

Think of SMB as a Transport.

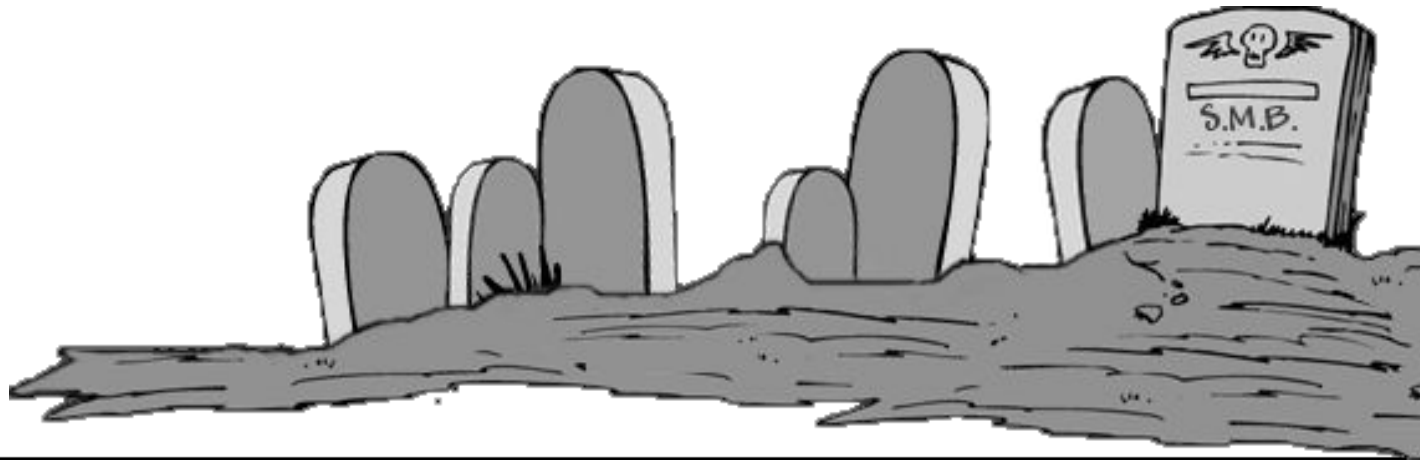




SMB History

What are SMB1, SMB2, and SMB3?

SMB1 is dead.

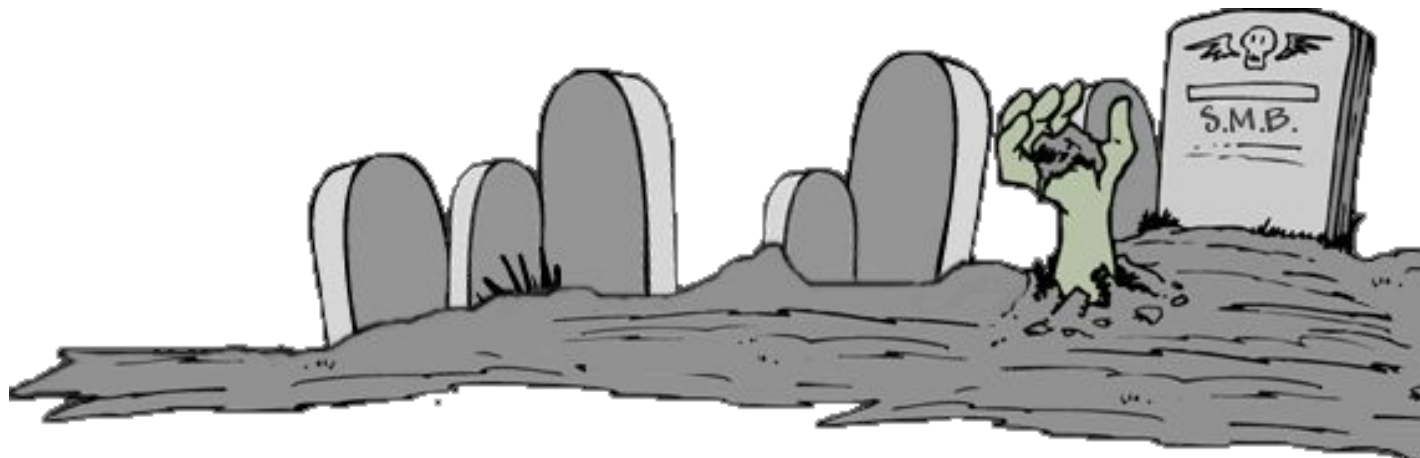




SMB History

What are SMB1, SMB2, and SMB3?

CIFS is dead.





Meet the Family





Blending SMB

SMB is just like POSIX, Right?

- Special-purpose storage
 - Remember record-oriented?
 - Native Database storage?
 - Those key:value drives?
- Object Stores
- ...and Windows!

Problem: POSIX is taught in programming classes. It's what developers know.





Blending SMB

Building the Blended Family

Be Prepared for the Challenges

- Create common ground
- Overcome cultural barriers
- Deal with unmet expectations





Blending SMB

Some Things You Should Know

- Opening a file is just plain diffren't.
- Hundreds vs. Millions of permutations

SMB is not really a "protocol", per. Se.
It is made up of "redirected" function
calls.





Blending SMB

Identification

- Who are you?

Authentication

- Prove it!

Authorization

- *This* is what you are allowed to do.





Blending SMB

Identification

- UIDs & GIDs vs. SIDs

Authentication

- Kerberos? NTLM?

Authorization

- Attributes and
Permission bits





Blending SMB

Unlocking Locking

- Advisory vs. Enforced
- File Locks vs. Share Modes
- Byte Range Locks
 - Merged vs. Stacked
- OpLocks and Leases
- Handle Locks





Blending SMB

Unicode

- Windows uses UTF-16LE
- Linux uses UTF8



File and Path Names

- Reserved characters differ
- Name length limits differ
- Case Sensitivity



What's in a name?

A rose by any other name would wither and die.



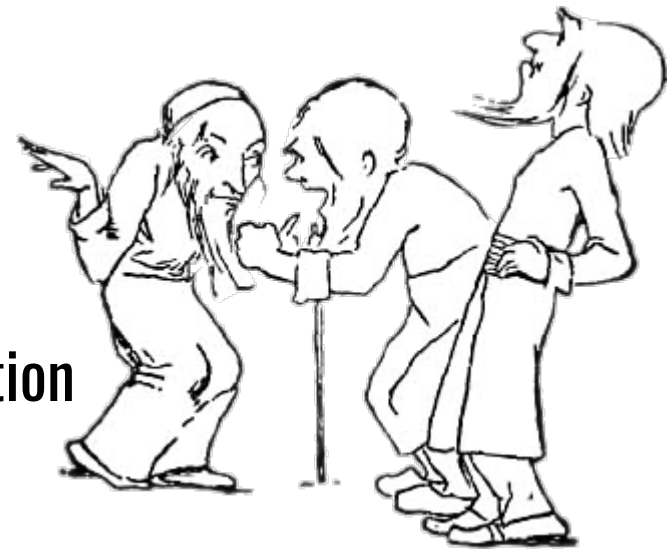
Deep Dive SMB Integration

Steve will present POSIX extensions to SMB3

- This is something we had for SMB1
- It is particularly useful when the client and server are both POSIX(y), but they are both speaking SMB (a foreign language)

Volker will explore Winbind

- Integrate Linux/Unix/POSIX Systems into AD
- Authoritative for Users and Groups
- Authentication and Authorization



The End

