HARDWIRED: An SMB Offload Engine

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Quick Introductions
Me:

- Samba Team Elder
- FS Overlord for...

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.
QUESTION: IS SMB STILL RELEVANT?
Is SMB Still Relevant?

WHERE WOULD WE BE WITHOUT SMB?

➔ WOULD WE RETIRE SAMBA?
➔ WHAT WOULD REPLACE SMB?
➔ IS THERE A PLAN?
➔ IS THERE A PLAN!?
Is SMB Still Relevant?

Is There a Plan?

→ Lots of new file systems
→ I’ve got a few ideas...
→ Perhaps something new will fly
Is SMB Still Relevant?

Are we Dinosaurs?
Is SMB Still Relevant?

**SMB is Not Dead Yet**

- It’s everywhere
- Too much pain to switch
- Also, it works

So, how do we move forward?
The Month of April
The Month of April

In April

★ It snowed, it rained
★ I was between jobs
★ I cleaned up some old projects

I spent some time thinking.
The Month of April

Some Past Projects

★ jCIFS
★ libcifs
★ Prequel
★ Carnaval
The Month of April

jCIFS

★ SMB1 Client-side Toolkit in Java
★ Reportedly used in everything from Supercomputing to Android Apps
★ Declining development effort means no SMB2/3 support
The Month of April

libcifs

★ A small collection of C code
★ Rudimentary NBT, a little SMB1 stuff
★ Some useful example code
  ○ SMB URL
  ○ LM / NTLM tools
★ I receive occasional queries from misguided CS students
The Month of April

Prequel

★ PeerDist version 1 Support
★ Basic functionality Completed
★ Failed to generate developer interest
★ Set aside for other priorities

Used as a reference by others.
The Month of April

Carnaval

★ SMB2/3 Toolkit in Python
★ A splash of SMB1 (Negprot and Echo)
★ Nice little NBT toolkit too
★ SMB2/3 Header Parsing recently added

https://github.com/ubigx-org/Carnaval/tree/master/carnaval/smb
Where Does This Lead Us?

- What am I aiming at with these tools?
- What am I trying to accomplish?
- What is it that I think we need?

I think we need...

A low-level SMB2/3 toolkit.
WHY?
What to Do with a Toolkit

**Proxy**

- Analysis
- Security Filter
- Proxy Server
- WAN Accelerator
- MultiChannel MUX
- RDMA Interposer

Needs Winbind!
What to Do with a Toolkit

Analysis & Security

❖ Gather Statistics
❖ Analyze packet flows
❖ Debugging
❖ "Sanitize" messages
❖ Yes, Samba can do much of this itself or in VFS modules
What to Do with a Toolkit

PROXY & WANERATOR

❖ Multiple Servers into One
❖ Caching for Speed
➢ Leveraging Peerdist?
❖ Yes, Samba can do some of this too
What to Do with a Toolkit

RDMA & MultiChannel

❖ A multi-threaded process
❖ Listen on Ethernet & RDMA
❖ Mux/Demux the channels
❖ Pass a single stream to/from the "real" server
❖ I think this has been tried...
The Plumbing
The Plumbing

TCP-in, TCP-out

- Use the `lo` device
- Use a `tun` device
- Use an actual proxy node
The Plumbing

Port to Hardware

- TOE card
The Plumbing

Create a Device API

- Don't re-package in TCP
- Standardize the API
YET ANOTHER PROJECT!
Yet Another Project

Zambezi

- https://gitlab.com/ubiqx/zambezi

- LGPL
- Only code that's ready
The End