

HARDWIRED: AN SMB OFFLOAD ENGINE

Christopher R. Hertel
Samba Team
SambaxP - June, 2019



Quick Introductions





Introductory esquisenessism

Me:

- Samba Team Elder
- FS Overlord for...



Tintri
BY **DDN**

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!?**

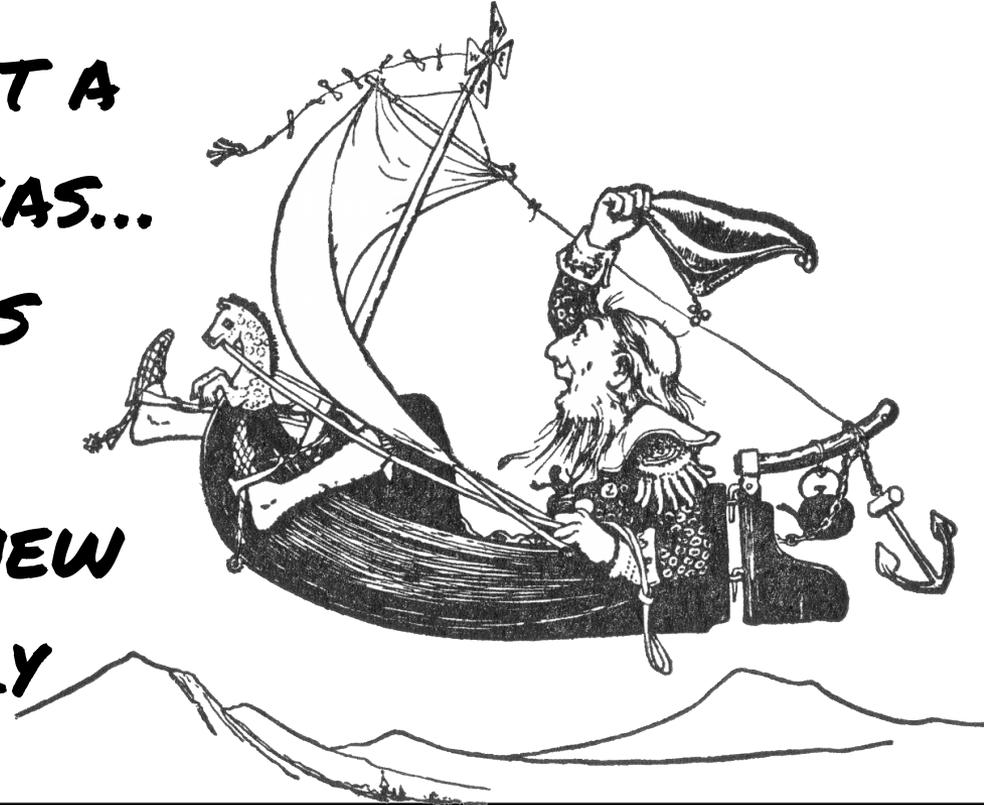




Is SMB Still Relevant?

IS THERE A PLAN?

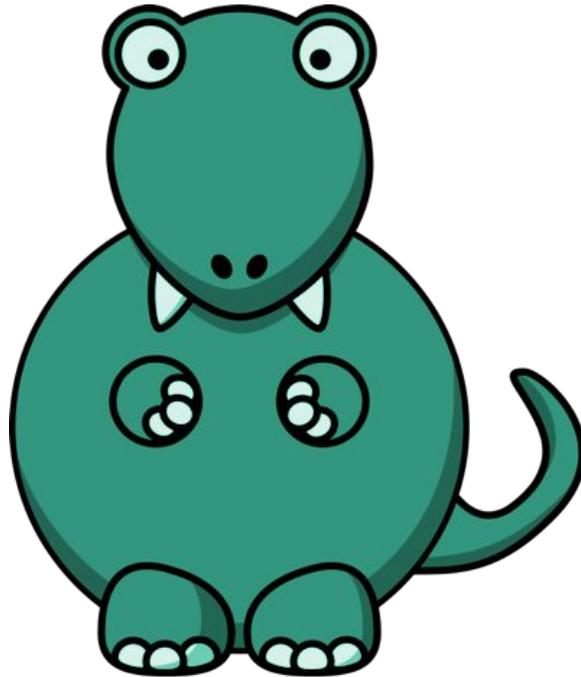
- **LOTS OF NEW FILE SYSTEMS**
- **I'VE GOT A FEW IDEAS...**
- **PERHAPS SOMETHING NEW WILL FLY**





Is SMB Still Relevant?

ARE WE DINOSAURS?





Is SMB Still Relevant?

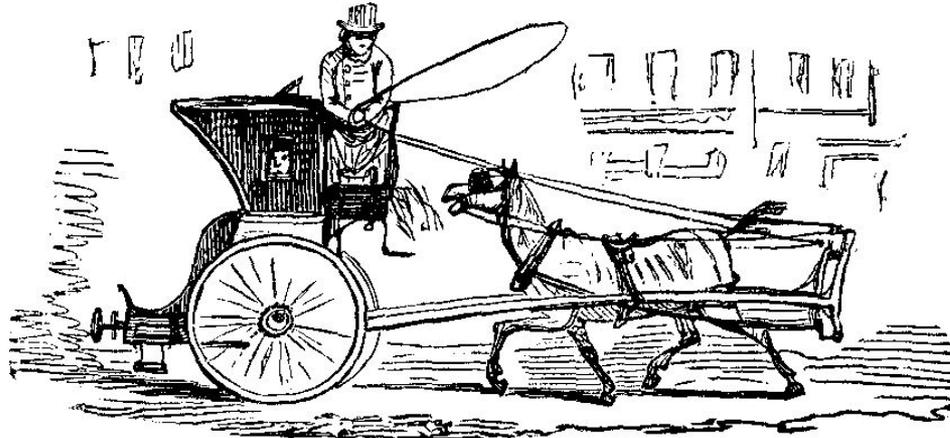
SMB IS NOT DEAD YET

→ **IT'S EVERYWHERE**

→ **TOO MUCH PAIN TO SWITCH**

→ **ALSO, IT WORKS**

SO, HOW DO WE MOVE FORWARD?





The Month of April

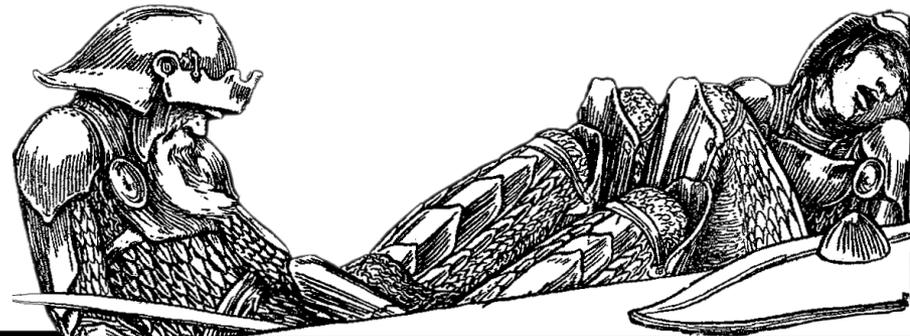


The Month of April

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

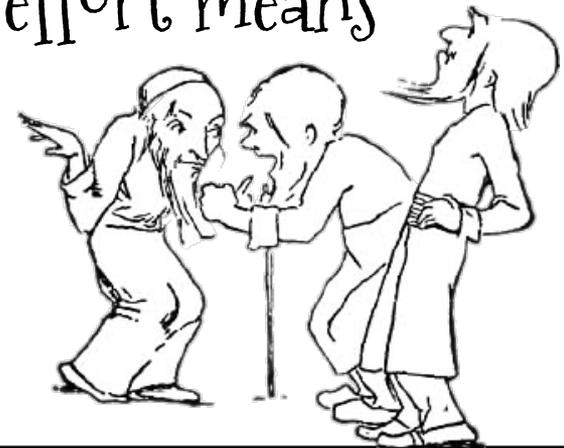




The Month of April

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/ubiqx-org/Carnaval/tree/master/carnaval/smb>



The Month of April

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?

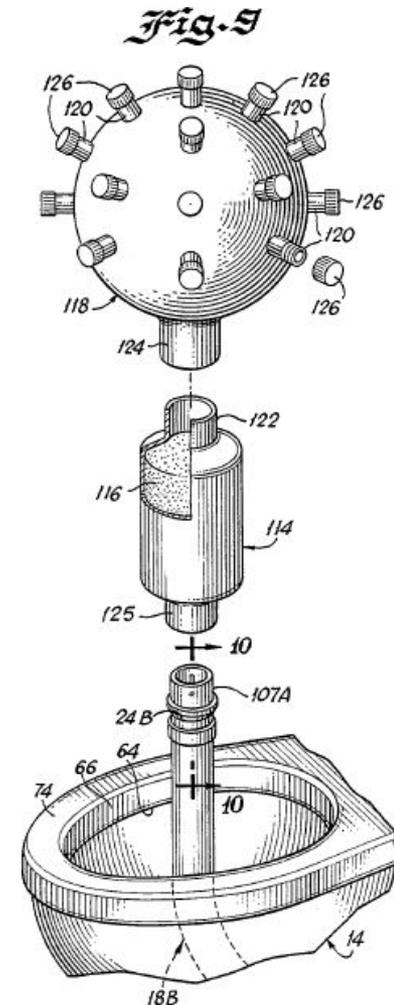


What to Do with a Toolkit

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

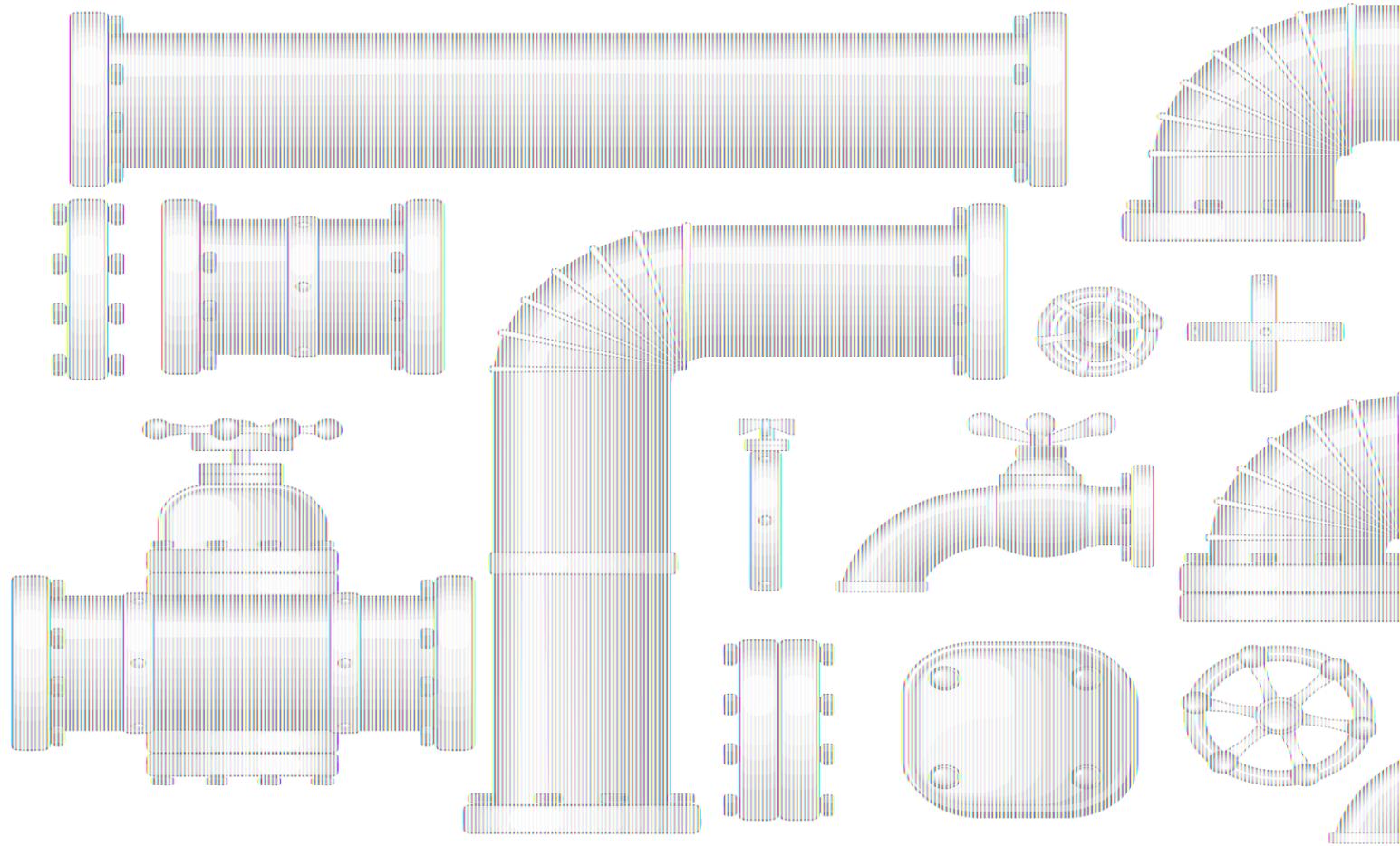




What to Do with a Toolkit

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



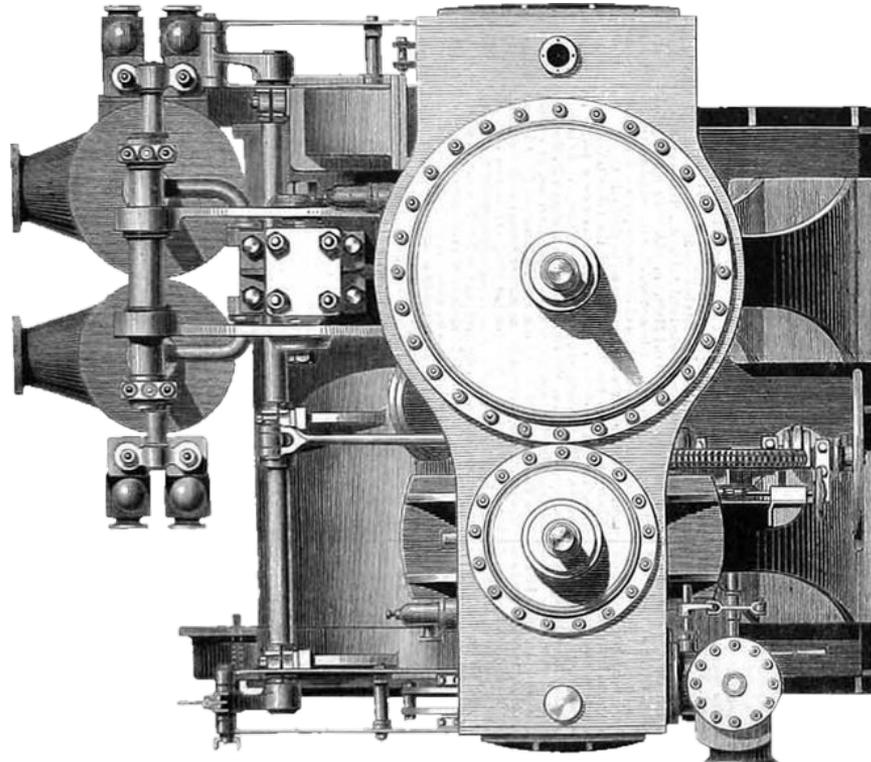
Samba Runs Above



The Plumbing

Port to Hardware

- TOE card

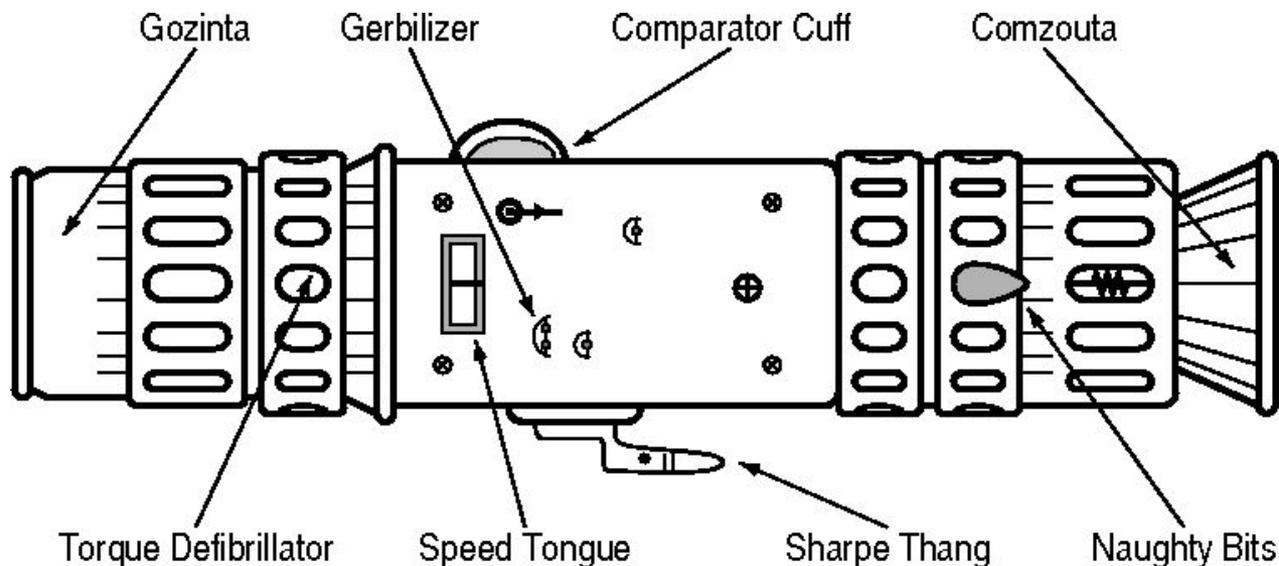




The Plumbing

Create a Device API

- Don't re-package in TCP
- Standardize the API





YET ANOTHER PROJECT!



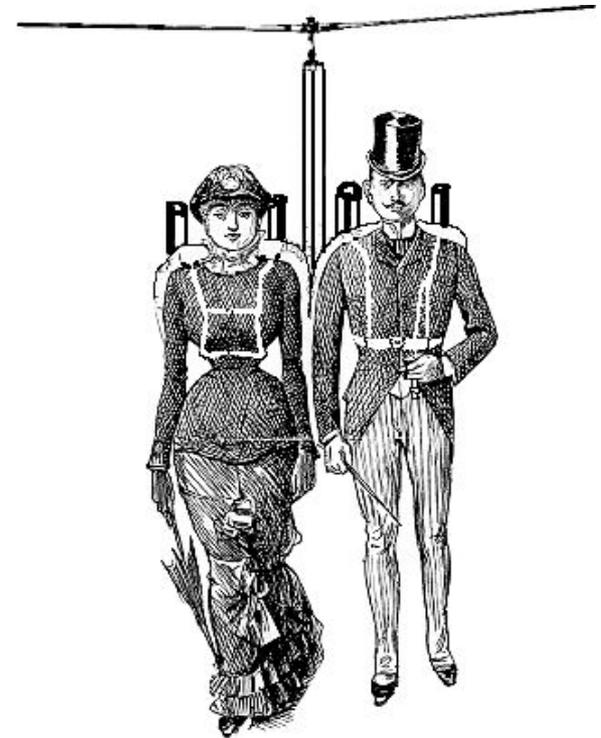


Yet Another Project

Zambezi

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

- ❑ LGPL
- ❑ Only code that's ready



The End

