

A Quarter Century of SambaXP

SambaXP 2026 Göttingen

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A very personal story of what happened since 1994

- ▶ My family's small business was running on NetWare 3.11
 - ▶ I was the admin, but I did not understand it fully
- ▶ Reading usenet I found someone (Tridge) who claimed that “smbserver” can serve Microsoft clients for free
- ▶ Took floppy disks from the University home to my NeXT workstation, tweaked it to build on NextSTEP
 - ▶ A MS-DOS client was happy to map drive D:
 - ▶ I was hooked
- ▶ Problem: It left zombie process behind
 - ▶ Proper SIGCHLD handling was not implemented yet
 - ▶ First patches from lendecke@namu01.gwdg.de in 1994

First CIFS conference

Date: Thu, 8 Aug 1996 10:16:35 -0700
From: Paul Leach <paulle@MICROSOFT.COM>
Subject: ANNOUNCE: CIFS Workshop

Dear CIFS Developer: Microsoft cordially invites you to attend the first Common Internet File System (CIFS) Implementor's Workshop.

- ▶ My first and only business class flight to Seattle paid by Microsoft
- ▶ Tridge's slides are still a good reference for SMB implementors

CIFS – Common Internet File System

- ▶ **Common?**
 - ▶ Not really, NFS, AFS, etc...
- ▶ **Internet?**
 - ▶ SMB1 is not encrypted, although Samba 3.2 in 2008 introduced transport encryption for SMB1. It was never really popular.
- ▶ **File System?**
 - ▶ To me a file system is an abstraction over a block device and not a protocol. But as NFS is also called File System, let's give CIFS that it also is one.
- ▶ New marketing term for SMB in response to SUN's WebNFS
 - ▶ WebNFS: Multi-Component lookups and server side symlink resolution (yes, really...)
 - ▶ CIFS: *SMBSERVER accepted as NetBIOS called name

NT4 compatible domain controller

- ▶ In 1997, draft-leach-cifs-rap-spec-00.txt defined “how an RPC like mechanism may be implemented using the Common Internet File System (CIFS) Transact SMB”
- ▶ Today found under [MS-RAP] in the Windows protocols
 - ▶ Only available on SMB1
- ▶ Too inflexible, the spec mostly looks like hand-marshalling
- ▶ Back then the Open Software Foundation DCE was the next big thing
 - ▶ DCE defines a very flexible but complex RPC mechanism
 - ▶ Microsoft based their answer to NetWare Bindery on DCE/RPC
- ▶ DCE/RPC benefits from a reliable transport, but not everyone was on TCP/IP yet
- ▶ SMB gives a reliable transport NetBEUI/IPX/whatever (and TCP)
- ▶ ⇒ DCE/RPC over SMB by Luke Kenneth Casson Leighton

Samba Domain Controller – Samba TNG

- ▶ Together with Tridge LKCL was one of the driving forces behind DCE/RPC for Samba
- ▶ DCE/RPC over SMB1 is a multi-layer abstraction using SMB transaction and read/write calls
 - ▶ DCE/RPC has a Interface Definition Language for the RPC calls
 - ▶ A fragmentation mechanism on top of SMB-level fragmentation
 - ▶ This looked very weird in tcpdump back then
- ▶ Samba not having access to the IDL files hand-marshalled DCE/RPC
- ▶ To serve Windows NT domain clients, some crypto was required
 - ▶ French versions of NT4 helped, as did some creative use of Windows internal log files

Samba TNG

- ▶ Samba back then had SMB and RPC all in one process
- ▶ Luke wanted to split this up
 - ▶ **smbd** just do what it was written for: SMB
 - ▶ DCE/RPC services split into separate daemons
 - ▶ This models our assumption of the Windows architecture much better
- ▶ Luke possibly wanted too much too quickly, so a fork happened
 - ▶ After a few years, Samba-TNG ceased operations, even with its ugly internals
- ▶ Samba 2.2 finally shipped a Windows DC in 2001
 - ▶ “Ability to act as an authentication source for Windows 2000 clients as well as for NT4.x clients.” is a tiny understatement

EU commission vs Microsoft

- ▶ In 1998 (according to Wikipedia) a complaint by SUN triggered the EU commission to investigate anti-competitive behaviour by MS
- ▶ A lot was about Windows Media Player, we were more interested in the protocol part of the case
- ▶ Microsoft had abused their desktop monopoly to gain market dominance in the “Workgroup Server” market
 - ▶ What exactly is the “Workgroup Server” market?
 - ▶ What does “on the wire” mean?
 - ▶ Are the protocols copyrightable?
- ▶ Microsoft lost big time, and was forced to document their protocols
- ▶ After some payment via the PFIF, MS dumped the specs on the web
- ▶ For many years, Microsoft’s protocols were very well and cooperatively documented
 - ▶ ... until the cloud happened

Samba 4 -> smbtoriture

- ▶ In the early 2000s, Tridge and myself “invented” ctdb as the basis for clustered Samba
 - ▶ The multi-process model of Samba helped a lot
- ▶ Tridge found smbd back then to messy to do clustered Samba “right”
 - ▶ The next version should be fully async and 100% correct
 - ▶ smbtoriture came out of this effort
- ▶ Tridge’s new file server is still in our source, but not used in production
- ▶ Until today, smbtoriture is still our core regression test engine
 - ▶ It helped the “old” smbd to become much better code

AD/DC -> Samba 4.0

- ▶ Luke Howard, a professional pianist, wrote an AD clone based on OpenLDAP in his spare time
 - ▶ Still documented on Novell (Microfocus) website as Domain Services for Windows
- ▶ openldap.org was reluctant to accept Microsoft's extensions of LDAP
 - ▶ Tridge wrote ldb, a database similar to sqlite with an LDAP data model
- ▶ A student in Cologne figured out the Active Directory Multi-Master Replication protocol as his bachelor thesis
 - ▶ I still Metze's level of wizardry hard to believe
- ▶ Working SMB-server, and an AD controller in different source trees
- ▶ Who would release first? Samba 4 or Perl 6?
 - ▶ A fusion of the best of both trees made it!
- ▶ Samba switched to time-based releases

The future: Samba foundation

- ▶ Samba today is an old and reasonably well-structured code base
 - ▶ All big SMB protocol elements are done
 - ▶ SMB is a valid option for Linux->Linux file services
- ▶ The world moves on
 - ▶ Identity Management moves to the cloud
 - ▶ S3 is the place where data lives these days
 - ▶ Nvidia has insane bandwidth and latency requirements
- ▶ No end of Samba Feature requests
- ▶ Samba Foundation e.V. is our new framework for contributors

Thanks for your attention

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