

## Samba / LDAP Lessons learnt

LDAPConf 2007

Cologne

6./7. September 2007

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- Co-founder SerNet - Service Network GmbH
  - Free Software as a successful business model
  - Network Security for the industry and the public sector
  - Samba-Support/Development in Germany
- For 15 years concerned with Free Software
- First patches to Samba in 1994
- Consultant for industry in IT questions
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## Overview

- Samba3 with LDAP
- A view on /etc/passwd and /etc/group
- Why the German Parliament migration failed 1<sup>st</sup> time
- Libldap
- Samba4 / LDAP



## Samba3 with LDAP

- Samba needs more information about a user than Unix provides
  - Different password hash style
  - All information you can find in usrmgr.ex or mmc
- Modular so-called „passdb“ backends
  - Smbpasswd (plain text), tdbsam (local db), ldapsam
- Winbind can store its ID mappings in LDAP
- ADS-Membership needs LDAP connectivity



## Samba3 with LDAP

- The samba Schema designed very closely to the internal Samba APIs
- Samba4 will have a schema close to AD, which is completely different
- Mapping between the two has been tried, but as Samba4 is not in production yet, the need is limited



## /etc/passwd, /etc/group

- Most important question during login:
  - What are my ID's to base access right on?
  - Uid, primary gid and auxiliary groups
- /etc/group: dialout:x:16:vlendec,administrator,vl
- Enumerating the file /etc/group is necessary to find all auxiliary group memberships
- „id <user>“ on my box does exactly this, „su - <user>“ doesn't
  - Linux nss knows the „initgroups“ call



## Typical Windows-Login

- SamLogon call for the real login, calculates groups
- Applications can issue GetGroupsForUser and GetAliasMembership calls
  - These application-level calls also calculate groups
- Some Windows autostart applications do this
- The German Parliament's logon session did this 3 times
  - 4 times calculate group memberships



## Samba as a Unix daemon

- Samba has followed the philosophy to be a „good citizen“ in the Unix environment: Use libc APIs where available
- man getgrouplist in Linux:
  - The glibc 2.3.2 implementation of this function is broken: It overwrites memory when the actual number of groups is larger than \*ngroups
- 4 enumerations of 5000 groups per windows login
- Very quickly slapd was very unhappy



## Fixes

- The obvious fix here was to dump the „good citizen“ policy
- LDAP queries done directly, this time optimized
- (&(objectclass=sambaGroupMapping)  
(|(memberUid=<username>)(gidNumber=<gid>)))
- This breaks the Unix compatibility
- Enabled with „ldapsam:trusted = yes“



## Round-Trips are evil

- When Windows views an ACL, it has to display names
- query\_securitydescriptor only sends SIDs
  - Sid2name translation happens in bulk
- Naive implementation via individual getgrgid calls
- ldapsam:trusted: One large query is sent with all SIDs, only asking for the names



## Winbind in AD

- Winbind provides Windows domain users and groups as /etc/passwd and /etc/group entries
- Quite some Unix applications enumerate /etc/passwd and /etc/group
- Enumeration of anything is evil, there might be MANY entries coming in
- PSA in France implements Linux desktops using winbind: > 100.000 users in a single domain
- „winbind enum users/groups = no“



## The „id“ command

- List current ID's numerically and by name
- getgroups() fetches numeric IDs
- Translation to the name via getgrgid()
- getgrgid for „Domain Users“ might take a while
  - In addition to the name, getgrgid also gives all members (remember PSA, >100.000)
- No way to cheat like with ldapsam:trusted
  - Applications issue this command
- Winbind has to cut „Domain Users“



## libldap

- OpenLDAP's libldap contains async calls
- These calls are not as async as necessary
  - connect(2), write(2) calls to the network are synchronous
  - LDAP server down leads to hard blocks
- Libldap didn't allow access to the data stream (SASL)
- This is what led me to write the (now) S4 LDAP libs
- Later OpenLDAP libs do allow access to the data stream, we can do our own network calls now



## Samba4 / LDAP

- Active Directory is basically LDAP, Kerberos, CIFS and DNS bundled
- (caveat: I'm not a Samba4 developer...)
- Samba4 contains its own LDAP server
- Internal to Samba4, ldb provides a simple local database with the basic LDAP data model
- OpenLDAP / Cyrus SASL source as of 3 years ago was quite a big piece to swallow
- „How hard can it be“



## Samba4 / LDAP

- Well, it turns out to be harder than expected
- Full LDAP semantics are quite complex
- Andrew Bartlett works on Samba4 with Fedora DS as the backend database
- An alternative approach to doing it on our own might be a local slapd fully configured via ldapi
- If we had known the OpenLDAP developers personally and if OpenLDAP had been at the point where it is now 3 years ago, we might not have done it.



## Questions/comments?

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