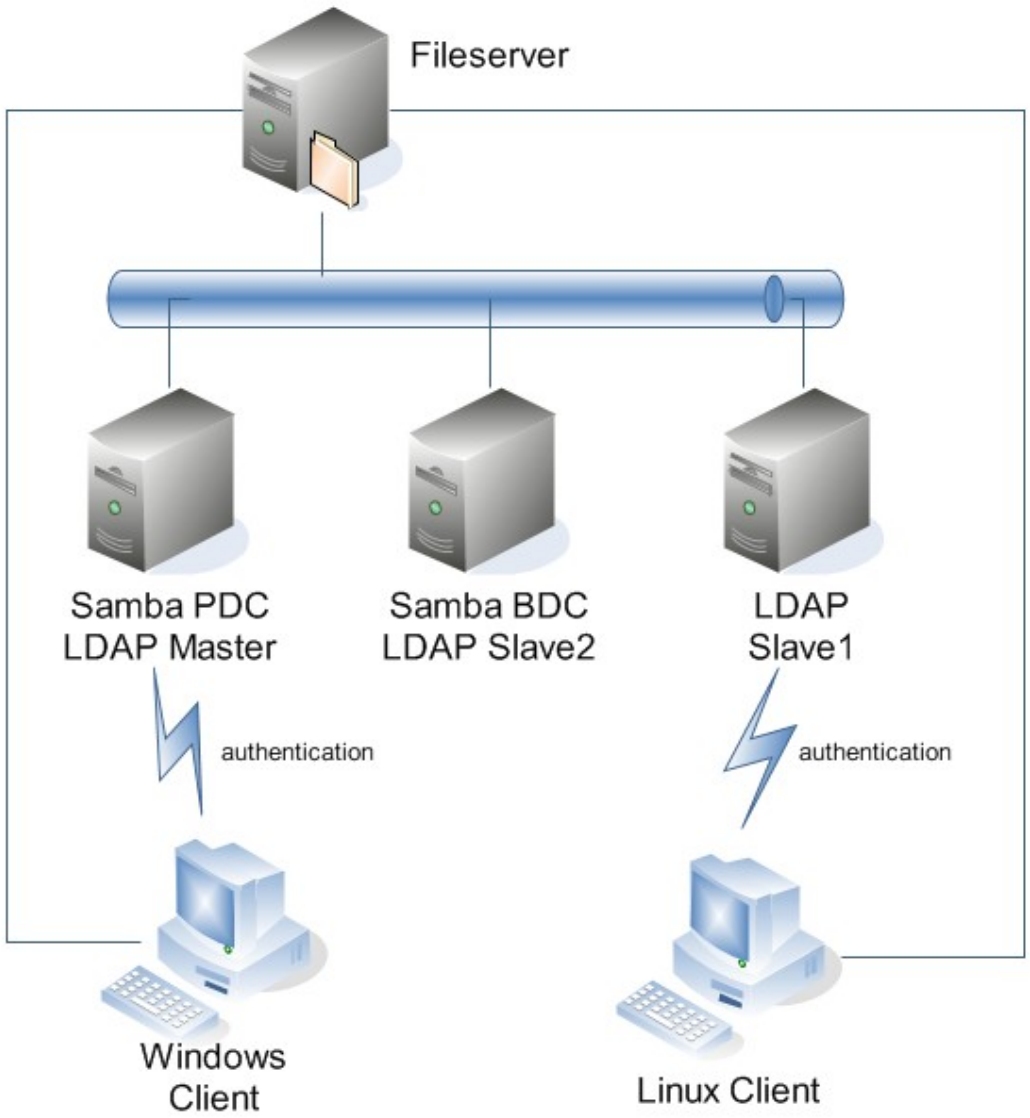
Hannes Kasparick

Samba as PDC / BDC with OpenLDAP

Overview



- authentication for Linux and Windows
- one password
- redundant authentication servers

What about LDAP?

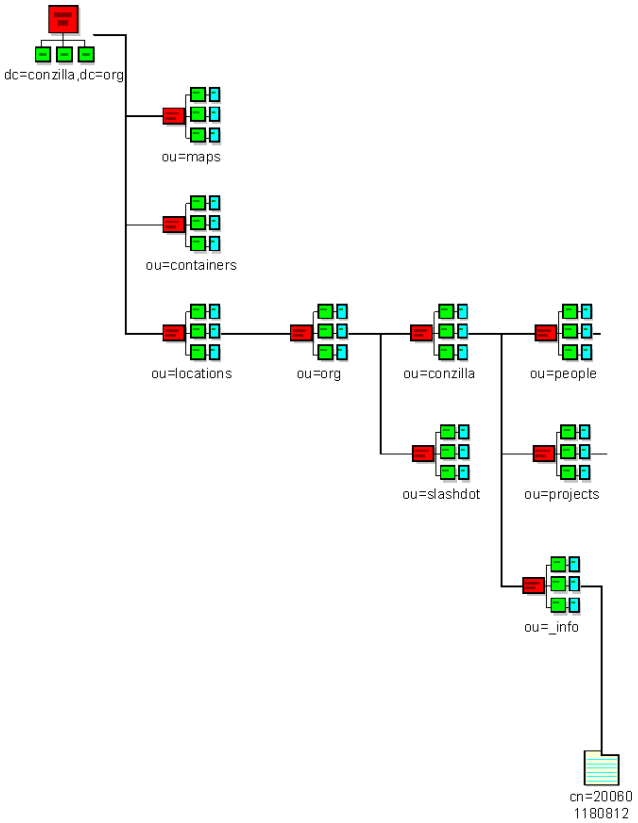
- directory service
- database
- hierachical structure (tree)
- data saved in objects
- objects with attributes
  - self defined attributes possible
- objects adressed by distinguished name
  - DNS: host.domain.tld
  - LDAP: dc=host,dc=domain,dc=tld

Notation

- OU Organisational Unit
- DC Domain Component
- CN Common Name

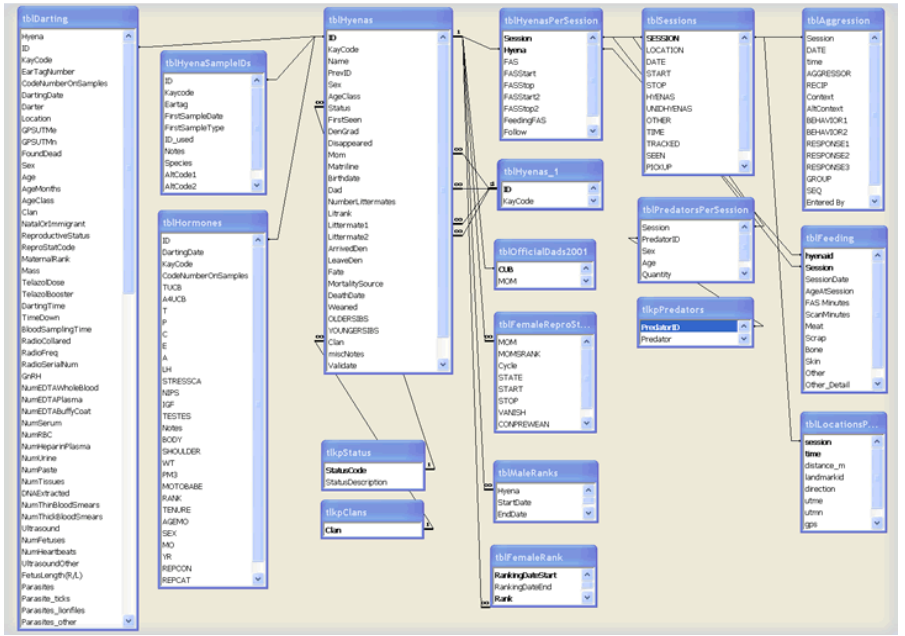
LDAP vs. Relational Database

- LDAP tree



Source: http://kmr.nada.kth.se

- Relational DB

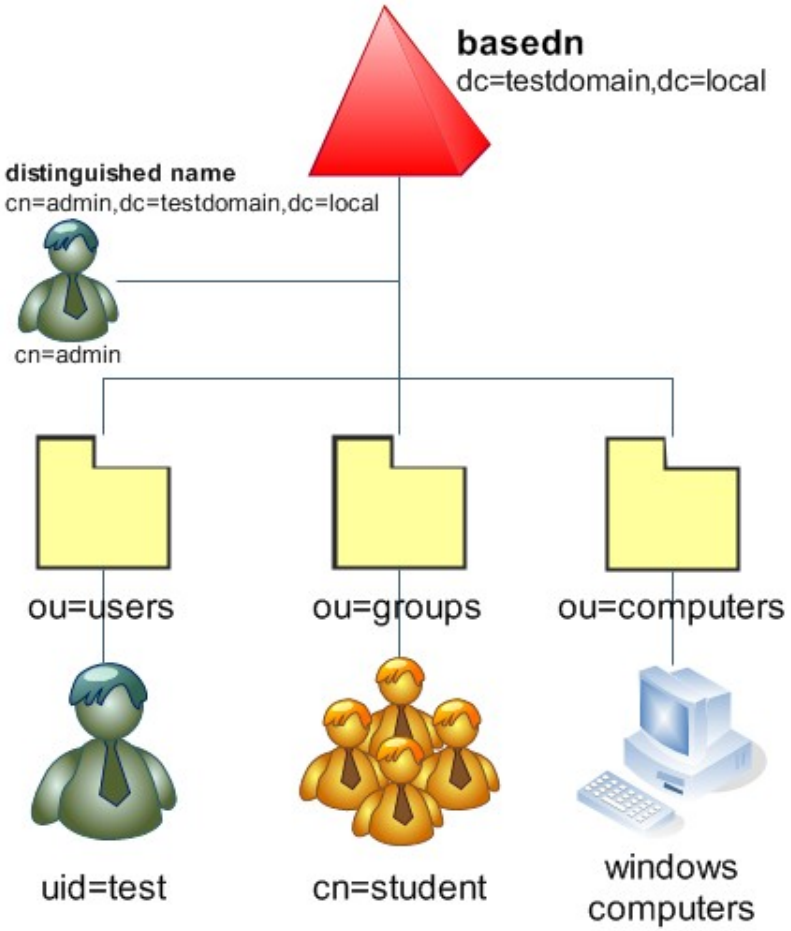


Source: http://hyenas.zoology.msu.edu

Approach

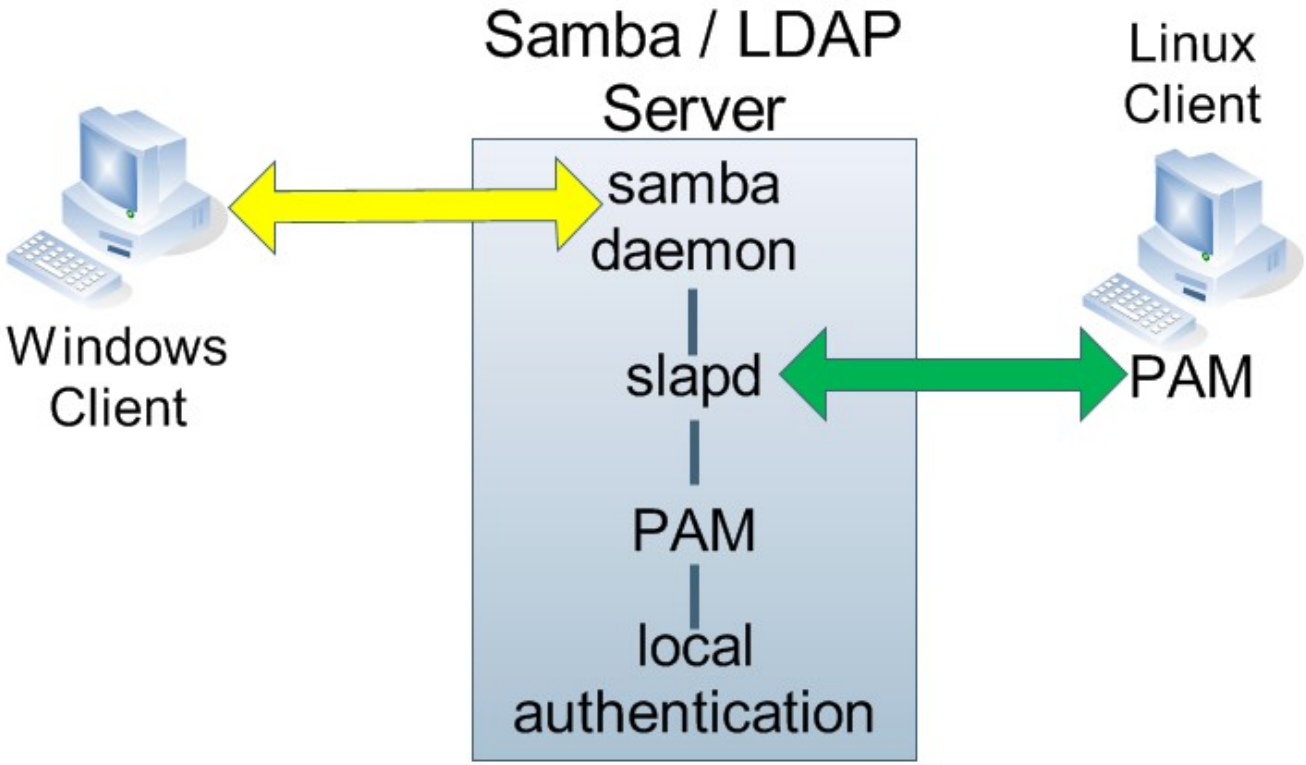
1) design LDAP structure of enviroment
2) set up OpenLDAP for Linux auth.
3) set up Samba PDC with LDAP auth.
4) set up OpenLDAP Slave
5) set up Samba BDC
6) if required: enable encryption

LDAP Structure



- keep it simple
- basedn is local domain name
- basedn can be different to samba domain name

Overview



Samba + OpenLDAP + Windows in 4 steps

Step 1

- install slapd

Windows Client

Samba / LDAP Server

slapd

OpenLDAP Server

- slapd
- download at www.openldap.org
- use package of your distribution if possible

Installation

- Debian packages: slapd and ldap-utils
  - can differ in other distributions
- use LDAPv3 protocol
- set suffix (domainname)
- configure loglevel
  - see manpage for details
- add samba.schema

Config Changes slapd.conf

- general settings

  suffix "dc=testdomain,dc=local"

  rootdn "cn=admin,dc=testdomain,dc=local"

  rootpw {SSHA}nSOVMp0ESCGmteCQxF9eoc

  loglevel 256

  include /etc/ldap/schema/samba.schema

  - password generated with „slappasswd“

Config Changes slapd.conf

- configure access restrictions

access to

attrs=userPassword,shadowLastChange,sambaNTPassword,sambaLMPassword,sambaPwdMustChange,sambaPwdLastSet

by dn="cn=admin,cn=testdomain,dc=local" write

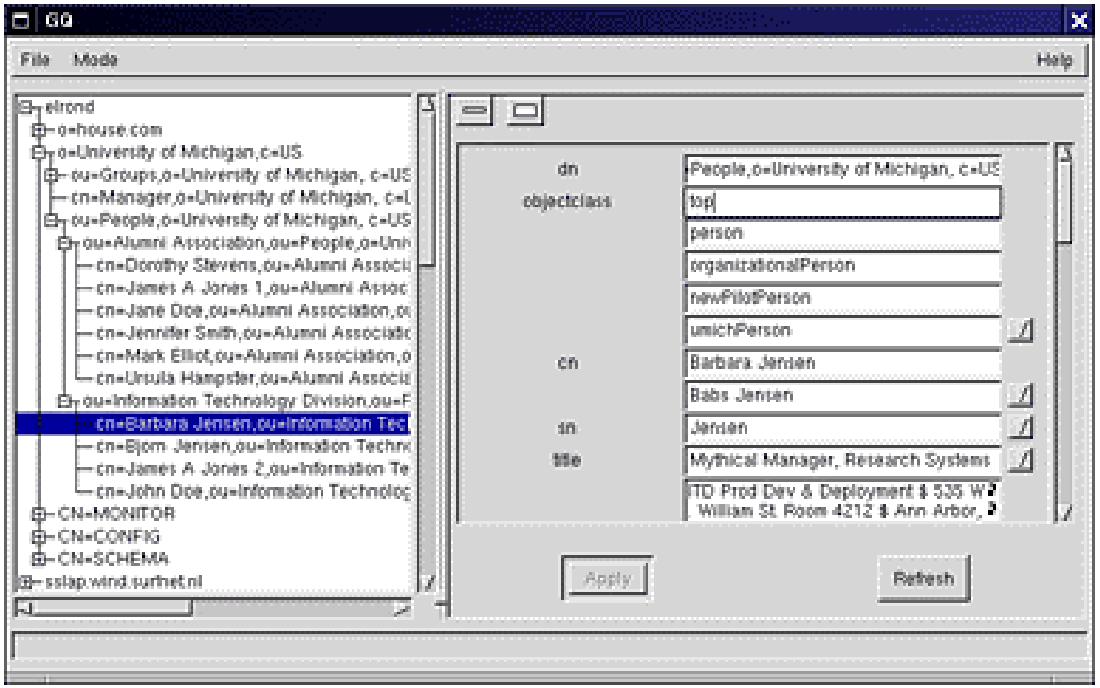
by anonymous auth

by self write

by * none

Access LDAP

- console with ldaputils: ldapsearch etc.
- GQ
- LDAP-Browser
- ldapvi
- ...

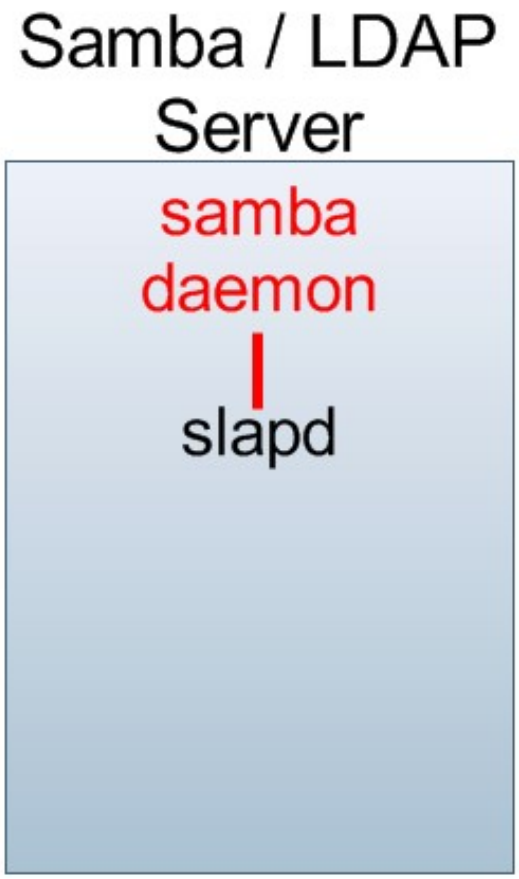


Source: http://gq-project.org/

Step 2

- install samba

Windows Client



Samba as Domain Controller

- Samba 3.x acts as NT4 compatible DC
  - Primary and Backup Domain Controllers
  - can be used as BDC with NT4 together
  - no group policies per default (commercial products exist)
- Samba 4 with Active Directory
  - see talk of Kai Blin at 3:15pm here

show smb.conf

smbldap-tools

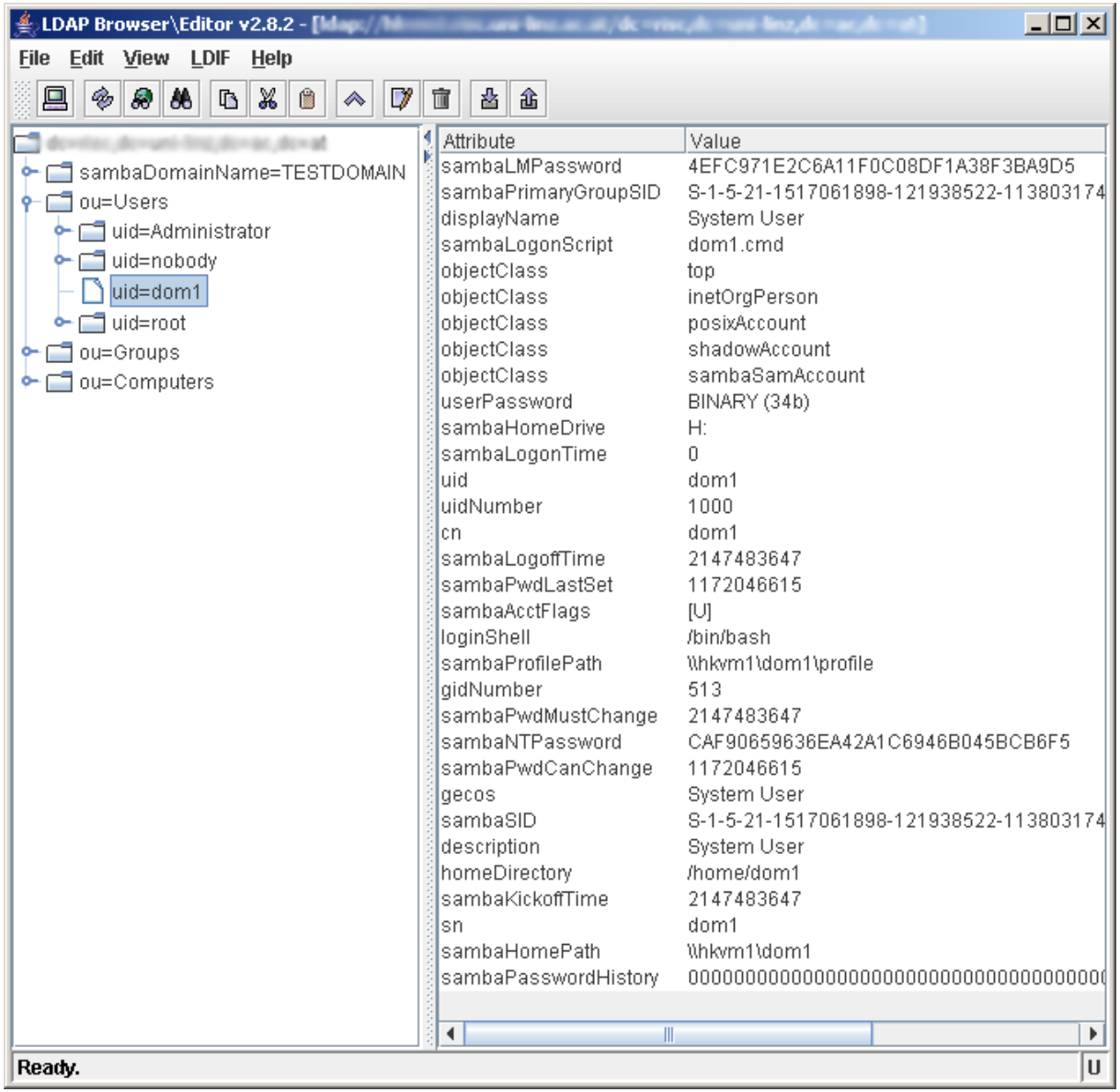
- powerful console management tools
- ~#: smbldap-populate
  - creates basic settings / users / groups
- no „adduser“ or „passwd“ any more!
- only smbldaptools or compatible tool

  ~#: smbldap-useradd -a -m <username>

  ~#: smbldap-passwd <username>

  ~#: smbldap-usermod --shadowExpire 2008-04-18 hkaspari

Result


LDAP Browser\Editor v2.8.2 - [ldap://[redacted]]
File Edit View LDIF Help
[redacted]
sambaDomainName=TESTDOMAIN
ou=Users
uid=Administrator
uid=nobody
uid=dom1
uid=root
ou=Groups
ou=Computers
Attribute Value
sambaLMPassword 4EFC971E2C6A11F0C08DF1A38F3BA9D5
sambaPrimaryGroupSID S-1-5-21-1517061898-121938522-113803174
displayName System User
sambaLogonScript dom1.cmd
objectClass top
objectClass inetOrgPerson
objectClass posixAccount
objectClass shadowAccount
objectClass sambaSamAccount
userPassword BINARY (34b)
sambaHomeDrive H:
sambaLogonTime 0
uid dom1
uidNumber 1000
cn dom1
sambaLogoffTime 2147483647
sambaPwdLastSet 1172046615
sambaAcctFlags [U]
loginShell /bin/bash
sambaProfilePath \\hkvm1\dom1\profile
gidNumber 513
sambaPwdMustChange 2147483647
sambaNTPassword CAF90659636EA42A1C6946B045BCB6F5
sambaPwdCanChange 1172046615
gecos System User
sambaSID S-1-5-21-1517061898-121938522-113803174
description System User
homeDirectory /home/dom1
sambaKickoffTime 2147483647
sn dom1
sambaHomePath \\hkvm1\dom1
sambaPasswordHistory 00000000000000000000000000000000000000
Ready.
U

Step 3

- local PAM authentication

Windows Client

Samba / LDAP Server

samba daemon

slapd

PAM

local authentication

PAM and LDAP on Server

- Plugable Authentication Modules
- libnss-ldap & libpam-ldap packages
- configure /etc/pam.d/*
- /etc/nsswitch.conf

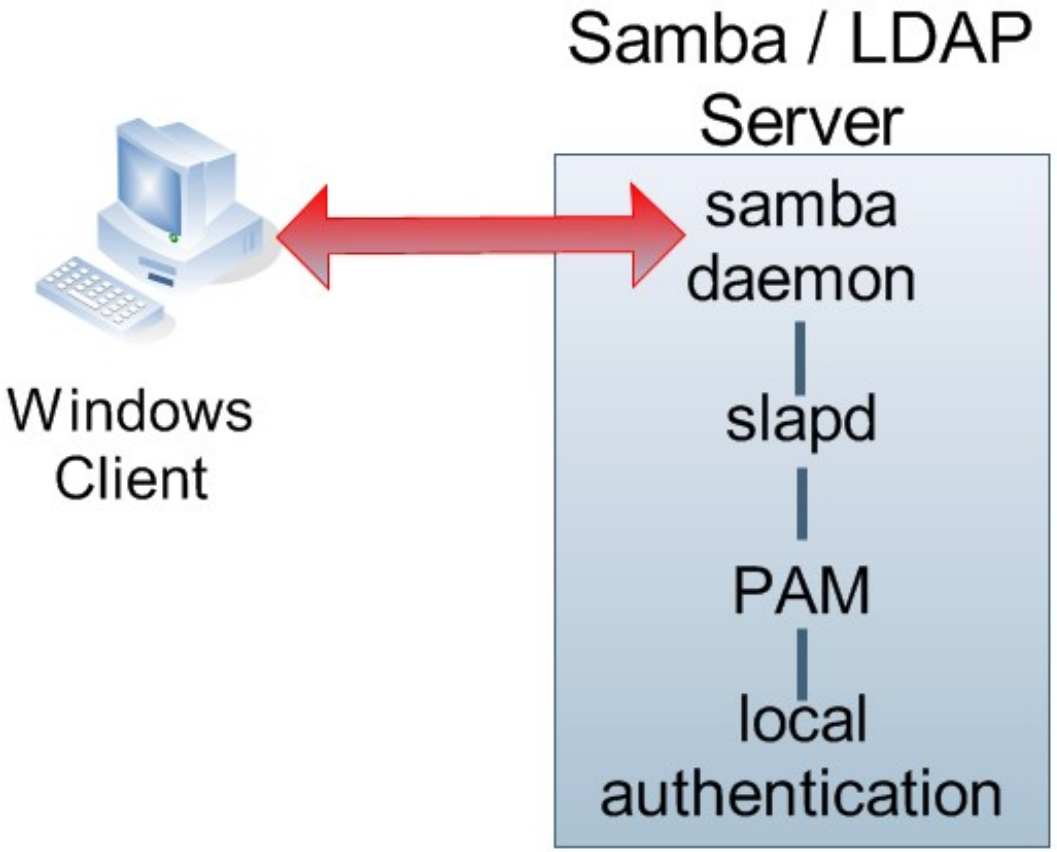
  passwd: files ldap

  group: files ldap

  shadow: files ldap
- ~#: getent passwd

Step 4

- integrate Windows



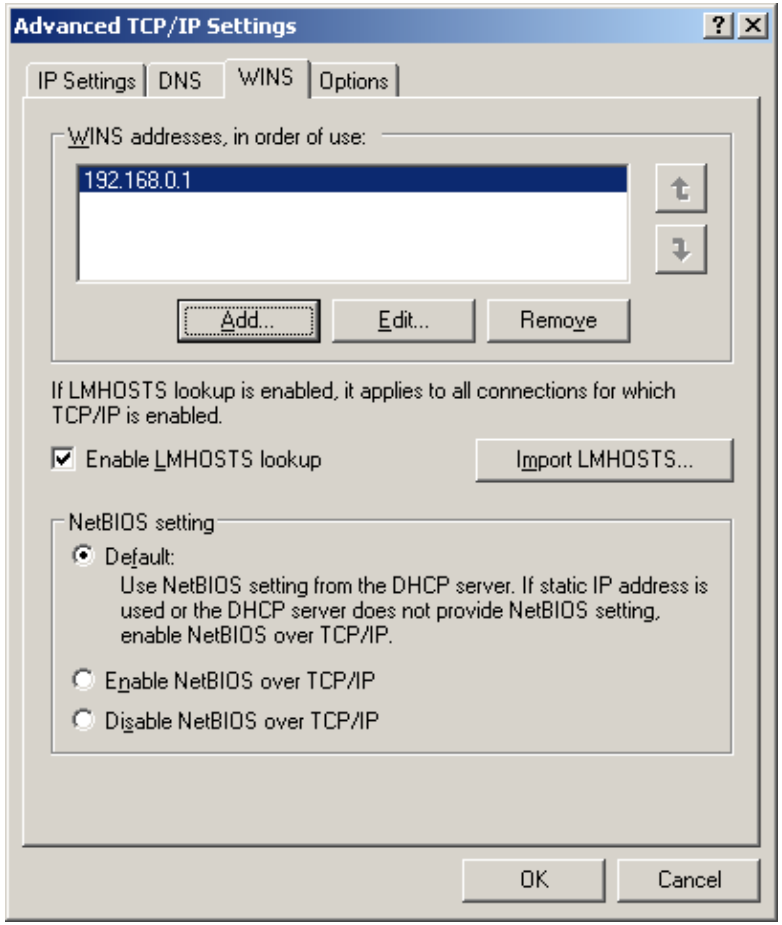
Adding Windows Clients

- Client needs to know the WINS server
  - DHCP or manually
- LDAP-root account

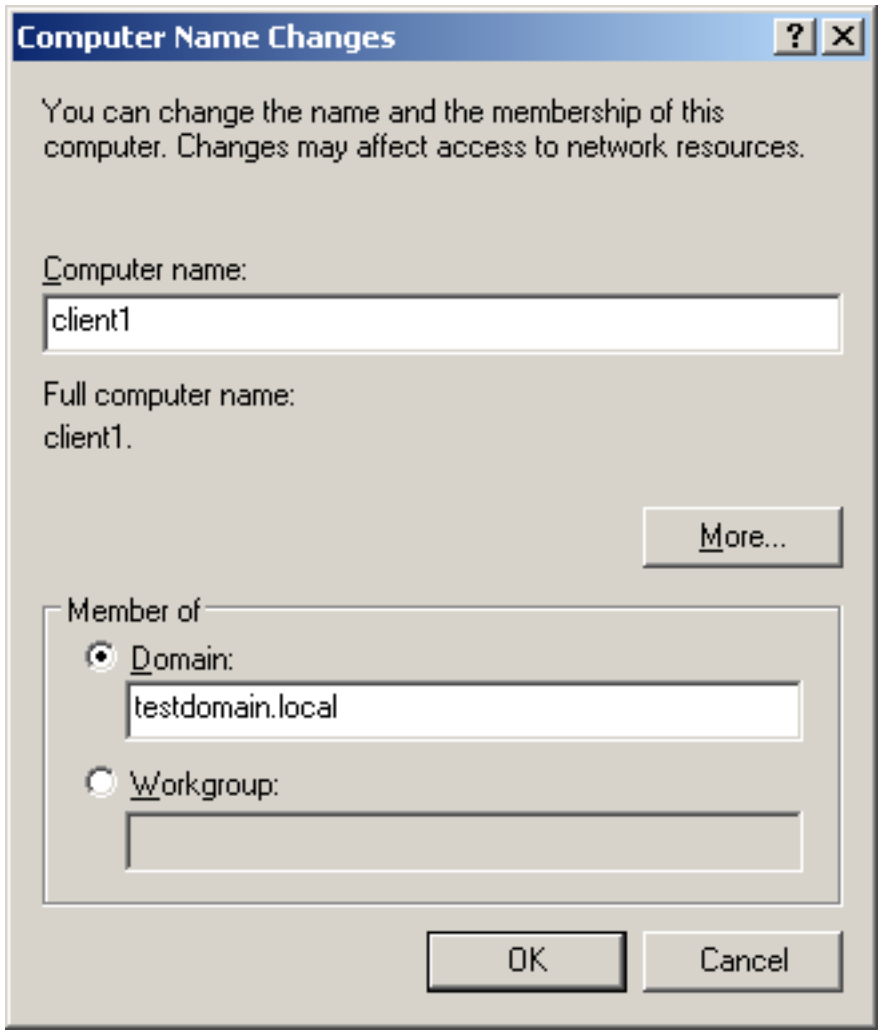
  or

  „~#: net rpc rights grant <username> SeMachineAccountPrivilege“

  „Successfully granted rights.“



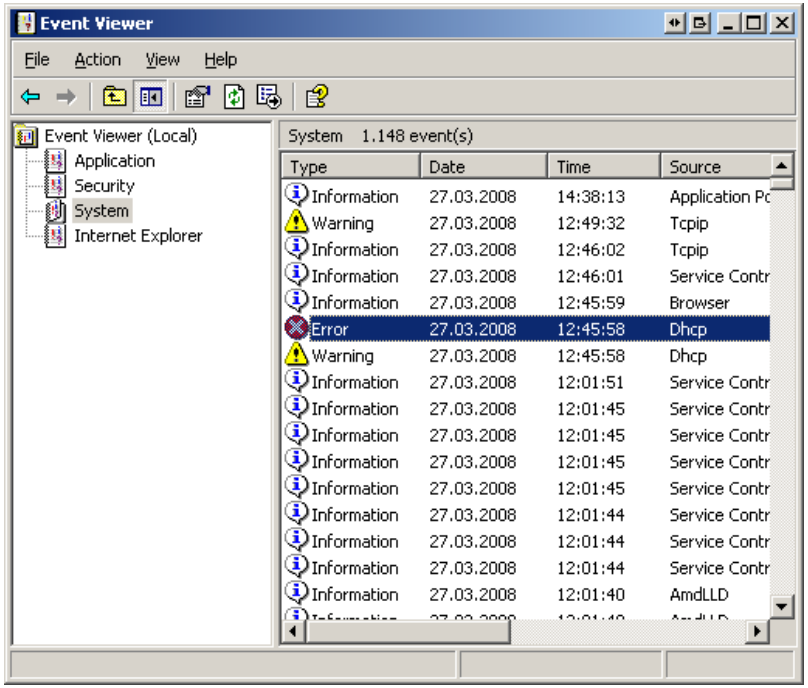
Welcome to domain testdomain



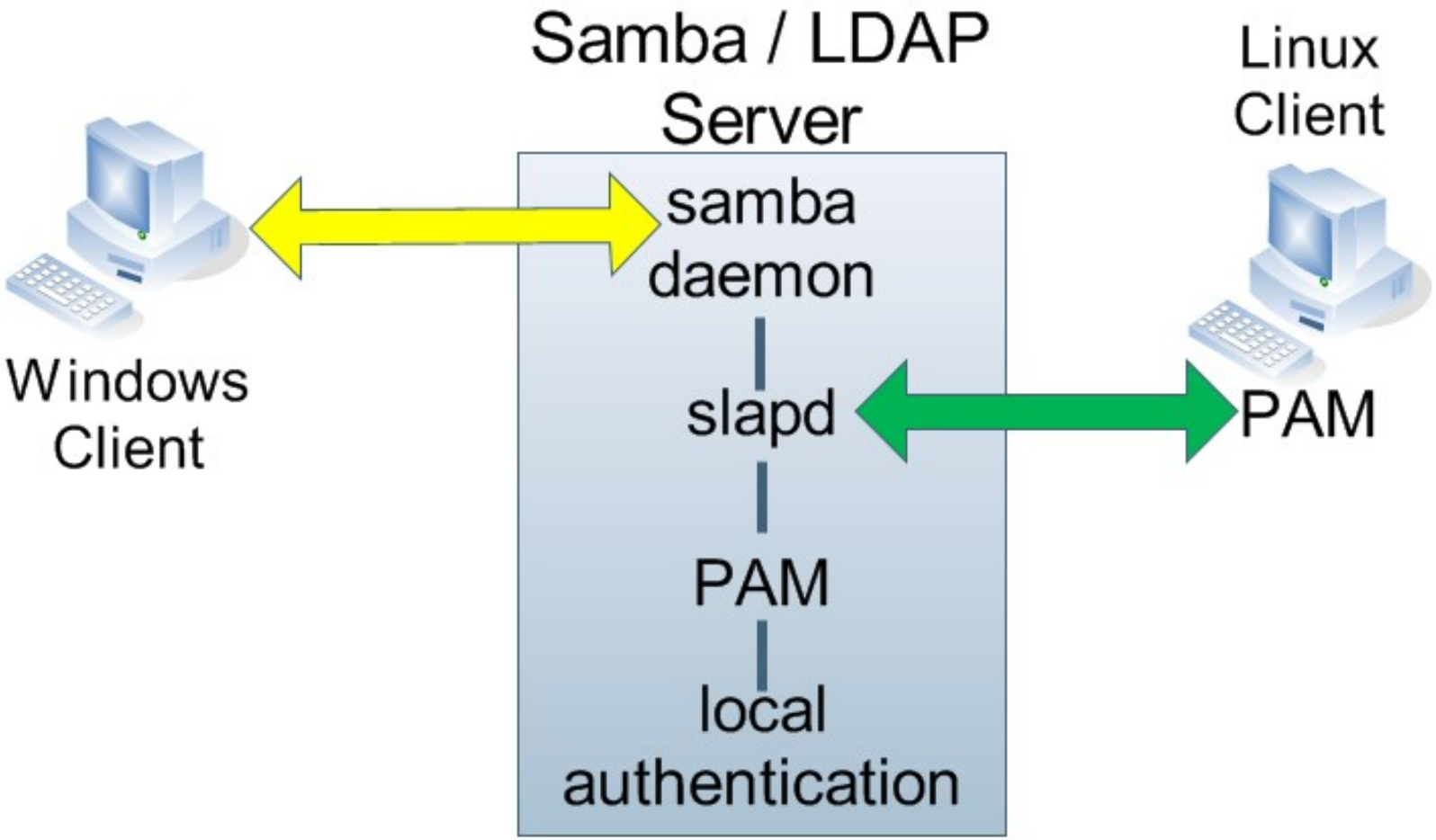
Welcome and reboot :-)

Troubleshooting

- Look at Windows „eventlog“
  - Enable auditing: Control Panel | Administrative Tools | Local Security Policy | Local Policy | Audit Policy
- log.smbd
- slapd.log



What we have now

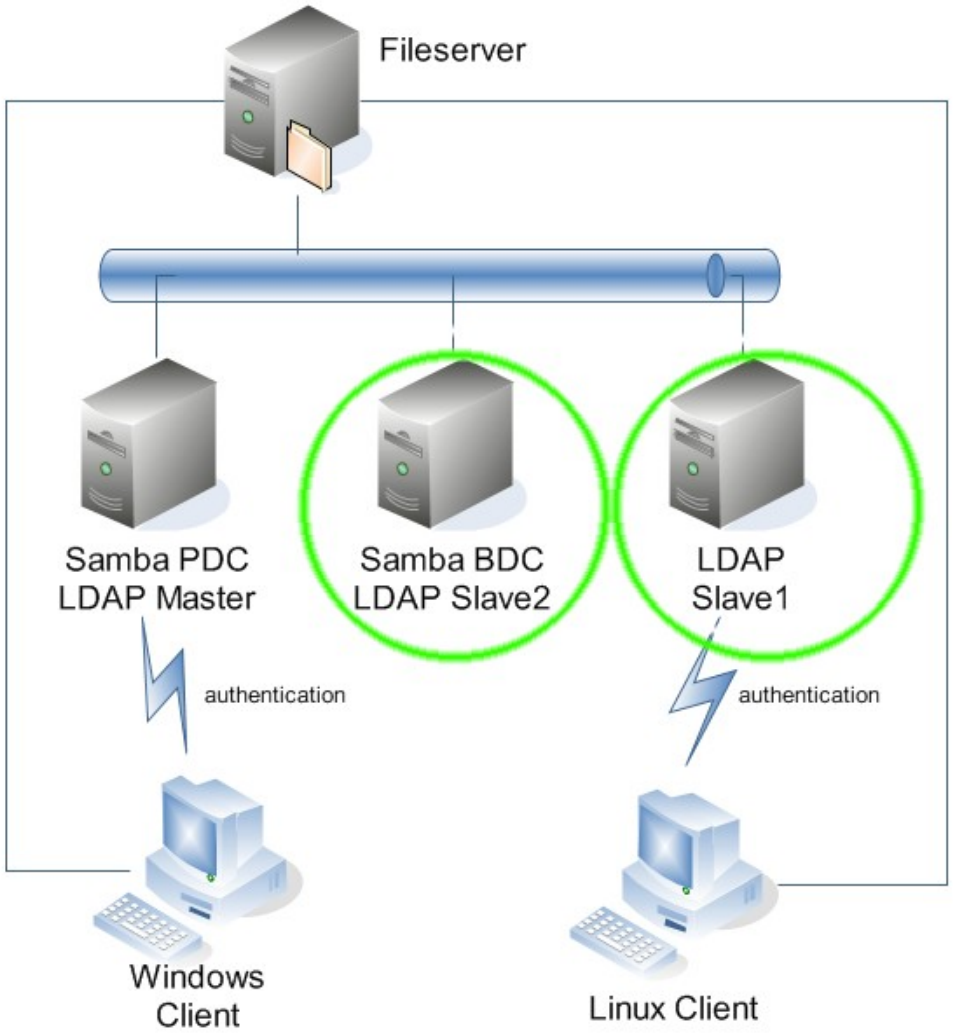


too bad...

High Availability

- domain controller down!?
  - Windows 2000 and newer caches logins
  - nscd daemon for caching in Unix
- more than redundant domain controller
  - switches, routing protocols
  - fileserver / storage
  - ...

Redundancy of slapd and samba

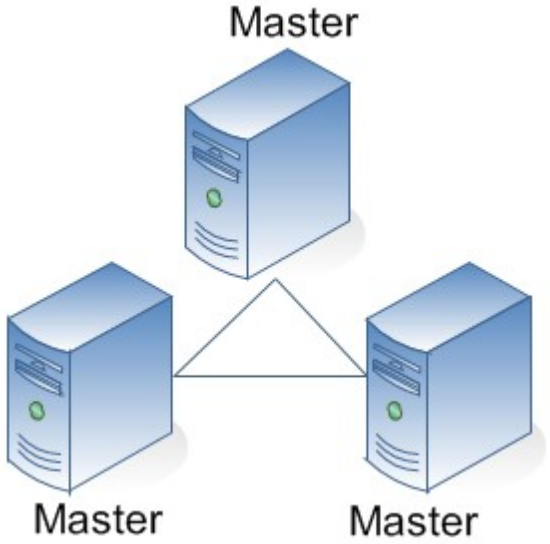


slapd-HA

- traditional: slurpd – Master / Slave
  - removed in version 2.4
- new since 2.2: syncrepl – Master / Slave
  - in 2.2 not for productive use
- current Version 2.4 (Oct. 2007)
  - N-Way Multi-Master replication
  - MirrorMode replication
  - Push mode / pull mode
  - delta-syncrepl

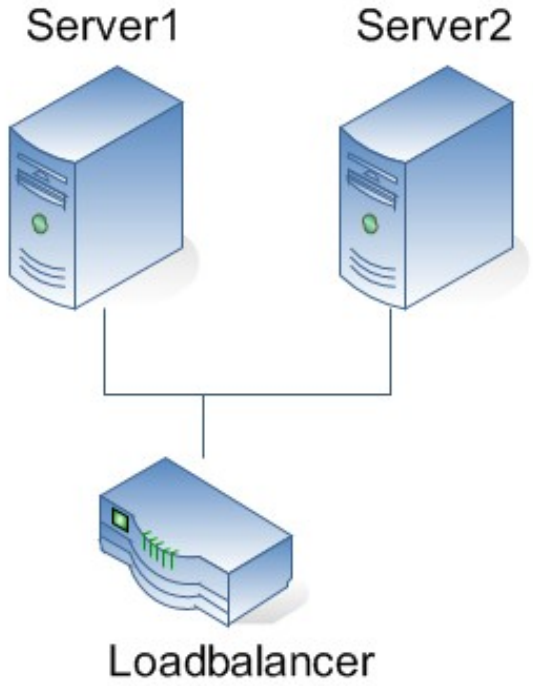
Multi Master Replication

- pro
  - no single point of failure
  - automatic failover
  - can be in different locations
- contra
  - network failures could lead to inconsistencies
  - all writes must be popagated to all servers – might be much network traffic
  - exact time needed (VMware time problems!?)



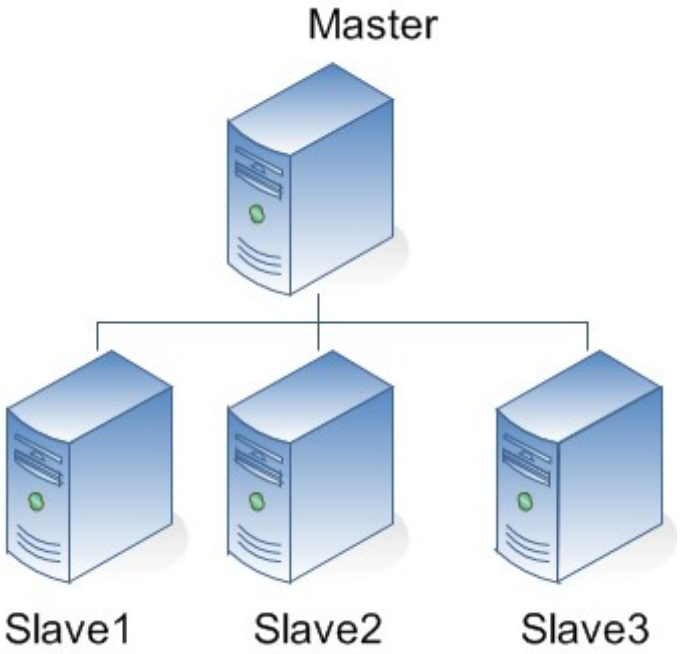
Mirror-Mode

- consistency guarantees of single-master replication, while providing HA
- external frontend directs access to servers
  - Active-Active Hot-Standby
- secondary master will only be used when first master crashed
- syncrepl / delta-syncrepl can be used



Master Slave Replication

- easy to manage
  - one master, many slaves
- all slaves copy data from master server
- when master down, only read access to slaves
- manual recovery: make one of the slaves a master



slapd.conf Master – Slave

- master
  - moduleload syncprov
- slaves

```
syncrepl rid=001
provider=ldap://master.testdomain.local
type=refreshOnly
interval=00:00:00:10
searchbase="dc=testdomain,dc=local"
binddn="cn=admin,dc=testdomain,dc=local"
credentials=password
```

HA - keep it simple

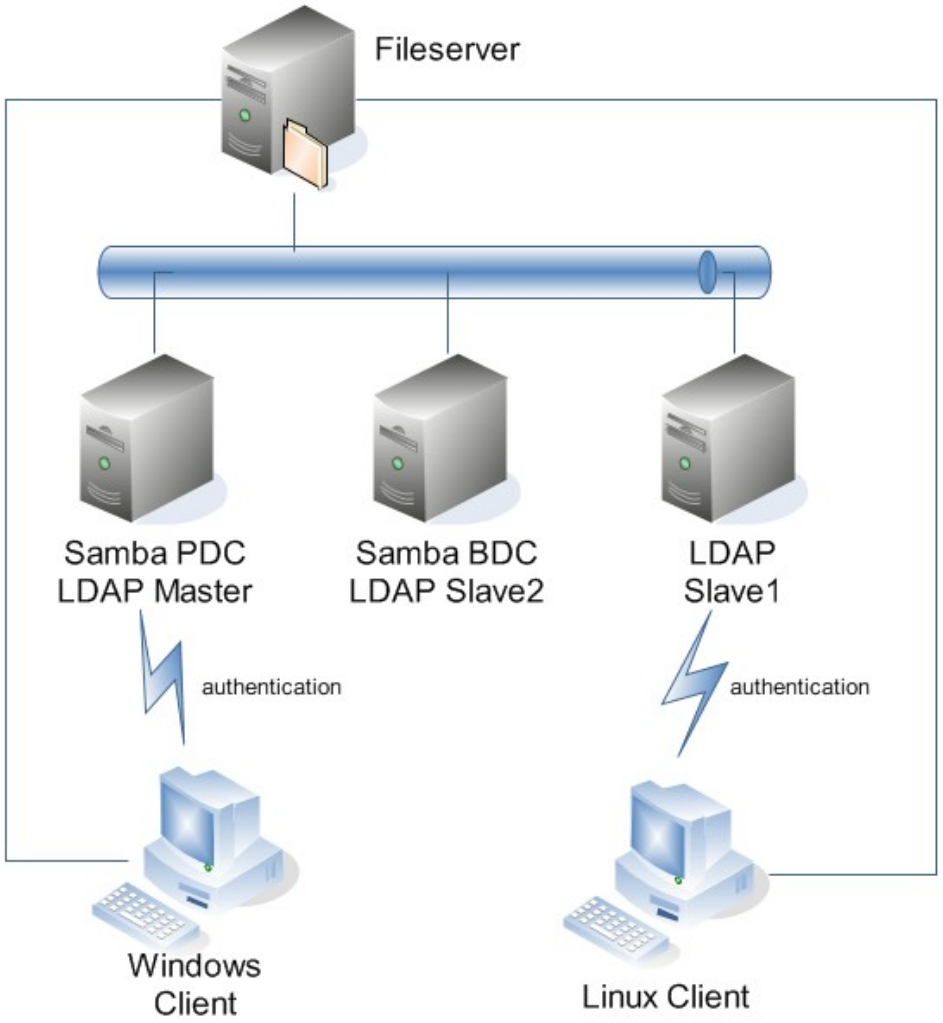
- you only have few changes and you do not need HA?
  - use one virtual machine with all services, make daily full backup
- pro
  - easy to configure
  - easy to manage
- contra
  - restore time probably longer
  - downtime while backup

Samba BDC

- backup Domain Controller like in NT4
  - since Windows 2000 there is no BDC
- almost identical configuration like PDC
- diffenrences in smb.conf

```
netbios name = Samba-BDC
local master = no
os level = 60
domain master = no
preferred master = no
passdb backend = ldapsam:"ldap://master ldap://slave/"
```

Done – everything reliable



Migration

- Windows NT to Samba
  1) Windows as PDC, Samba as BDC
  2) Upgrade Samba BDC to Samba PDC
  3) Add new Samba BDC
- NIS to Samba
  - Migration Tools [1] + scripting

[1] http://www.padl.com/OSS/MigrationTools.html

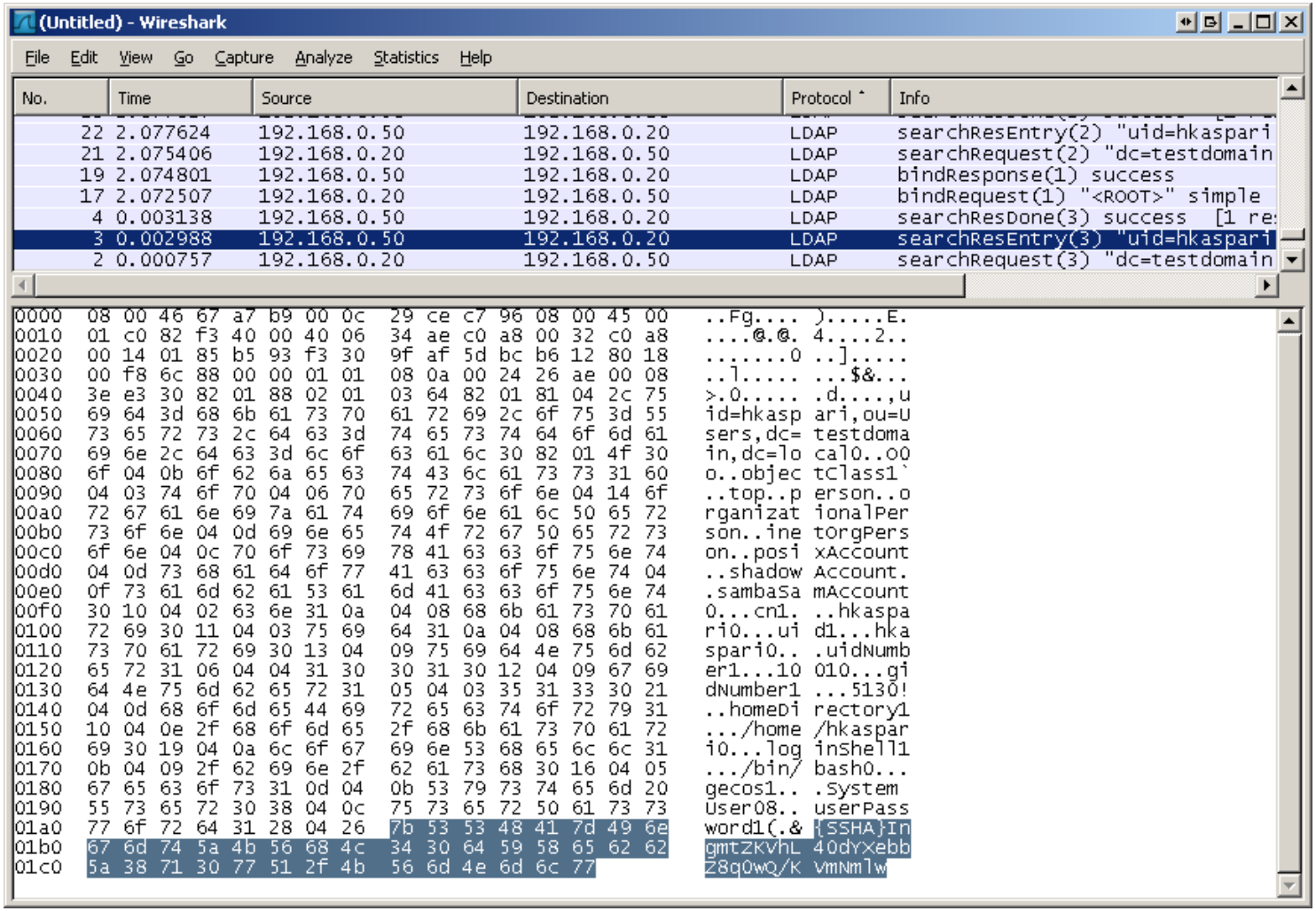
Migration Tools

- useful perlscript collection
- install them on PC in NIS-Domain
- change variables in migrate_common.ph
- export data from NIS
  - migrate_all_nis_offline.sh > nis.ldif
- split into relevant parts & scrub
- import data into LDAP

LDAP Security

Per default unencrypted but passwords are hashed

Picture: client server traffic while ssh login



How to secure?

- StartTLS or LDAPS possible
  - StartTLS is standard method today
  - LDAPS listed as deprecated
- both methods can be used on same server
- note: it is tricky to configure!

considerations

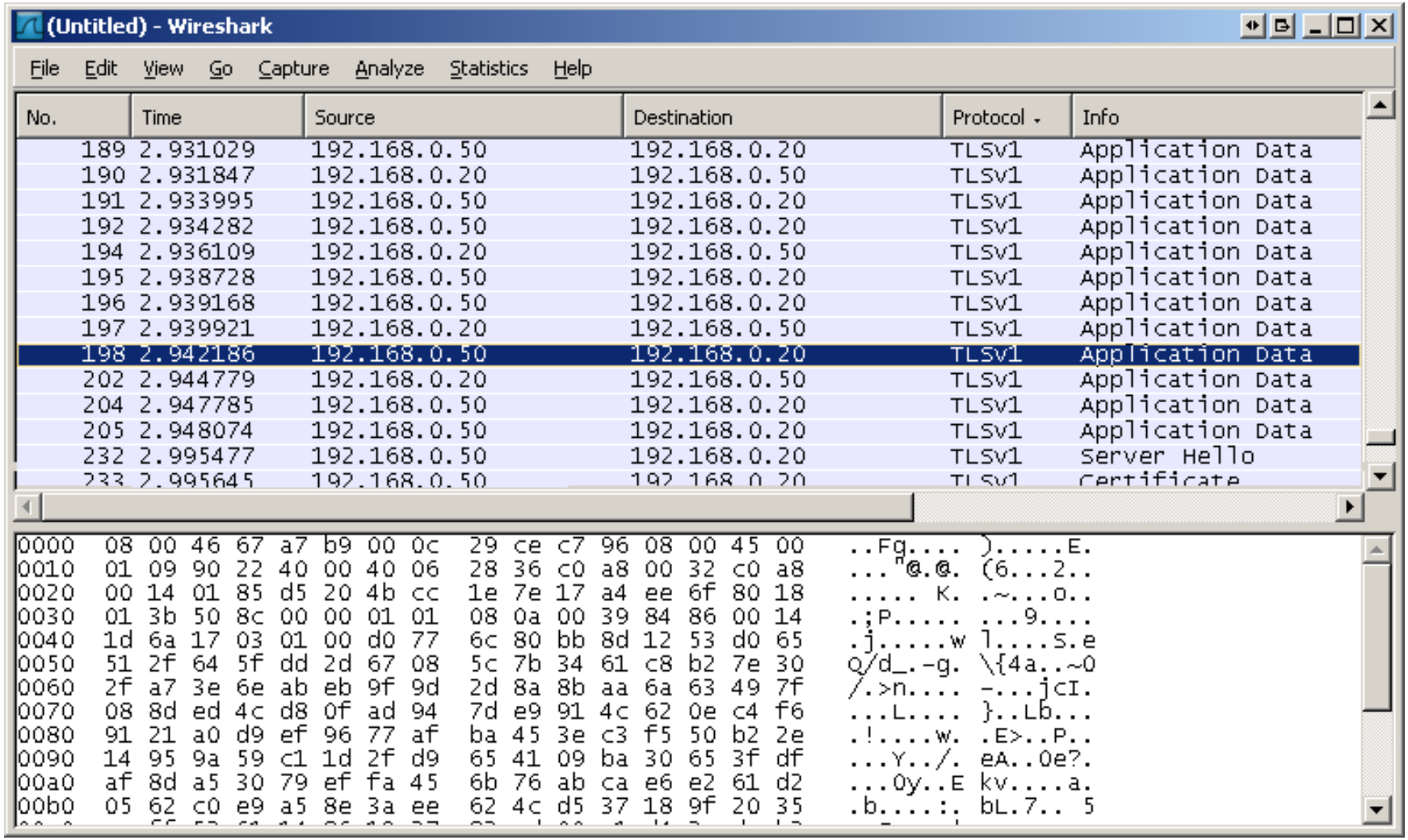
- use stable distribution
- if it works – avoid updates
- maybe problems with gnutls versions
- debug TLS

```
ldapsearch -x -D  cn=admin,dc=testdomain,dc=local
-W -H ldap://master -ZZ -d 8
```

procedure

- create Certificate Authority and certificates
  - OpenSSL package includes scripts
  - no passwords for server certificates
- configure slapd with TLS
  - beware of AppArmor in new Ubuntu
- propagate CA-certificate to Clients
- configure clients to use TLS

Secured


(Untitled) - Wireshark
File Edit View Go Capture Analyze Statistics Help
No. Time Source Destination Protocol Info
189 2.931029 192.168.0.50 192.168.0.20 TLSv1 Application Data
190 2.931847 192.168.0.20 192.168.0.50 TLSv1 Application Data
191 2.933995 192.168.0.50 192.168.0.20 TLSv1 Application Data
192 2.934282 192.168.0.50 192.168.0.20 TLSv1 Application Data
194 2.936109 192.168.0.20 192.168.0.50 TLSv1 Application Data
195 2.938728 192.168.0.50 192.168.0.20 TLSv1 Application Data
196 2.939168 192.168.0.50 192.168.0.20 TLSv1 Application Data
197 2.939921 192.168.0.20 192.168.0.50 TLSv1 Application Data
198 2.942186 192.168.0.50 192.168.0.20 TLSv1 Application Data
202 2.944779 192.168.0.20 192.168.0.50 TLSv1 Application Data
204 2.947785 192.168.0.50 192.168.0.20 TLSv1 Application Data
205 2.948074 192.168.0.50 192.168.0.20 TLSv1 Application Data
232 2.995477 192.168.0.50 192.168.0.20 TLSv1 Server Hello
0000 08 00 46 67 a7 b9 00 0c 29 ce c7 96 08 00 45 00
0010 01 09 90 22 40 00 40 06 28 36 c0 a8 00 32 c0 a8
0020 00 14 01 85 d5 20 4b cc 1e 7e 17 a4 ee 6f 80 18
0030 01 3b 50 8c 00 00 01 01 08 0a 00 39 84 86 00 14
0040 1d 6a 17 03 01 00 d0 77 6c 80 bb 8d 12 53 d0 65
0050 51 2f 64 5f dd 2d 67 08 5c 7b 34 61 c8 b2 7e 30
0060 2f a7 3e 6e ab eb 9f 9d 2d 8a 8b aa 6a 63 49 7f
0070 08 8d ed 4c d8 0f ad 94 7d e9 91 4c 62 0e c4 f6
0080 91 21 a0 d9 ef 96 77 af ba 45 3e c3 f5 50 b2 2e
0090 14 95 9a 59 c1 1d 2f d9 65 41 09 ba 30 65 3f df
00a0 af 8d a5 30 79 ef fa 45 6b 76 ab ca e6 e2 61 d2
00b0 05 62 c0 e9 a5 8e 3a ee 62 4c d5 37 18 9f 20 35

More Information?

- Matt Butcher - Mastering OpenLDAP Packt Publishing (2007)
- http://wiki.samba.org
- http://de5.samba.org/samba/docs/man/Samba-HOWTO-Collection/
- http://samba-ldap.de/ - German howto

Questions?