

Samba 3 in the Enterprise

hands-on experience and lab-report

Günther Deschner
Samba Team
SUSE LINUX Products GmbH



Novell.

Overview



- The author
- What are the Enterprise requirements?
 - Scalability and Performance
 - Samba as Domain Controller
 - Samba as File- and Print Server
 - Migration
- Conclusion

The author



Günther Deschner



- Currently working for Research & Development at Novell / SUSE LINUX
- 5 yrs. Linux Consultant experience
- Strong interest in the Samba-Project since 2001
- Member of the Samba-Team since 2004
- Many larger Samba projects (mostly in the area of public authorities and government)

What are the Enterprise requirements and btw: what is “the Enterprise”?

Samba in the Enterprise



- What is “the Enterprise” ?
- Samba behaviour in large scale environments
- Here Samba has to deal with:
 - Thousands and thousands of users, groups and machines
 - Complex or huge trusted-domain setups
 - Elaborate migration scenarios
 - Distributed network topologies
 - Project Managers who tend to take Samba as a 1:1 replacement for their Windows Servers
 - Administrators who are used to Windows-like administration and expect Samba to behave the same



Samba in the Enterprise



- Today Samba is used in environments in which it has not initially been designed for
- Is Samba actually able to meet Enterprise requirements?
- What is the Samba Team doing for making Samba 3 more suitable to the Enterprise environments?
- If we want or not, Samba 3 is perceived as a direct competitor to Windows 2003 !



Samba in the Enterprise



- Two major points will be discussed in this call:
 - Scalability and Performance
 - Migration

Scalability and Performance



Samba as Domain Controller



- Huge DCs mostly use LDAP Directory Services (DS)
- First critical aspect:
How well does the DS perform and scale?
- Most common: OpenLDAP
- Very important performance impact:
OpenLDAP Release and Berkeley DB tuning

Samba as Domain Controller



- Second critical aspect:
How well does Samba query the DS ?
- Earlier Samba 3 versions had
 - Relatively poor LDAP-performance for large user databases
 - High inefficiency in handling Domain Logons from Windows XP (and all involved MSRPC calls)
- Consequences:
 - MSRPC-calls are timing out
 - Admin-Tools break down
 - Complete loss of PDC functionality

Samba as Domain Controller

- What was done during the last months?
- Various LDAP-related improvements:
 - Almost completely replaced “expensive” enumeration-calls with direct LDAP queries
 - `ldapsam:trusted = yes`
(a variety of performance improvements that all assume that NSS- and pdb-Accounts are part of the same LDAP-Object)
 - LDAP-filtering for pdb-enumeration-calls to distinguish the listing of user and computer accounts
 - LDAP Paged Results (RFC 2696) to make `usrmgr.exe` and related tools to work at all in 40k user environments

Samba as Domain Controller



- *Example: A High-Performance Samba3-LDAP-DC*
- Customer had a Samba PDC and lots of Windows XP clients
- Size: > 10k Users, > 7k Machines, 6k global groups
- During migration: very poor PDC-performance (PDC deadlock)
- Samba < 3.0.7 and OpenLDAP 2.1.x (ldbm or bdb Backend) could only handle about 300 concurrent Domain-Logons spread over 8 minutes
- How to reproduce that?

- Debugging:
 - Samba 4 smbtorure-Test to simulate 1:1 Windows XP Domain-Logon attempt (RPC-LOGIN)
 - Test-Lab with equivalent hardware
 - Scripts to trigger huge amounts of parallel smbtorure-logon-attempts, randomly spread over realistic peak times
 - Scripting framework to record and monitor benchmark results
 - Logfile analysis

- Improvements:
 - Rule of thumb: avoid unnecessary enumerations when direct LDAP queries are sufficient; avoid redundant LDAP queries where possible
- Redesigning customer`s infrastructure, renewing software components and enhancing Samba's LDAP-Code (Idapsam:trusted=yes) lead to enormous performance gain:
- Several thousands concurrent and successful Windows XP Domain-Logons evenly spread over 10 minutes with tuned OpenLDAP and current Samba 3 Release

Samba as File Server



- Samba3 is known for high file-serving performance
- Implicit issues with Domain Membership in a Samba-controlled Domain:
 - Implications with nss_ldap (critical number of LDAP connections)
 - Winbindd does operate blocking (alternative non-blocking implementation in trunk)
 - Sequence Number call (querydomaininfo) that winbindd used, triggered full-dump of user database on Samba PDC (imagine > 100 file-servers with winbindd that call for sequence numbers each five minutes)



Samba as File Server



- Addition of non-enumerating info-levels of querydominfo
- Alternative sequence-number implementation tied to OpenLDAP's syncrepl sequence-number (in trunk)



Samba as File Server



- ***Example: Federal Ministry of Finance (Bundesministerium der Finanzen), Berlin***
- heavily SAN-based infrastructure (EMC Symetrix)
- One redundant File-Server storing Home-Directories and Roaming Profiles for approx. 2500 users for a couple of years now
- To avoid undesired dependencies but to have at the same time a unified mapping: `idmap_rid`

Migration

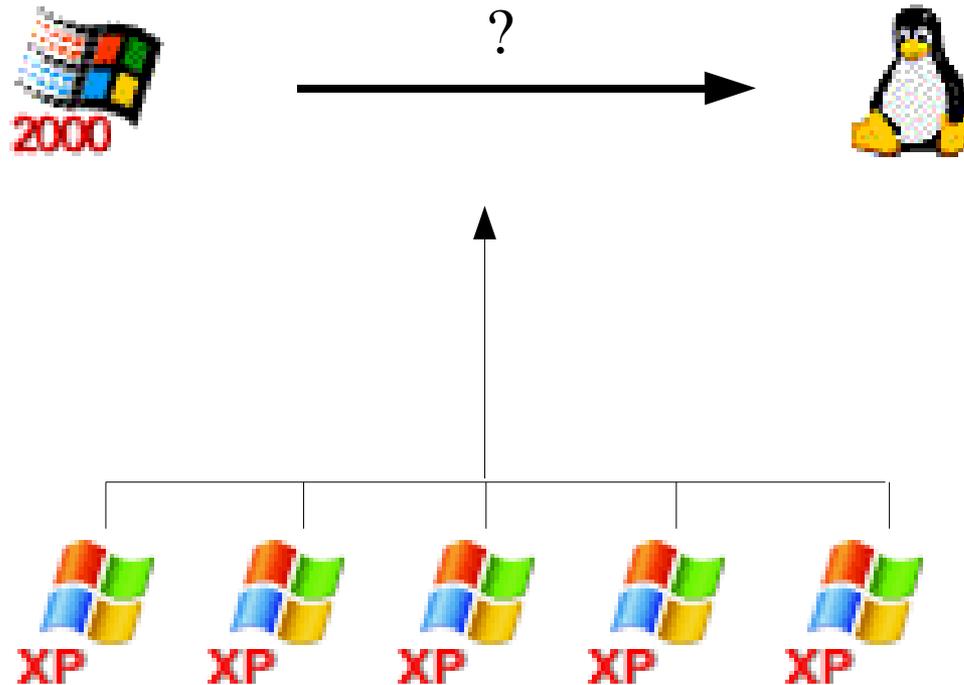


Migration - Example



- ***Example: Another German Government customer***
- Highly automated process to build and administrate a huge number of file- and print servers (around 300)
- Requirement for automated and unattended migration from Windows NT to Samba 3
- Only a few administrators with good Unix-KnowHow

- How can we achieve a transparent and complete migration from a Windows Server to a Samba Server?



Migrate - to what?

- Final migration goal: Samba Server should look like a clone of the Windows Server (the fewer differences the better)
- All security relevant permissions (ACLs) should retain their validity
- Migration should not require any manual intervention and must be scriptable (automated)

Migrate - what and how?

- What to migrate?
 - Shares (incl. Share-ACLs)
 - Files (incl. ACLs, DOS Attributes, etc.)
 - Printers (incl. Drivers, Forms, Settings, ACLs, etc.)
 - User- and Group-Accounts (incl. aliases)
- How to migrate? - Existing utilities:
 - Files: robocopy, scopy, xcopy, smbget, smbclient, cifs and smbfs kernel modules, etc.
 - Printers: printmig.exe
 - User- and Group-Accounts: net rpc vampire

- rpcclient is powerfull for printer-administration but is just able to handle clear text data
- net has been expanded to meet above requirements
- New net-based migration utilities allow to do file- and printserver-cloning
 - recursively copy files incl. security descriptors (ACLs), timestamps and DOS-attributes from one Fileserver to another
 - copy printer-drivers, printers, printer-settings, printer security descriptors (ACLs) and printer metadata from one Printserver to another



Migration - net



- net migration suite
 - is independent from SMB-implementation of source or destination servers
 - does not need to care about any implementation details on the UNIX-side
 - can access all data that SMB- or MSRPC-client-calls can handle
 - allow to migrate from Server A to Server B over Client C

Migration - the net syntax

```
net rpc share migrate files [share]
net rpc share migrate shares ...
net rpc share migrate all ...
net rpc printer migrate printers [printer]
net rpc printer migrate drivers ...
net rpc printer migrate security ...
net rpc printer migrate forms ...
net rpc printer migrate settings ...
net rpc printer migrate all ...
```

Migration - net examples

- Migrate the printer driver of printer “hplaser” from SRV1 to SRV2:

```
net rpc printer migrate drivers hplaser -S srv1 --  
destination=srv2 -U admin%pass
```

- Migrate the share “myshare” from a Win2k PDC to the local Samba Server:

```
net rpc share migrate all myshare  
-S w2kpcdc -U admin%pass --acls --attrs
```

Conclusion

Conclusion



- Samba 3 is - more than ever - getting into good shape to face Enterprise needs
- Samba 3 is **NOT** (and will never be) an equivalent to Windows 2003 Servers
- (In-)famous POSIX-ACL-Mapping is still one of the main obstacles to deploy Samba in a lot of projects
- Until Samba 4 is ready for production, the Samba Team continues Samba 3 development to achieve improved quality, performance and scalability

Thank you for your attention.

gd@samba.org

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