

Solaris CIFS Server

Afshin Salek
Sun Microsystems
Solaris File Systems Group

Today's Talk

- Why native CIFS server for Solaris?
- Changes made to Solaris for accommodating CIFS
- A brief look at CIFS server architecture
- Current status summary
- Roadmap

Why Native CIFS Server

- **First Class Solaris Citizen**
 - > Provide built-in support for Windows interoperability
 - > Fundamental support for SIDs to address identity mapping challenges
 - > Case-insensitive file system (ZFS)
 - > Close coordination with NFS and local access
- **Kernel based implementation**
 - > Better I/O performance
 - > Easier/better integration with NFS and local access
 - > Oplocks/delegations
 - > File change notification
 - > Mandatory locking
 - > Byte range locks/Posix locks
 - > Share reservations (deny/share modes)

Solaris Changes for CIFS

- SID support changes
- VFS changes
- ZFS changes
- Share management changes
- Utility changes
- Other miscellaneous changes

SID support changes

- Identity mapping is a major challenge in Windows-Unix interoperability realm
 - > Single name space vs. two disjoint name spaces
 - > Universally unique vs. non-unique identities
- Support name-based mapping
- We store SIDs wherever they cannot be mapped to Solaris UIDs/GIDs
 - > Unified POSIX and Windows Credentials for Solaris (PSARC 2007/064)
- Credential structure has changed to store SIDs
 - > User SID, Owner SID, primary group SID, list of SIDs
 - > SIDs can have attributes
 - > `sys/sid.h`
- ZFS can store SIDs in its ACLs and owner/group fields
- Cross ID mapping is supported
 - > User/group SIDs can be mapped to GIDs/UIDs

VFS Changes

- **VOP Caller Context (PSARC 2007/218)**
 - > Passing caller specific data to VFS, e.g. caller's identity (NFS/CIFS/Local)
- **VFS Feature Registration and ACL-on-Create (PSARC 2007/227)**
 - > A new mechanism for file systems to register optional features at mount time. An interface for callers to query features is also provided (e.g. Case-insensitivity)
 - > Can specify an ACL at file/folder creation time to support NTTransactCreate
- **CIFS share reservations (PSARC 2007/268)**
 - > Changes to coordinate CIFS share/deny modes with NFS and local open share reservations
- **Extensible Attribute Interfaces (PSARC 2007/315)**
 - > Support for DOS attributes and some other attributes
- **Modified Access Checks for CIFS (PSARC 2007/403)**
 - > Passing 32-bit access mask to VOP_ACCESS
 - > Skipping ACL check for some operations

ZFS Changes

- **ZFS Case-Insensitive Support** (PSARC 2007/244)
- **Provide DOS attributes**
 - > PSARC 2007/315 Extensible Attribute Interfaces
- **Can Store SIDs** (in a compressed form called FUID)
 - > PSARC 2007/064 Unified POSIX and Windows Credentials for Solaris
- **Use SIDs in cred for access check**
- **ACL auto inheritance**
- **UTF-8 names on disk**
- **ZFS sharesmb property** (PSARC 2007/560)

Share Management Changes

- CIFS Support for sharemgr (PSARC 2007/280)
- Share management was NFS based so the central management entity was a path
- CIFS share management is name based
 - > A path can be shared many times using different names
 - > Directories in different levels of a path can be shared out
 - > Properties (e.g. comment, ACL) are associated with the name not the path
 - > Share names are case-insensitive

Utility Changes

- ls(1) '-/' and '-%' options for system attributes (PSARC 2007/394)
- Add system attribute to chmod (PSARC 2007/410)
- CIFS system attributes support for cp(1), pack(1), unpack(1), compress(1) and uncompress(1) [PSARC 2007/432]
- CIFS system attributes support for cpio, pax and tar (PSARC 2007/459)
- Update utilities to match CIFS system attributes changes (PSARC 2007/546)
- Sharemgr(1M) and sharectl(1M) enhancement (PSARC 2007/280)
- **New CLIs: smb(1M), smbadm(1M), smbstat (1M)**

Utility Changes (ls example)

- Two new options to display system attributes supported by the file. ("-/ flag" and "-% timestamp")

> **ls -/ c test.txt**

```
-rw-r--r--  1 root      root          0 Jan 14 16:51 test.txt
  {A-RS---m--}
```

> **ls -/ v test.txt**

```
-rw-r--r--  1 root      root          0 Jan 14 16:51 test.txt
  {archive,nohidden,readonly,system,noappendonly,nonodump,
  noimmutable,av_modified,noav_quarantined,nonounlink}
```

> **ls -l -% all file**

```
-rw-r--r--  1 root      root          0 Jan 14 16:51 test.txt
      timestamp: atime          Jan 14 16:51:16 2008
      timestamp: ctime          Jan 14 16:53:07 2008
      timestamp: mtime          Jan 14 16:51:16 2008
      timestamp: crtime         Jan 14 16:51:16 2008
```

Utility Changes (chmod example)

- Set the readonly and system attributes of a ZFS file using compact notation

```
chmod S+cRS test.txt
```

- Set the readonly and system attributes of a ZFS file using verbose notation

```
chmod S+v' {readonly,system}' test.txt
```

```
ls -/c  
-rw-r--r--    1 root    root      0 Jan 14 16:51 test.txt  
      {A-RS---m--}
```

- Clear the readonly and system attributes of a ZFS file using compact notation

```
chmod S-cRS test.txt
```

- Clear the readonly and system attributes of a ZFS file using verbose notation

```
chmod S-v' {readonly,system}' test.txt
```

```
ls -/c  
-rw-r--r--    1 root    root      0 Jan 14 16:51 test.txt  
      {A-----m--}
```

Utility Changes (sharemgr example)

- sharemgr(1M)

- > Share management for NFS and CIFS

```
sharemgr create homegroup
sharemgr add-share -s /export/home -r home homegroup
sharemgr show -vp homegroup
```

```
homegroup  nfs=()  smb=()
            /export/home
            home=/export/home
```

Utility Changes (New CLIs)

- **smbd(1M)** is managed as an SMF network service

```
svcadm enable -r smb/server
svcadm disable smb/server
svcadm refresh smb/server
svcs -d smb/server
```

STATE	STIME	FMRI
online	Mar_06	svc:/milestone/network:default
online	Mar_06	svc:/system/filesystem/local:default
online	Mar_06	svc:/system/idmap:default

- **smbadm(1M)**

- > Join a domain or workgroup

```
smbadm join -u username domain
smbadm join -w workgroup
```

- > SMB local group management

```
smbadm add-member -m member [[-m member] ...] group
smbadm create [-d description] group
smbadm delete group
smbadm get [[-p property] ...] group
smbadm remove-member -m member [[-m member] ...] group
smbadm rename group new-group
smbadm set -p property=value [[-p property=value] ...] group
smbadm show [-m] [-p] [group]
```

Other Changes

- 2007/139 Kernel Crypto support for MD4
- 2007/149 UTF-8 Text Preparation
- 2007/173 kiconv
- 2007/440 nbmand changes for CIFS Service
- 2007/458 User land UTF-8 text preparation functions
- 2007/544 pam_smb_passwd
 - > Local SMB passwords are added by passwd(1)
- mdb is enhanced to recognize smbstrv data types

pam_smb_passwd (PSARC/2007/544)

- Enhances PAM password management to include Windows style passwords

- Required for authenticating local users

- Manually add this line to /etc/pam.conf

```
other password required pam_smb_passwd.so.1 nowarn
```

- Hashed passwords stored in /var/smb/smbpasswd

```
# passwd newuser  
New Password: ****  
Re-enter new Password: ****
```

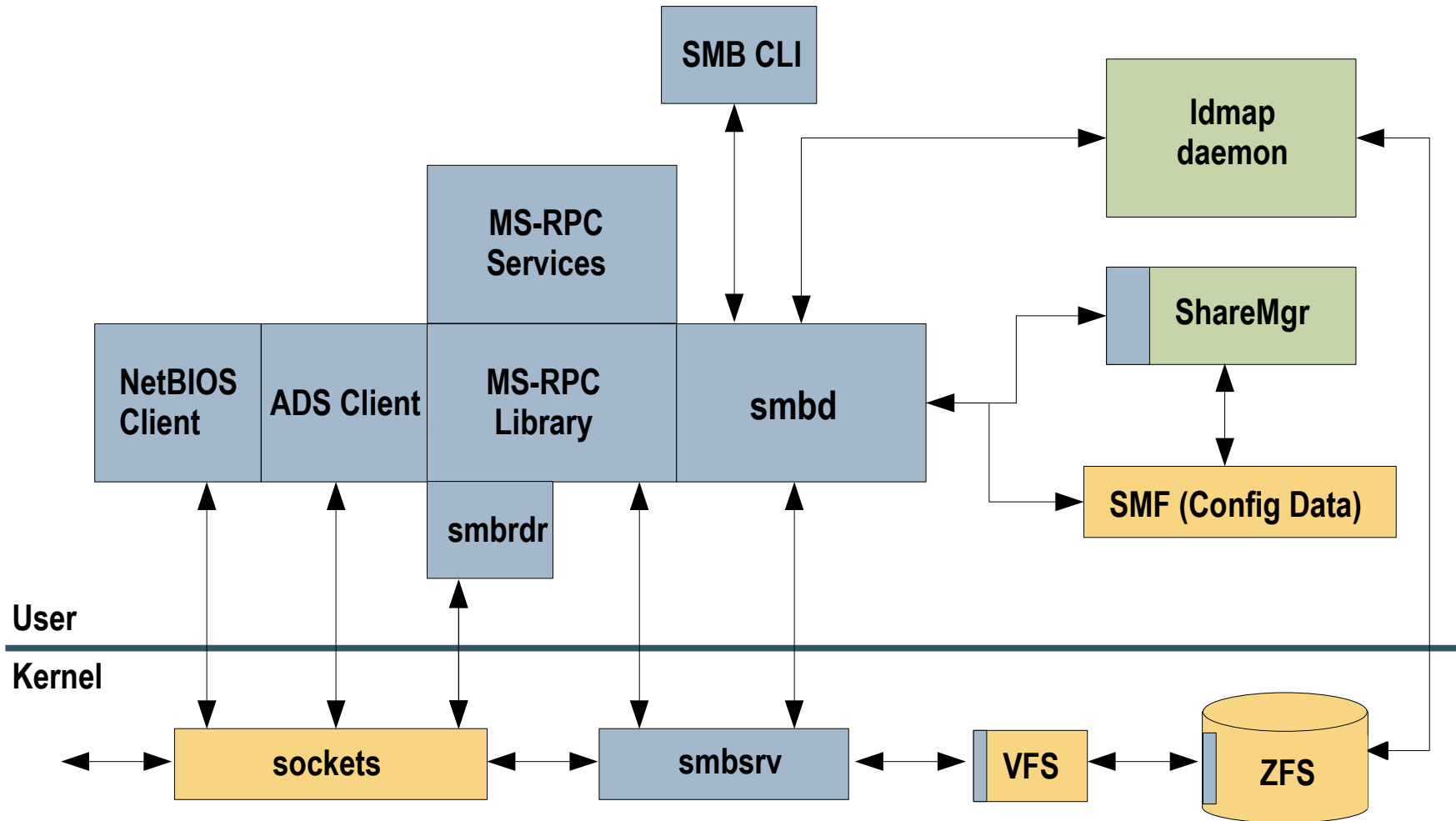
```
# cat /var/smb/smbpasswd  
newuser:1001::9A05AF0B1AEECAD48C1760BC6A211F25
```

- Individual users can be enabled or disabled

```
smbadm disable-user username  
smbadm enable-user username
```

```
# smbadm disable-user root  
# cat /var/smb/smbpasswd  
root:0:*DIS*:*DIS*  
newuser:1001::9A05AF0B1AEECAD48C1760BC6A211F25
```

Solaris CIFS Server Architecture



CIFS Server Status Summary

- SMB/CIFS LM 0.12 protocol
 - > Legacy dialects somewhat supported
- MS-RPC protocol compiler and library
- Core MS-RPC Services
- SMB/CIFS Redirector
- NetBIOS transport and services
 - > Name Service cache, Datagram Service, Transport, Browser client
- ADS Client
 - > Dynamically publish shares in ADS
- Dynamic DNS client
 - > Dynamically publish name-IP mappings in DNS
- SMB Autohome
 - > Dynamically share home directories

CIFS Server Roadmap

- Performance
- Remote Manageability via CMC, Sever Manager
- Share-level ACLs
- MS-DFS (SMB referrals)
- Print support
- IPv6
- Kerberos user authentication and extended security
- SMB2
- Mac/DAVE and UNIX extensions

opensolaris

- ***Project Pages***

- > <http://www.opensolaris.org/os/project/cifs-server/>
- > <http://www.opensolaris.org/os/project/smbfs/>
- > <http://www.opensolaris.org/os/project/winchester/>
- > <http://www.opensolaris.org/os/community/zfs/>

- ***CIFS Documentation***

- > <http://opensolaris.org/os/project/cifs-server/docs/>

- ***CIFS Discussion***

- > cifs-discuss@opensolaris.org

- ***ARC Cases***

- > <http://www.opensolaris.org/os/community/arc/caselog/>

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