

Samba Printing

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Windows NT/2000/XP Point and Print concept.

- Printers (representing queues to different printers) have data structures called DEVICEMODES attached.
- Standard capabilities are stored in the DEVICEMODE.
- Non-standard capabilities are created by the Win32 printer driver code and stored as key/value pairs associated with the printer.
- Notification backchannel mechanism allows server to notify clients on capability changes and on printer status changes.

Windows Point and Print (continued)

- Translation can be done either on the client (RAW) print type, or by sending a metafile to the server (EMF).
- Metafile on the server depends on associated driver code being run on the server.
 - Special per-printer DEVICEMODE sent when printer handle opened to enable remote translation (EMF).
- GUI representation of capabilities shared by system print dialog and by Win32 driver code.
- Printing (and printer administration) security done by associating Win32 ACLs with printer object.

Windows Point and Print (continued)

- All print communication done using DCE/RPC calls over SMB.
- Print path starts with printer handle being opened.
 - Print "Job" submitted into queue (job ID returned).
 - Data spooled into job.
 - On "close" then the print is started.
- Backchannel notification very poorly done (reverse SMB connection from server to client).
- Standard job commands (enumerate, delete) and queue commands (pause, resume, purge).

Samba Printer Code

- Implements Windows NT/2000/XP "point and print" interfaces.
- Provides driver download.
- Provides remote store for capability data.
- Maps Windows "printers" onto UNIX print queues.
- Depends on drivers doing the data translation (rasterization/conversion to PS etc.) on the client (raw mode).
- Uses internal tdb database to store capabilities such as DEVICEMODE and key/value pair data.
- Can fail with drivers that are expected to be run on the server.

Samba Printer Code (continued)

- Printer tdb acts as a registry store for printer capabilities.
- Print queue tdb keeps track of Win32 submitted jobs. Associates Windows data with underlying UNIX spooling data (as returned from lpq).
- On job submission a job entry is created in the queue tdb.
- Data then spooled into a tmp file.
- On completion job submitted into UNIX print system using internal Samba vectored API.
- Polling used to report print status.

Samba Interface to UNIX print system

- Kept as simple as possible. Consists of operations :
 - `get_queue`
 - `pause_queue`
 - `resume_queue`
 - `job_delete`
 - `job_pause`
 - `job_resume`
 - `job_submit`
- CUPS currently only real API user. Others map UNIX commands (`lpq`, `lprm`, `lpc`) under interface.

Win32 Printer capabilities in Samba

- DEVICEMODE stored per printer object in tdb.
- Security : ACLs stored per printer in tdb.
 - Accessing user checked against stored ACL before allowing desired access.
- Generic key/value access provided by `GetPrinterData()/SetPrinterData()/EnumPrinterData()` calls.
- These can set arbitrary capabilities and enumerate the list
- Treated as "blobs" of typed data and stored in the tdb.
- No mapping between UNIX capabilities and Win32.

Setting up a Samba Printer

- A driver needs to be bound to the client view of a printer.
- "Printer" administrator must bind a driver to a UNIX print queue.
 - Clients then transparently download and install this code.
 - Users don't need to know printer type or how it is configured.
- Driver takes care of GUI dialog capabilities. Changes are stored on Samba server and sent via notification to other clients.

Known Problems

- No way to ensure Win32 printer driver associated with a printer by the printer Admin is correct.
- No way to ensure capabilities set from Win32 match to capabilities set under UNIX (must trust print admin).
- Even with perfect UNIX API, transition to use extra features will be slow as Samba must compile on many older systems.
- Win32 printer status decoupled from UNIX printer status (must pass through narrow API) and error codes don't always match.

Resources

- Main Samba Web site :
- <http://samba.org>
- Newsgroup :
 - <news:comp.protocols.smb>
- Samba discussion list :
 - email: samba@samba.org
- Samba development list :
 - email: samba-technical@samba.org