

Supporting Windows IPC mechanisms in Samba

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Thinking as a Windows ISV...

- Agenda
 - Transports involved
 - Discussion of available IPC Mechanisms
 - External use of RPC
 - External use of WMI



History of Windows IPC mechanisms

• Mailslots	Win 3	Samba 1.9
• RPC	NT 3	Samba 2.0
• DCOM	NT 4	Samba 4.0
• WMI	Win2k	Samba 4.0
• .NET Remoting	Win2k	Mono?



Transports

- SMB Named Pipes
- IPX/SPX
- NetBEUI
- TCP/IP
- “Local”
- ... and more



Named Pipes

- Similar to unix domain sockets
- *\PIPE\...* on local systems
- Shared over SMB as *IPC\$*



Registering Named Pipes

- Plugin
- Fallback to Unix Domain Sockets(?)



RAP

- Supported by OS/2, Windows for Workgroups
- “Original” RPC mechanism in SMB
- Not user-extendible (global opnums)



Mailslots

- Used for browsing (Network Neighborhood)
- One-Way
- 425- and 426-byte messages not possible
- Uses Named Pipes for small messages, datagrams for larger ones
- Unreliable



(MS)RPC

- Based on DCE/RPC
- Works over SMB, TCP/IP or SPX
- Interfaces specified in IDL
- Used extensively by 3rd-party developers



DCOM

- Distributed version of COM
- Uses RPC underneath
- Basis of various other technologies
 - WMI
 - ActiveX

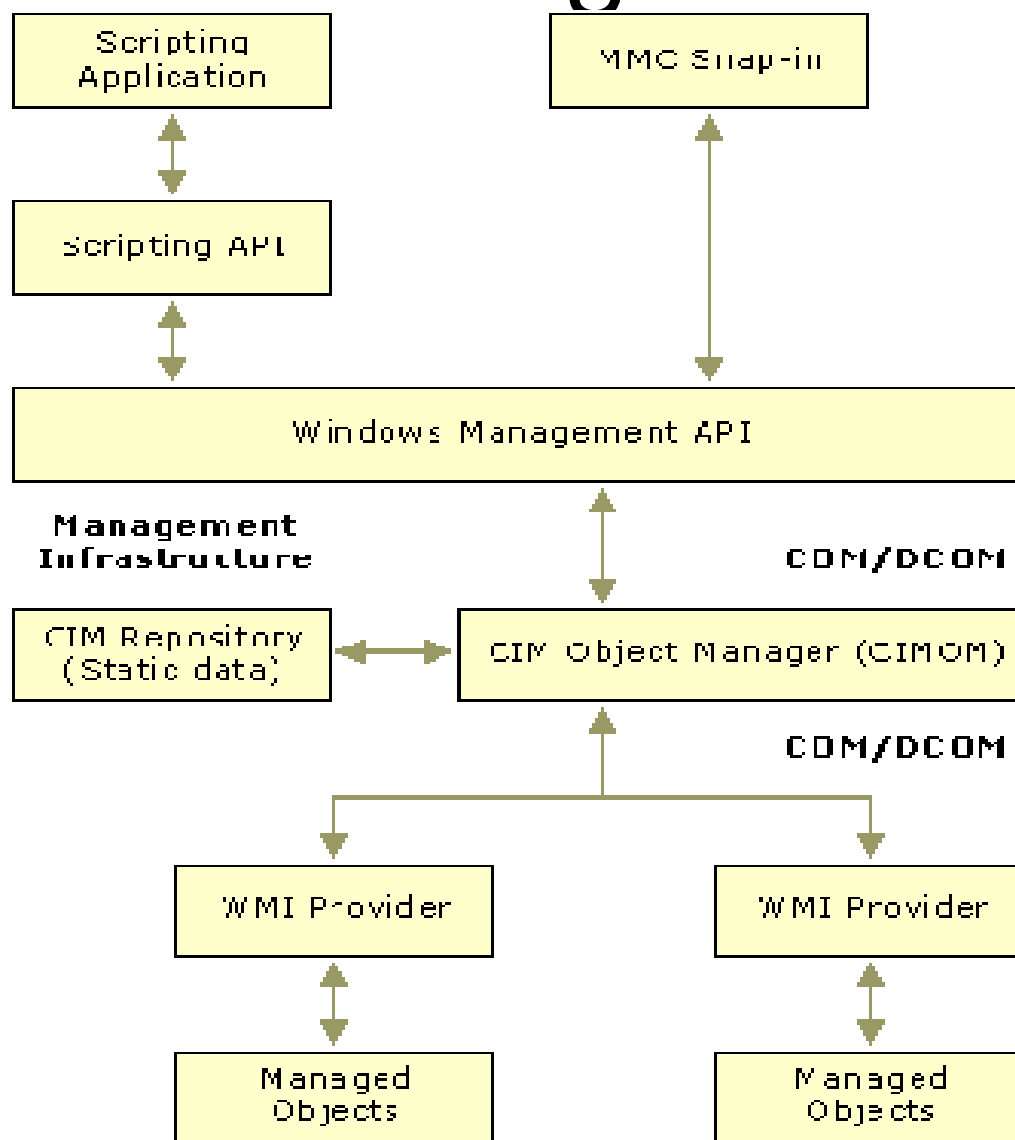


WMI

- Based on DCOM
- Windows Management Interface
- Implementation of WBEM
- Used by the Windows MMC
- Scriptable



WMI – Where it gets complicated...



WMI and the Windows MMC

The image shows a Windows Management Console (MMC) interface with three overlapping windows:

- Add/Remove Snap-in:** A dialog box with the 'Extensions' tab selected. It lists 'Snap-ins that can be extended' (Computer Management) and 'Available extensions' (Device Manager extension, Disk Defragmenter, Disk Management Extension, Event Viewer Extension, Local Users and Groups, Logical and Mapped Drives). The 'Event Viewer Extension' is highlighted.
- Console 1 - [1:Console Root\Computer Management (Local)\System Tools]:** The main console window showing a tree view of 'System Tools' with 'Event Viewer' selected. The right pane shows a list of extension snap-ins: Event Viewer, System Information, Performance Logs and Alerts, Shared Folders, Device Manager, and Local Users and Groups.
- Console 1: [Console Root\Computer Management (Local)\System Tools\Event Viewer\System]:** A sub-window showing the 'System' log. The table below displays the log entries.

Type	Date	Time	Source
Error	11/30/1999	1:57:51 PM	Browser
Warning	11/30/1999	1:55:01 PM	Browser
Information	11/30/1999	1:47:09 PM	Tcpip
Warning	11/30/1999	1:45:16 PM	Dnsapi
Information	11/30/1999	1:11:57 PM	Tcpip
Warning	11/30/1999	1:43:28 PM	Browser
Information	11/30/1999	1:14:44 PM	eventlog
Information	11/30/1999	1:11:11 PM	eventlog
Information	11/30/1999	1:09:27 PM	eventlog



WMI - Scripting

Scripting in all COM-compatible languages: *VBScript*, *Jscript*, *Python(!)*

```
For Each Host In WScript.Arguments
    Set WMIservice = GetObject("winmgmts:{impersonationLevel=impersonate}!\" & host & "\root\cimv2")

    Set colsettings = WMIservice.ExecQuery("SELECT * FROM Win32_Processor")

    For Each proc In colsettings
        Wscript.Echo(host & ": " & proc.description)
    Next
Next
```



WMI – in .NET

```
using System;
using System.Management;

class Class1
{
    static void Main(string[] args)
    {
        ConnectionOptions co = new ConnectionOptions();
        co.Username = "john"; co.Password = "john";
        ManagementScope ms =
            new ManagementScope("\\\\.192.168.1.2\\root\\cimv2", co);

        ObjectQuery oq =
            new ObjectQuery("SELECT * FROM Win32_OperatingSystem");

        ManagementObjectSearcher query1 = new ManagementObjectSearcher(ms, oq);
        query1.Get()[0].InvokeMethod("Reboot", { "" });
    }
}
```



.NET Remoting

- Mono?
- Various backends (“Channels”)
 - DCOM
 - “Simple”
 - Indigo



Reasons for external use of RPC/DCOM

- Other projects
 - Wine / ReactOS
 - OpenChange
 - GUI Utilities
 - OpenPegasus
 - Mono?
 - Support ActiveX controls in Mozilla ?
 - 3rd party vendor integration

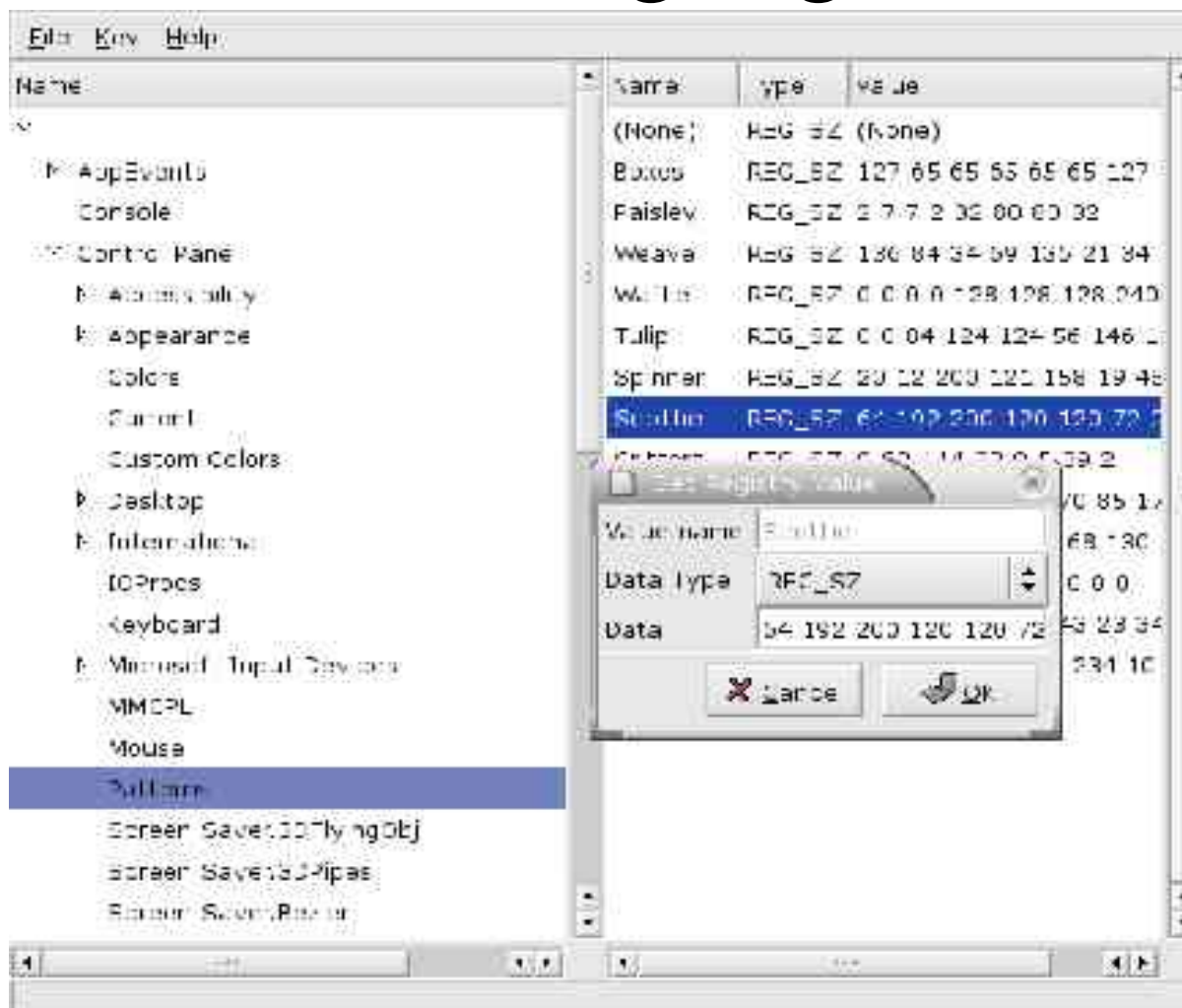


External use of RPC

- Interface implementation scenarios:
 - Standalone (just epm registration)
 - Proxy-forwarded
 - Internal (plugin-based)
- Use Samba libraries
 - Installed headers
 - pidl



GUI - gregedit



State of affairs

- *pidl*
 - Updated for being MIDL-compatible
 - Not installed (yet)
- *RPC subsystem*
 - Headers need to be installed for use by other projects
- *DCOM*
 - Very simple sample example working, working on infrastructure at the moment
 - Python support planned
- *WMI*
 - Not started (yet)



Further Resources

- Slides available at <http://samba.org/~jelmer/>
- <http://devel.samba.org/>

