Replicating WINS servers on Linux with Samba4Wins

WINNING EDGE

Samba4Wins lets you set up a WINS server for NetBIOS name resolution in Linux. **BY WALTER NEU**

Although in recent years Microsoft has attempted to place more emphasis on DNS, the reality is, if you work on a network with Windows systems, it is almost impossible to escape the NetBIOS protocol system.

NetBIOS helps clients locate resources and find login servers. To do this, it normally broadcasts to UDP port 137. Besides flooding the network with broadcast traffic, this approach doesn't work on routed networks. Routers do not forward broadcasts, so the request stays in the network segment where it started.

The Windows implementation of the NetBIOS name server, WINS (Windows Internet Name Service), resolved the issue by dynamically maintaining a database of NetBIOS names. Clients don't need to broadcast to reserve and resolve names; instead, they send UDP packets to the WINS server (Figure 1). In all versions of Windows, the administrator needs to set the WINS server IP address in the advanced section of the *Wins* tab below the TCP/IP protocol property settings. Administrators with Samba define the WINS server address by setting the

wins server = IP address parameter in the *[global]* section of *smb.conf*. Routers will forward targeted UDP packets to the WINS server, and the presence of it reduces broadcast traffic.

To benefit the users of free operating systems, Sernet, a service provider heavily involved with the Samba project, launched the Samba4Wins project [1]. Samba4Wins replaces a Microsoft WINS server at a functional level and is perfectly capable of replicating data to other servers. It's part of Samba 4, but all services that are not required for a running WINS server are deactivated, such as Active Directory integration. Until the final

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Listing 1: smb4wins.conf

```
01 [globals]
02 netbios name = winssrv-01
03 workgroup = dbsys
04 interfaces = eth0
05 bind interfaces only = yes
06 log level = 4
```

Listing 2: WINS Backup

```
01 cd /var/lib/samba4wins/private
02 ldbadd -H wins_config.ldb < \
03 /backup/winssrv-01_backup.ldif
04 Added 1 records with 0 failures
```
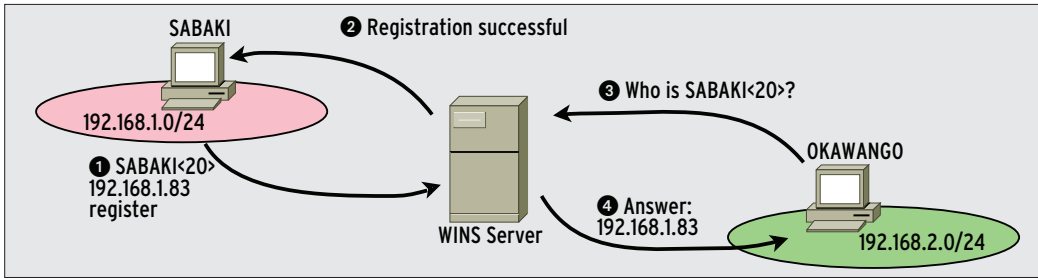
Figure 1: A machine called SABAKI registers its name and IP with the WINS server as a Type 0x20 resource and receives an acknowledgment. OKAWANGO resides on another subnet and receives a response to a targeted UDP request (3) for SABAKI. This would be impossible by broadcasting.

Samba 4 release, when Samba packages will replace the Samba4Wins application, admins can run the Samba4Wins daemon parallel to Samba 3.0.21 or newer. Although you can run a WINS server without Samba4Wins, it offers no free software option for replicating with other WINS servers, and many complex networks need this ability.

Preventing Flooding

Samba4Wins source and binary packages are available for Debian derivates and the major enterprise distributions RHEL 4, SLES 9, and SLES 10 [1]. The servers can run parallel to an existing Samba installation as separate *smbd-4wins* daemons.

The *samba4wins.conf* configuration file is located in the */etc/samba4wins/* directory. The developers recommend launching the server with the default settings (i.e., an empty file). If you set *log level = 4*, you can monitor what is going on inside the server. The *samba4wins.conf* configuration file also sup-

ports a number of parameters from Samba 3 that you might be familiar with (see Listing 1). If you are running Samba4Wins parallel to Samba 3, you need to set the *nbtd:disable_broadcast* option to *yes* to prevent Samba4Wins from responding to broadcasts on UDP port 137.

The configuration parameters for a WINS replication partner are stored in a Samba LDB database, *wins_config.ldb*, which the server expects to find in the */var/lib/samba4wins/private/* directory. If you want to check or modify the entries in the database, use the *ldbedit* tool, which will open the database contents in your favorite editor so you can set the replication partners for your WINS server. To allow this, type:

```
cd /var/lib/samba4wins/private
ldbedit -H wins_config.ldb -a
```
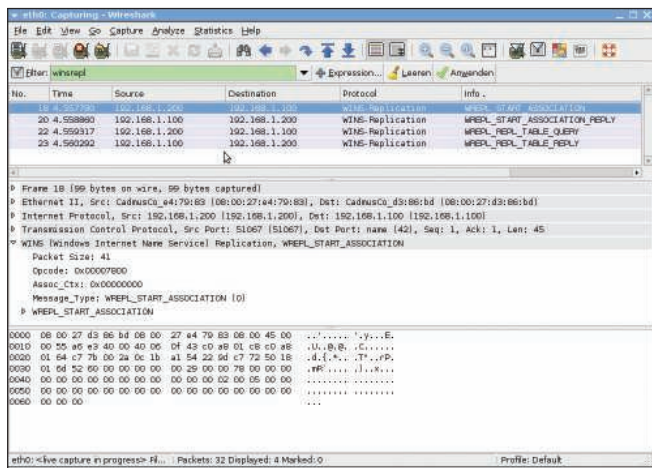
Figure 2: The Wireshark network sniffer visualizing WINS replication on TCP port 42.

The *-H* option passes in the LDB URL that the tool will connect with – a local file in this case. The *-a* at the end of the line tells the tool to edit all the records in the database. Incidentally, WINS uses LDIF syntax just like an LDAP server. LDIF (LDAP Data Interchange Format) is a text format for displaying LDAP directory content. The *wins_config.ldb* database on *WinsSRV-02*,

```
dn: CN=WinsSRV-01,CN=PARTNERS
objectClass: wreplPartner
address: 192.168.1.100
```

tells the WINS database to synchronize with a machine called *WinsSRV-01* with IP address 192.168.1.100. The *CN = PARTNERS* name component tells the server to use the entry as a replication partner. Of course, you need to add similar replication entries on *WinsSRV-01*:

```
dn: CN=WinsSRV-02,CN=PARTNERS
objectClass: wreplPartner
address: 192.168.1.200
```

In this minimal configuration, both WINS servers act as pull and push partners (i.e., synchronization is bidirectional). The *samba 4wins-1.0.7- HOWTO.*
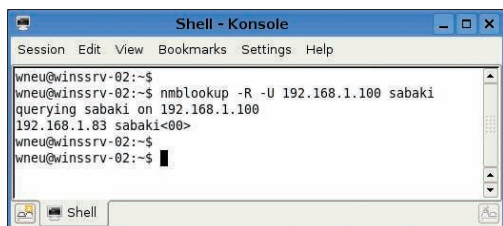

Figure 3: nmblookup queries the WINS server 192.168.1.100 for the NetBIOS name sabaki.

txt file on the download server has other useful information (e.g., on networking, load balancing, and timeouts) and more configuration options. The *ldbsearch* command lets you save the final configuration:

```
cd /var/lib/⤵
samba4wins/private
ldbsearch -H ⤵
wins_config.ldb⤵
objectClass=\*> ⤵
/backup/wins_config-backup.ldif
```

The command searches the *wins_config.ldb* database for records that match the *objectClass = ** condition and redirects the output to a file called */backup/wins_config-backup.ldif*. The *ldbadd* command (Listing 2) lets you restore the LDIF-formatted configuration backup to the LDB database.

Through use of the same approach, you can back up the WINS database in */var/lib/samba4wins/wins_config.ldb* (see Listing 2). After completing the configuration and starting the daemon on both servers – by typing */etc/init.d/smb-d4wins start* or *samba4wins*, depending on your distribution – you can monitor replication via TCP port 42 with the Wireshark sniffer (see Figure 2). The tool includes the *Winsrepl* dissector, which visualizes the protocol [2].

Winning Names

The *nmblookup* diagnostics tool helps you query the two WINS databases. Figure 3 shows the tool querying the server at 192.168.1.100 for the name *sabaki*. (Incidentally, Samba's NetBIOS tools are not case sensitive.) To test the replicated database, run the *nmblookup* against the second WINS server.

If everything is working properly, the results should be identical, apart from the fact that the server IPs will differ. The *ldbsearch* referred to earlier also returns registered names in LDIF format. Users can either retrieve all entries by querying for *objectClass = winsRecord* or enter

an appropriate query to restrict the search to specific resource types.

Resource Types

The resource type is the 16th byte in a NetBIOS name. In Windows, the resource type is typically represented as a hexadecimal sequence, often following the name and enclosed in angle brackets. This suffix lets applications reserve names without getting in each other's way. For example, the *0x03* suffix stands for a message service. If a machine offers file or print services, the client can use the NetBIOS name registered with the *0x20* type field to set up a connection to the server. For more details on resource types, refer to the Microsoft Knowledge Base [3].

If you prefer, you can also search the LDB for name records by specifying the *name = NetBIOS name* option. This option supports typing the NetBIOS name in capital letters (Listing 3).

Samba4Wins signals the end of Redmond's monopoly on WINS server replication and the end of the Linux administrator's fear of relying on a single WINS server. ■

Listing 3: ldbsearch -H wins.ldb name=SABAKI

```
01 01 # record 1
02 02 dn: name=SABAKI,type=0x20
03 03 type: 0x20
04 04 name: SABAKI
05 05 objectClass: winsRecord
06 [...]
07 10 expireTime: 20090120004152.0Z
08 11 versionID: 6
09 12 winsOwner: 192.168.1.100
10 13 address: 192.168.1.83;winsOwner
   :192.168.1.100;expireTime:20090120
   004152.0Z;
11 14 distinguishedName:
   name=SABAKI,type=0x20
12 [...]
```

INFO

[1] Download Samba4Wins: *http://enterprisesamba.org/index.php?id=88*

[2] Wireshark dissector for WINS: *http://wiki.wireshark.org/WINS-Replication*

[3] NetBIOS resource types: *http://support.microsoft.com/?kb/163409/EN-US/*