Engineering Support Application Note
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Connecting Acorn machines to Novell NetWare™

This Application Note details a method of providing direct connectivity between an Acorn RISC OS computer equipped with a network card and OmniClient II, to a Novell NetWare 4.1x or IntranetWare™ server.

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Applicable Hardware :	All Acorn computers running RISC OS 3.1 or greater	Related Application Notes:	None

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Introduction

NetWare™ is a server/networking product from Novell, Inc. which is in widespread use around the world. The most recent versions of this product, NetWare 4.10, 4.11 and IntranetWare are able to use a freely available migration tool (based on the SAMBA[1] distribution) from Novell Consulting to emulate a LAN Manager server for file and print services. With the addition of OmniClient[2] II (multi-protocol client software available from Acorn), an Acorn RISC OS computer fitted with an Ethernet card can connect directly to the NetWare server. Note that it is not possible to do this with OmniClient I, an earlier version of the OmniClient product, and that there is a related commercial product* from Novell.

Requirements

i) a Novell NetWare 4.10 or later server with at least 16MB of DRAM

ii) a PC compatible client computer for administrative use, preferably already connected via an Ethernet network to the above NetWare server. A RiscPC fitted with an Ethernet card, a PCx86 card and Aleph One's Network Links[3] software can also be used in place of a PC compatible.

iii) a copy of Microsoft MSDOS and Windows™ 3.1x or Windows 95, again, preferably already installed on the administration PC-compatible.

iv) the file SAMBA.EXE (approx. 197K in size) from Novell Consulting. This can be downloaded from Novell's web server using the following URL:

`http://www.novell.com/corp/programs/ncs/toolkit/download/samba.exe`

Note that you do *not* need to download LMIG.EXE from the same source.

v) an Acorn computer, fitted with an Ethernet card and RISC OS 3.10 or later.

vi) a single-user or site licence version of OmniClient II.

vii) depending upon the configuration of the NetWare server, some additional update files may be needed. The most likely to be required is LIBUPC.EXE (approx. 800K in size, new versions of CLIB.NLM and DSAPI.NLM). This can be found at:

`ftp://ftp.novell.com/pub/updates/nwos/nw410/libupc.exe`

viii) the documentation for the Novell Consulting Migration Toolkit. This is supplied in the form of an Envoy document, so it may be necessary to download an Envoy viewer program or plugin as well. The URL is:

`http://www.novell.com/corp/programs/ncs/toolkit/mig_tls/docs/qt_docs.evy`

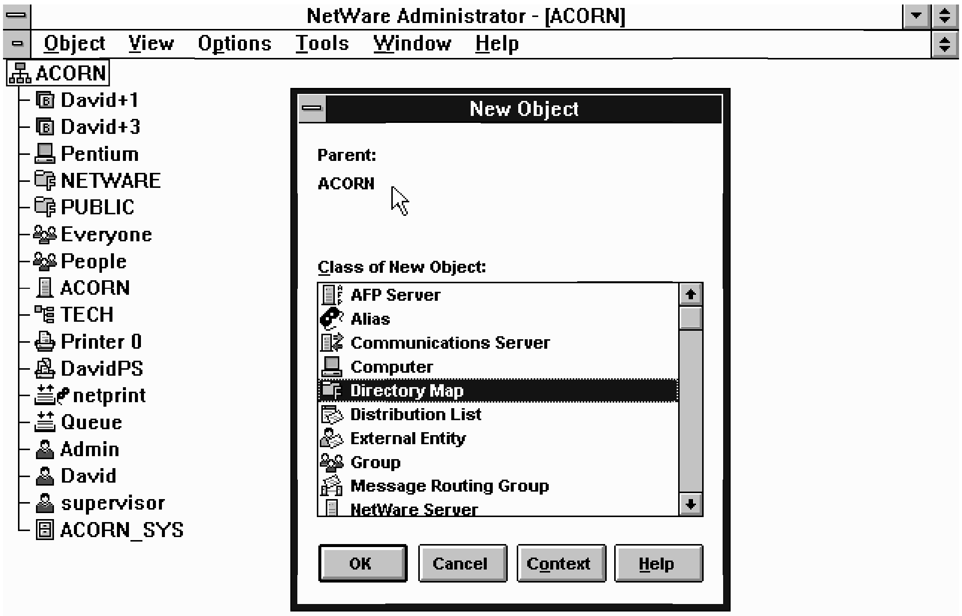
The NetWare server must also have the TCP/IP protocol installed and configured prior to starting installation of the LAN Manager share emulation server. This is usually done with INETCFG.NLM from the server console, or optionally from the administration PC using RCONSOLE.

1 See http://lake.canberra.edu.au/pub/samba
2 See http://www.acorn.com/acorn/technology/sheets/010-Networking/
3 See http://www.aleph1.co.uk/docs/netlinks/NETLIN_1.HTM

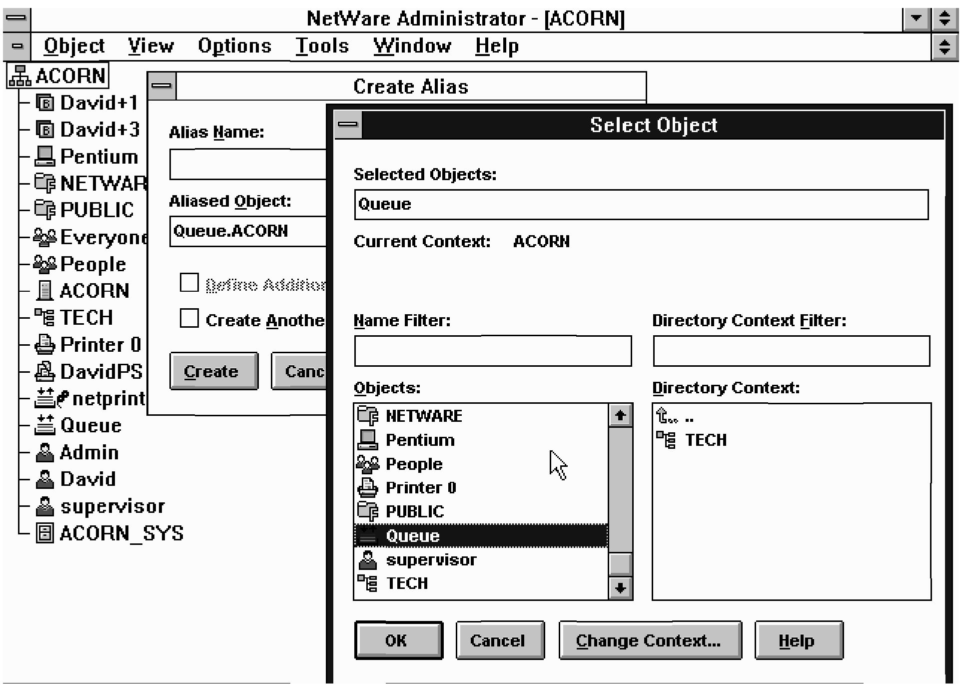
Server Configuration

Assuming that the NetWare server has been pre-configured as described above, continue as follows.

First, add one or more NDS **Directory Map** objects to your NDS tree using NWADMIN (from within Windows) on the administration PC. You will need to add one Directory Map object for each LAN Manager share you wish to make from the NetWare server, and these Directory Map objects *must* be in the same NDS context as the NetWare server. The **Path** property of each Directory Map object is the *actual* NetWare volume/directory that will be shared. There *must* be at least one Directory Map object in the NDS tree. The example below shows the creation of an as yet unnamed Directory Map object and two existing Directory Map objects, named NETWARE and PUBLIC respectively.



This is documented in more detail on pages 40 & 41 of the Novell documentation supplied in Envoy file format. To emulate a LAN Manager printer share you must create an NDS Alias object in the NDS tree that references the Queue you wish print jobs to be directed to, an example is shown below.



Note that the names you give to the NDS Directory Map and Alias objects will be the names of the LAN Manager shares from the NetWare server, eg; in the previous example a Print Queue Alias is called netprint.

Once you have completed creating the NDS objects, exit NWADMIN and run the SAMBA.EXE file from the MSDOS prompt to decompress the contents. This will create the directories MIGTOOLS\SAMBA\SAMBA and MIGTOOLS\SAMBA\SYSTEM, which should contain the following files;

```
NBNS.NLM
SAMBA.NLM
NETBEUI.NLM
NWGLUE.NLM
TCPBEUI.NLM
```

These are the various NLMs (**N**etWare **L**oadable **M**odules) that comprise the Share Emulation server. Copy all of these files into the SYS:SYSTEM directory on the NetWare server. They will subsequently need to have their attributes correctly set, this can be done by issuing the following command for each file;

```
FLAG SYS:SYSTEM\NBNS.NLM RO SH DI RI /FO
```

where `NBNS.NLM` is replaced with the other filenames for each command. At this stage, if you have a NetWare 4.10 server that has not been recently updated, you may need to update CLIB.NLM, etc. The easiest way to do this is to download an upgrade file from the Novell Support Connection site, at present, this upgrade file is called LIBUPC.EXE. If you are using NetWare 4.11 or IntranetWare, you can skip the next paragraph - although Novell generally recommends that you use the latest version of any NLM.

This file is a self-extracting archive like SAMBA.EXE. Once you have extracted the files, copy all of the decompressed files onto a floppy disk and put this disk into the floppy disk drive of your NetWare server. At your NetWare server (or from RCONSOLE), in the System Console screen, type `LOAD INSTALL`, then choose the menu selections "Product Options" and "Install a Product not Listed". Use `F3` to specify a different disk drive letter if necessary.

Once all the required NLMs have been copied into the SYS:SYSTEM directory, the final stage is to edit the AUTOEXEC.NCF file to automatically load the Share Emulation Server NLMs during server startup. Once again, type `LOAD INSTALL` as in the previous paragraph. Choose the menu selections "NCF files options" and then "Edit AUTOEXEC.NCF file". This starts a text editor and loads the current AUTOEXEC.NCF file ready for editing. Use the arrow keys to scroll to below the last line of the file, and add the following four lines in the order shown;

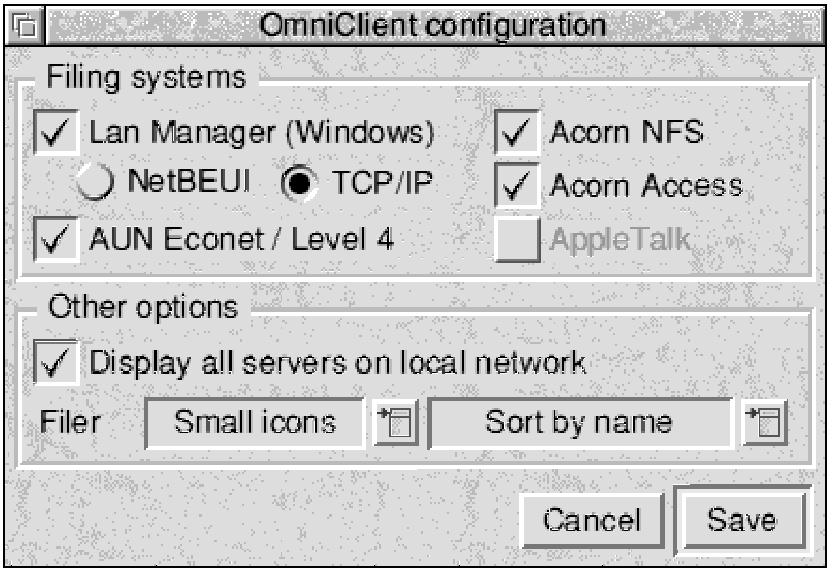
```
LOAD NETBEUI
LOAD TCPBEUI
LOAD NBNS
LOAD SAMBA
```

Press the `ESC` key, and reply **Yes** to the dialog box question "Save AUTOEXEC.NCF file?". It is now recommended that you restart your NetWare server, do this (warn your users first!) by typing `DOWN` at the System Console and wait until your server stops before restarting it as you would normally.

When the NetWare server restarts, it will be sharing those directories and print queues that have NDS objects created for them, via NetBIOS over TCP/IP. Note that a number of other NLMs than those listed above will auto-load during the NetWare server's startup, eg; LLC8022.NLM, etc. This is normal.

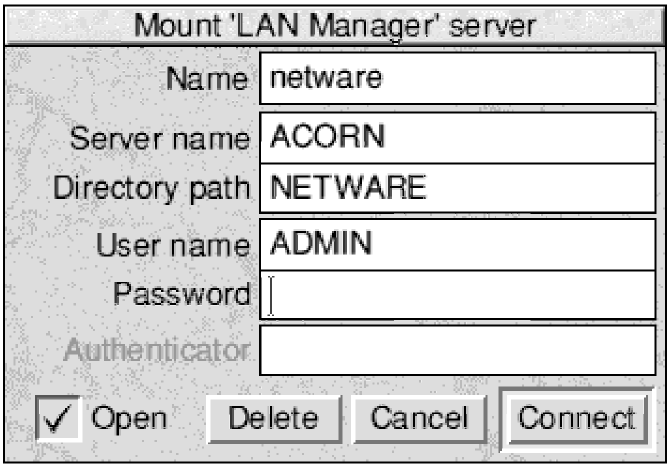
Client Configuration

The configuration of the client computers is identical to the configuration used to connect to a Microsoft Windows™ NT server, when using NetBIOS-over-TCP/IP as the default protocol. In detail, the only change that this requires is to issue a "**`*CONFIGURE LMTRANSPORT IP`**" command, and reset the computer. You can also make this change by using the *!OmniSetup* utility supplied as part of the OmniClient II product, an example is shown below.



Connecting to the NetWare Server

To make a connection to the NetWare server, you need to have both the name of a shared directory and a valid username/password pair. The process is exactly the same as logging in to a Windows NT server; the server name is the name of the NetWare server and the directory path is the name of the shared directory.



The process for printing via the NetWare server is also exactly the same as printing via a Windows NT server, however, NetWare requires that you are authenticated into the NDS tree before you can print. In practice, this means you must have a username/password pair in the filename given to *!Printers*, eg;

```
OmniPrint#LanMan;ACORN;netprint;printuser;password:
```

Check the filing system rights and NDS tree rights of the user you create to handle print requests carefully.

Final Checklist

There are several items you should check before finally leaving the NetWare server.

- Check that the amount of memory allocated to Cache buffers has not decreased too much, you can use the Console Monitor and the menu option "Resource utilization" to view this.

- If you also have a Windows NT server or other LAN Manager shares on the same Ethernet as the NetWare server, check that you do not have any shared resources with the same names as the NDS Directory Map objects or Queue Alias objects you have created. NetBIOS does not allow for two shares with the same name to exist on the network simultaneously.

- Finally, check that any existing client PC's can continue to work unaffected by the addition of the Share Emulation server.

If you have checked the above items and found no conflicts, then you have completed the installation process. It is important to note that the Share Emulation server software is covered both by Novell's Limited Warranty and Licence Agreement, and the GNU General Public Licence Terms and Conditions. Copies of both of these documents are included in the binary distribution files.

* Novell also offer a product called IntranetWare NFS Services as an added-value option for NetWare 4.1x servers, and similar products for NetWare 3.x servers called NetWare NFS and NetWare FleX/IP. By using these optional add-ons, it is also possible (again using Acorn's OmniClient) to connect directly to NetWare servers from Acorn RISC OS computers. Note however, that NFS Services is *not* free, it is a commercial product available from Novell Sales Partners.