A Sample Citrix Installation

This document shows a way of using the TCP/IP BOOT-PROM to imple-ment a diskless Windows for Workgroups 3.11 environment for the Citrix Win16 client. This document is not intended to be a detailed step-by-step description, instead we just want to present you the concept of one possible solution.

We assume that you are already familiar with:

- the Citrix WinFrame/WinCenter products, installing and config-uring the Citrix Win16 client.
- the TCP/IP BOOT-PROM and related utilities, installing and configuring BOOTP and TFTP servers, and creating boot image files as described in the TCP/IP BOOT-PROM User's Manual.

Installation Concept

To ease installation and administration of the Citrix Win16 clients, a disk-less environment was chosen. The client PCs start from the network using the TCP/IP BOOT-PROM and download an MS-DOS 6.22 boot image. From within this boot image, a RAM disk is established in the client PC's memory.

Then, by using the TCP/IP BOOT-PROM's capability to transfer files by TFTP, two compressed file archives are downloaded from the server. The first archive contains all necessary WfW 3.11 files, while the second ar-chive contains the Citrix Win16 client files. After downloading, both ar-chives are uncompressed within the RAM disk.

Next, Windows for Workgroups is started from within the RAM disk. Dur-ing startup, WfW loads the protected mode network driver, the TCP/IP pro-tocol (MS TCP/IP-32) and also the Citrix Win16 client.

Now let's have a look at the concept details.

The Boot Image

One major advantage of the TCP/IP BOOT-PROM is that you can start several client PC's using the same boot image. A 'patching' mechanism (implemented by BOOTP 'tags' and the BPUTIL utility program) allows to provide each client PC with its unique configuration parameters. Following, you see the contents of the boot image:

Root Directory

```
SYS             <DIR>
AUTOEXEC BAT
COMMAND  COM
CONFIG   SYS
BPUTIL   COM
BPUTIL   SYS
PKUNZIP  EXE
IO       SYS    (hidden)
MSDOS    SYS    (hidden)
```

Directory SYS

```
HIMEM    SYS
IFSHLP   SYS
RAMDRIVE SYS
```

Configuration file contents

The following excerpt from CONFIG.SYS shows how to 'patch' the AUTOEXEC.BAT and how to establish the RAM disk:

```
...
device=a:\sys\himem.sys /testmem:off
device=a:\bputil.sys -x
devicehigh=a:\sys\ramdrive.sys 6000 /E
device=a:\bputil.sys -a a:\autoexec.batx
shell=a:\command.com /E:3072 /P
...
```

The following excerpts from AUTOEXEC.BAT show how to download and decompress the compressed archives, how to patch the system files and how to start Windows for Workgroups.

```
REM *** RAM disk is drive D:
set WINVER=wfw311
set WFCVER=ica16
d:
a:\bputil -T #@sip########## wfw311/%WINVER%.zip d:/%WINVER%.zip
a:\pkunzip -d %WINVER%.zip
del %WINVER%.zip
a:\bputil -T #@sip########## ica16/%WFCVER%.zip d:/%WFCVER%.zip
a:\pkunzip -d %WFCVER%.zip
del %WFCVER%.zip
```

The archives contain configuration files that have to be patched with information that is unique to each client PC. These files have to be 'patched' by using the TCP/IP BOOT-PROM utility program BPUTIL. As a sample, we show how to patch the SYSTEM.INI file:

```
...
copy d:\wfw311\system.ini a:\system.ini
a:\bputil -a a:\system.ini
copy a:\system.ini d:\wfw311\system.ini
```

Now, we are ready to start Windows for Workgroups and the Citrix Win16 client so that the user can work with it. When the user has finished his work and shuts down Windows, we want to display a message that tells the user to turn off his PC:

```
...
set PATH=d:\wfw311;d:\ica16
set TEMP=d:\wfw311\temp

cd \wfw311
win

cls
echo You can now turn off your computer.
pause > nul
goto msg
```

The following excerpt from SYSTEM.INI shows some of the tags which are replaced by the BPUTIL program:

```
...
[network drivers]
netcard=elnk3.dos
transport=ndishlp.sys
devdir=d:\WFW311
LoadRMDrivers=No

[ms$elnk30]
DefaultGateway=#@yip#########
IPMask=255.0.0.0
IPAddress=#@yip#########
Description=3Com EtherLink III
Binding=ms$elnk3

[MSTCP]
EnableRouting=0
Interfaces=ms$elnk30
deadgwdetect=1
pmtudiscovery=1

[NBT]
LANABASE=0
EnableProxy=0
EnableDNS=0
```

The RAM Disk

The RAM disk contains the necessary Windows for Workgroups 3.11 files as well as the Citrix Win16 client files. Following, you see the contents of the compressed archive WFW311.ZIP

```
SYSTEM          <DIR>
TEMP            <DIR>
CALLPROG EXE
COMPAQ   INI
CONNECT  DAT
CONTROL  INI
CPQMODE  INI
NDDENB   DLL
NDISHLP  SYS
NDISLOG  TXT
PROGMAN  EXE
PROGMAN  INI
PROTOCOL INI
REG      DAT
SERIALNO INI
SYSTEM   INI
TCP32UI  DLL
WFCMGR   INI
WFCWIN   LOG
WIN      COM
WIN      INI
WINSOCK  DLL
```

The subdirectory SYSTEM contains the following files:

```
8514FIX  FON
8514OEM  FON
8514SYS  FON
COMM     DRV
COMMDLG  DLL
CPQGR3   EXE
CPQHQV08 EXE
CPQVDD   EXE
DDEML    DLL
ELNK3    386
GDI      EXE
IFSMGR   386
IOS      386
KBDGR    DLL
KEYBOARD DRV
KRNL386  EXE
LANGGER  DLL
LMOUSE   DRV
LPT      386
LVMD     386
LZEXPAND DLL
MMSYSTEM DLL
NDIS     386
```

```
NDIS2SUP 386
NETWARE  DRV
SERIAL   386
SHELL    DLL
SOUND    DRV
SYSTEM   DRV
TIMER    DRV
USER     EXE
VCOMM    386
VER      DLL
VFAT     386
VGA      3GR
VGA      DRV
VIP      386
VPMTD    386
VTCP     386
VTDAPI   386
VTDI     386
VXDLDR   386
WFCWIN   LOG
WIN386   EXE
WIN87EM  DLL
WSOCK    386
WSTCP    386
WSWAP    EXE
```

Following, you see the contents of the compressed archive ICA16.ZIP

```
CACHE             <DIR>
APPSRV   INI
MODULE   INI
VDCMW    DLL
VDCPM30W DLL
WFCLIENT INI
WFCRUN   EXE
WFCSETUP INI
WFCWIN   LOG
WFCWIN16 LOG
WFCWINW  DLL
WFICA16  EXE
```

Additional Notes

You may have to perform several modifications to implement a configuration that suits your needs. Again, we want to point out that this document does not provide complete step-by-step instructions, it only describes the installation parts related to the TCP/IP BOOT-PROM.