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NET.CFG Parameters for the NetWare DOS Requester 1.1

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NetWare DOS Requester 1.1 contains a number of new NET.CFG parameters that allow the Requester to be fine-tuned for particular environments. Reconnection capabilities have been enhanced, and network administrators have increased flexibility in making memory adjustments and controlling the loading of VLMs. On the Personal NetWare side, new NET.CFG parameters allow for more efficient communications and easier definitions of groups.

Previous AppNotes in This Series

"The Functions and Operations of the NetWare DOS Requester v1.1" (May 94)

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Introduction

In April of 1993, Novell Research published the special NetWare 4.0 edition of *NetWare Application Notes.* The issue contained a rather lengthy write-up on the new NetWare DOS Requester 1.0 that shipped with NetWare 4. Since then, the DOS Requester has gone through a number of enhancements to improve its overall performance and functionality, and has now been upgraded to version 1.1.

This AppNote looks at the following:

- New NET.CFG settings
- Personal NetWare NET.CFG parameters
- Tips for running the DOS Requester

See "The Functions and Operations of the NetWare DOS Requester 1.1," (*Novell Application Notes*, May 1994) for a discussion of the DOS Requester's theory of operations, how the DOS Requester initializes and how it performs a read request.

New NET.CFG Parameters

The new versions of the DOS Requester include a number of expanded NET.CFG settings. Three of these parameters, Auto Retry = 5, Bind Reconnect = ON, and Load CONN Table Low = OFF, were covered in a NetNote called the "Last Minute Changes to the DOS Requester" (*NetWare Application Notes*, June 1993) but are also covered here for reference convenience.

As with the other DOS Requester settings in the NET.CFG file, the settings described here are to be indented under the NetWare DOS Requester heading, with the heading itself flush-left.

Auto Retry = 5. You can use this NET.CFG parameter in conjunction with NetWare's automatic reconnection capabilities. The parameter defaults to five seconds, but can be set between 0 (OFF) and 3640 seconds (60 minutes).

When you receive the "Error reading (or writing) to the network: Abort, Retry, Fail?" message, the Auto Retry parameter will automatically try re-establishing the connection for you every five seconds until it can reconnect to the network or server (in the case of NetWare 3.x and below). You must have the AUTO.VLM module running (place VLM = AUTO.VLM in NET.CFG) in order to use this parameter. If you are reattaching to NetWare 4 servers, you will also need VLM = RSA.VLM in the NET.CFG file in order for re-authentication to work.

Bind Reconnect = ON. The DOS Requester has automatic reconnection capabilities for bindery-based servers (NetWare 3.x and below). With this parameter enabled, the DOS Requester stores the workstation's password in encrypted form in its memory and uses the password when the Requester needs to reestablish server connections. You must have the AUTO.VLM module running (place VLM = AUTO.VLM in NET.CFG) in order to use DOS Requester's reconnection capabilities.

While the bindery reconnection capability is not as secure as Directory Services with its RSA encryption, it's a nice addition to NetWare and can be a lifesaver for Windows users. Of course, a lot depends on how you are running Windows (locally or from the network) and how the applications you are using react to connection loss or to a restored server.

The reconnection capability reestablishes your static resources, such as server attachments, drive mappings, and print capture settings, bringing you back to a state similar to just logging in to the server. However, auto-reconnection can't restore active resources, such as open files or pending print jobs opened for printing.

How reconnection affects you depends on whether or not the server has gone down. If the server has gone down, all the open files in the server cache are lost and most applications don't respond congenially to connection loss during file opens. At this point, you will have to reconstruct previously opened files through the application's automatic back-up capabilities or accept the data loss and use an earlier version of the data file. In the unlikely event that the file has become corrupt because of the server failure, you will have to restore the data file from a backed-up version.

If the server has not gone down and all you lose is a periodic connection because of bad bridging/routing traffic or just excessive traffic, all open files are still in server cache. Once you reconnect to the server, the workstation's applications should continue running. Most applications are not affected by brief connection loses and reconnections.

Load Conn Table Low = OFF. When set to ON, this parameter loads the connection table low enough in memory to be found by NetWare 4 utilities. The memory area is always in conventional memory and should be at an address below 8000:0000.

Auto Large Table = OFF. This parameter works only when you have the AUTO.VLM loaded and you have the Bind Reconnect = ON parameter placed in NET.CFG. Hence, this parameter is used in conjunction with reconnection to NetWare bindery-based servers. When the parameter is set to OFF (the default), you have 34 characters (bytes) to cover both the user's name and password length for each bindery reconnection (name + password + 2 null characters, which actually leaves you with 32 usable characters).

If this is sufficient, use the default. But if you need more characters, place the Auto Large Table = ON setting under the NetWare DOS Requester heading. The On setting extends the number of characters to 178, to accommodate the maximum length of 48 characters plus a null terminator for the user's name and 128 characters plus a null terminator for the user's password.

Exclude VLM = <VLM>. Use this parameter when you want to exclude any of the default VLMs that load automatically. You can use the Exclude parameter instead of the Use Defaults = OFF parameter and then writing out the name of every VLM module you want to include. The VLM modules that are loaded by default are shown in Figure 1.

Figure 1: VLM modules loaded by default.

Modules	***NDS***	***BIND***	***PNW***
CONN.VLM	***R***	***R***	*R*
IPXNCP.VLM	***R***	***R***	*R*
TRAN.VLM	***R***	***R***	*R*
SECURITY.VLM	***O***	***O***	*O*
NDS.VLM	***R***	***O***	*O*
BIND.VLM	***O***	***R***	*O*
PNW.VLM	***O***	***O***	*R*
NWP.VLM	***R***	***R***	*R*
FIO.VLM	***R***	***R***	*R*
GENERAL.VLM	***R***	***R***	*R*
REDIR.VLM	***R***	***R***	*R*
PRINT.VLM	***O***	***O***	*O*
NETX.VLM	***O***	***O***	*O*

Note: Novell's current documentation states that the GENERAL.VLM is optional; however, this is incorrect.

Figure 1 shows which modules are required (R) and which modules are optional (O) for the different operating systems you are connecting to and using. For example, if you are running only NetWare 3.x and are not attaching to any NetWare 4 server, you can place EXCLUDE VLM = NDS.VLM under the NetWare DOS Requester heading, as shown here:

EXCLUDE VLM = NDS.VLM

Exclude only VLMs that are optional for the environment you are working in. For example, PNW.VLM is not required for you to connect to a 3.12 or 4.01 server and can be excluded. Some VLMs, such as REDIR.VLM or CONN.VLM, are required and should not be used with the EXCLUDE VLM parameter.

You can load VLM modules that are not included in the default module list by simply typing VLM = <path><VLM> under the NetWare DOS Requester heading. For example, to load the AUTO.VLM without turning the defaults off, place VLM = AUTO.VLM under the NetWare DOS Requester heading.

Next are three parameters that can be used to delete modules from the default VLM load list (NetWare Protocol, Exclude VLM, and Use Defaults). These parameters are prioritized, and should be listed in the order shown below if you include them in the NET.CFG file.

NetWare Protocol. The settings used in this parameter will not be processed if you list it after the Use Defaults OFF or the Exclude VLM= parameters in the NET.CFG file. Either of the following is correct usage:

```
NetWare Protocol = NDS,BIND,PNW
```

```
NetWare Protocol = BIND,NDS
```

Exclude VLM. If you use the NetWare Protocol parameter, you should place the Exclude VLM parameter *after* the NetWare Protocol parameter (and under the NetWare DOS Requester heading in NET.CFG). If you do not, this parameter can override any changes you make with the NetWare Protocol parameter or with the VLM=<vlm name> parameter. The correct usage is

```
EXCLUDE VLM = NETX.VLM
```

Use Defaults. The Use Defaults parameter will override any changes you make through the NetWare Protocol parameter. The correct usage is

```
USE DEFAULTS = OFF
VLM = CONN.VLM
VLM = IPXNCP.VLM
VLM = NETX.VLM
```

Message Timeout = 0. This parameter allows messages to come and go without your having to press <Ctrl>-<Del> to get rid of the message. The number setting, 0 to 10,000, are clock ticks and not seconds. There are approximately 18.21 ticks per second, so ten seconds are about 182.1 ticks and 30 seconds are roughly 540 ticks.

This parameter can be useful when you are running a program unattended and you don't want it to be interrupted while it's running. In these instances, you can type Message Timeout = 1 <Enter> and messages will disappear without interrupting your work. If you leave it set to 0, you must press <Ctrl>-<Del> to get rid of the message.

Currently, NWPOPUP.EXE in Windows does not support the Message Timeout parameter. Messages displayed in a pop-up box in graphical Windows applications are not automatically cleared.

The Message Timeout parameter doesn't have to be indented under the NetWare DOS Requester heading and can be placed anywhere in the NET.CFG file. However, for consistency sake, it's easier to indent all these parameters and place them under the NetWare DOS Requester heading.

NetWare Protocol = NDS,BIND,PNW. This parameter sets the priority order for the protocols you are using. The default is as shown, with NDS loading first, followed by BIND, then PNW (Personal NetWare).

The priority order determined by the "NetWare Protocol" parameter actually determines the load order of the protocol VLMs, and this load order affects how you attach to servers when your workstation initially comes up. If NDS attaches to a Directory Services server, you are attached to a Directory Services server type. If BIND is the protocol used to attach to a NetWare Directory Services server, your connection is initially a bindery type. This occurs if BIND has a higher priority in the NetWare Protocol parameter list, if

NDS is not loaded, or if a "Preferred Server" parameter points to an NDS-type server (in a NET.CFG file that does not include "Preferred Tree"). In this situation, if NDS *is* loaded, the NetWare 4 LOGIN.EXE utility automatically upgrades the connection type from bindery to NDS.

When using the DOS Requester, the default protocol is NetWare Directory Services, followed by Bindery, and then Personal NetWare. The workstation first searches for "Preferred Tree" or "Preferred Server" statements (discussed below). If neither of these is found, or if the preferred entity does not exist, the VLMs issue a "wildcard" call to connect to the nearest server. The wildcard call uses the load order to determine the sequence of server types it searches for. Since NDS is loaded first by default, the VLMs issue a "Nearest Server Query" for a server type 0278h, which is an NDS-type server. This SAP is issued four times, and if no one replies, it selects the next priority protocol (bindery) and issues the same set of requests with a server type 4 (bindery). If no one responds to these, it finally looks for a PNW server with a login resource. If it does not find any of these, and the "Message Level" is set to 2 or higher, a "File server cannot be found" message is generated. This order of SAPping correlates directly with the NetWare Protocol load order.

Currently, if you use the "Set Reply To Get Nearest File Server=Off" command on a NetWare 4-based server, the server still responds to a "Nearest Server Query" for a "Directory Services Tree." In order for a NetWare 4 server to filter out "Nearest Server Query" requests for a "Directory Services Tree," download 401PT2.EXE from Library 1 or 4 in the NOVLIB forum of CompuServe, and load PM401.NLM and GNSOFFFX.NLM. The GNSOFFFX.NLM allows you to filter out "Nearest Server Query" requests for "Directory Services Tree" packets, while "Set Reply To Get Nearest File Server = OFF" will filter out the "Nearest Server Query" for "File Server" packets.

Note: DS servers can respond to "Nearest Server Query" SAP (Service Advertising Protocol) packets for both "File Server" and "Directory Services Tree" SAP packets. This is because a NetWare 4 server advertises two types of services. It advertises file services by placing the file server name and 0004 in a SAP packet. It also advertises Directory Services by placing the tree name and 0278 in a SAP packet.

Figure 2 covers selected protocol load orders. It does not cover Personal NetWare configurations or configurations where only NDS or Bind is loaded.

Figure 2: Protocol load orders.

Protocol Load Order	Preferred Server	Preferred Tree	Result	Server Type
NDS, BIND	*	*	Get Nearest Directory Services Tree	0278
NDS, BIND	*		Get Nearest File Server	0004
NDS, BIND		*	Get Nearest Directory Services Tree	0278
NDS, BIND			Get Nearest Directory Services Tree	0278
BIND, NDS	*	*	Get Nearest File Server	0004
BIND, NDS	*		Get Nearest File Server	0004
BIND, NDS		*	Get Nearest Directory Services	0278

			Tree	
BIND, NDS			Get Nearest File Server	0004

Note: An asterisk (*) in the Preferred Server or Preferred Tree column indicates that the NET.CFG file was using that parameter for the test. For example, line 1 indicates that NDS.VLM loaded first, BIND.VLM loaded second. The NET.CFG file had both a Preferred Server and a Preferred Tree statement, and the Result column shows a "Nearest Server Query" for a "Directory Services Tree" by using a server type 0278 in the SAP packet.

The VLMs will only use either the Preferred Server or the Preferred Tree parameter, but not both at the same time. This is how it works.

First the VLMs issue a command to get the preferred connection type (preferred protocol). If the preferred protocol is NDS, as in the first four examples in Figure 2, the VLMs will first check for a preferred tree statement. If the VLMs find a preferred tree statement, they issue a "Nearest Server Query" for a Directory Services tree and specify the preferred tree name. They will not check for a Preferred Server statement, since a preferred tree setting was found.

If the VLMs do not find a Preferred Tree statement and if BIND is an included protocol, they next check for a Preferred Server setting. If you specify a preferred server, the VLMs issue a "Nearest Server Query" for a Directory Services tree, and specify the preferred server connection. If you don't specify either a Preferred Tree or Preferred Server, the VLMs issue a "Nearest Server Query" for each type included in the NetWare Protocol list, in order.

If the preferred protocol is BIND, as shown in the last four examples in Figure 2, the VLMs will check for a Preferred Server statement first. If the VLMs find a Preferred Server statement, they issue a "Nearest Server Query" for a file server, specifying the preferred server name, and do not check for a Preferred Tree statement.

If the VLMs do not find a Preferred Server statement, they will next check for a Preferred Tree statement, provided NDS is an included protocol. If you specify a Preferred Tree, the VLMs will issue a "Nearest Server Query" for a directory server, and specify the preferred tree connection again. If you don't specify either a Preferred Server or Preferred Tree, the VLMs will issue a "Nearest Server Query" for each type included in the NetWare Protocol list, in order.

The reason the VLMs will use either a Preferred Tree or a Preferred Server parameter, but not both, is due to the initial SAP packet sent. If you set the Preferred Tree statement, the DOS Requester issues a SAP packet with a "Nearest Server Query" for a Directory Services tree. If you set the Preferred Server parameter, the DOS Requester issues a SAP packet with a "Nearest Server Query" for a file server. The server type (i.e., 0004 or 0278) in the SAP packet determines what type of preferred connection you can request.

PBurst Read Window Size = 16. This parameter specifies the number of packets outstanding before the server sends back an acknowledgement to the workstation for a read request. The default is 16 packets within a window. Values range from 2 to 64.

The Packet Burst code of the FIO.VLM tests the bandwidth to see the maximum throughput and negotiates the window size. Window Size is one half of the data-transfer-on-the-wire equation. The other half is the maximum data size of a burst. The ceiling of the data size is 64 packets with the DOS Requester 1.1 release. To illustrate, if you set the Window Size to 64 and you are running Ethernet (in a 1500 byte packet setting), this would equal 96 KB worth of packets in a window before an acknowledgement is sent back to the workstation.

In many instances, setting this high will not decrease your performance. However, for local networks, you won't see an increase in performance either. Resizing windows was implemented to assist with slow-link

WAN connections.

With Packet Burst, you can reduce the ratio of acknowledgements to packets sent. On a local network, this can greatly decrease your overall network traffic. On limited links, Packet Burst substantially improves your overall throughput. (See "Packet Burst Update: BNETX vs. VLM Implementations," *NetWare Application Notes*, Nov., 1993.)

PBurst Write Window Size = 10. The Write Window Size works the same way as the Read Window Size. This parameter specifies the number of packets outstanding before a server sends an acknowledgement back to the workstation for a write request. In this example, 10 is the number of packets within a window. Values range from 2 to 64.

In some instances, setting this high may decrease your overall server performance. This is due to getting large amounts of data off the network, freeing up cache blocks for the new information, as well as read-after-write verifications on data written to disk. In NetWare 3.12 and below, writing to disk takes precedence over file reads, which will slow down server read requests. However, this anomaly is not a factor NetWare 4. (For more information on NetWare 4's optimization features, see "NetWare 4.0 Performance Tuning and Optimization: Part 1," *NetWare Application Notes*, May, 1993.)

Minimum Time To Net = 5000. This parameter allows the user to override the "time-to-network" value that is obtained from the local router during connect time. You will need to use this parameter when the "time to net" obtained from the router is too low for bridged WAN/Satellite configurations and the workstation "times out" or hangs during the connection process. The parameter value is in milliseconds and can range from 0 to 65535 (a value of 1000 = 1 sec).

A good value to try is 7500. If the initial connection fails, the DOS Requester uses the default of 5 seconds (5000) as a timeout. But if the 5 second value is too low, the initial connection will fail. However, do not set this value artificially high, because it can have an adverse affect on performance.

Local links are defined as 1 tick (default) for each hop a server is away from the router. However, a T1 link might show a server 1 hop away, but actually have a delay of 5-7 ticks, or 1/3 of a second. A server might show up 1 hop away (assumed to be 1 tick), but actually have a much larger time to net value.

You must use the Minimum Time To Net parameter when linking through a WAN/Satellite connection to NetWare 2.x or NetWare 3.11 servers that cannot or do not load the PBURST.NLM. These servers do not support the LIP (Large Internet Packet) echo socket used to measure the actual time to net. You may also need to use this parameter when linking at 2400 baud or less.

Timeouts now are based on the initial workstation-to-server-to-workstation round trip calculated at connect time. If the LIP echo socket is not supported on a server, the DOS Requester uses a default of MLID transport time (in ticks) * 4 ticks + 10 ticks (there are roughly 18 ticks in a second).

Note: The MLID Transport Time is one-way only and not a round-trip measurement. The MLID Transport Time can be obtained by issuing an IPXGetLocalTarget API call. The AH register will contain the HOPS and the CX register will contain the TICKS to the router/server responding to the IPXGetLocalTarget request.

Default Changes

Two changes have been made to the NET.CFG default settings.

Cache Writes = On. This parameter defaulted to Off during beta testing (and our consequent write-up), but now defaults to On for product shipment. You can see performance improvements by leaving this parameter set to On. But if you are confused as to how you are presently running, put Cache Writes = On (indented) under the DOS Requester heading in the NET.CFG file to end all doubts.

Cache Buffer Size = maximum media size minus 64 bytes. The DOS Requester sets this parameter dynamically to your media type, minus 64 bytes. The actual size varies, but since this is dynamically configured, you won't need to set this parameter.

Personal NetWare NET.CFG Parameters

Personal NetWare comes with a number of NET.CFG settings to help set up and maintain Personal NetWare connections, as well as define its environment. The list includes Broadcast Retries, Broadcast Timeout, Broadcast Send Delay, Preferred Workgroup, Workgroup Net, and Responder.

Broadcast Retries = 3. This parameter determines how many times the PNW module will retry when broadcasting to its communications partners if a request is not answered. Broadcast retries ensure you have gathered all the resources within the workgroup. If the number is too low, the workstation may not gather all its resources. The default is 3, but you can set retries from 1 to 255. You may want this number higher if you are running Personal NetWare through a serial or modem connection, or if your workgroup extends through bridges or routers and you have problems including all stations.

Broadcast Timeout = 2. This number determines how many "ticks" before the current broadcast for information gathering times out. There are roughly 18.21 ticks per second for IBM PCs and compatibles. The default is 2 and you can set retries between 1 and 255. You may want this number higher if you are running Personal NetWare through a serial or modem connection, or if your workgroup extends through bridges or routers and you have problems including all stations.

Broadcast Send Delay = 0. This number determines how many "ticks" between the times the DOS Requester broadcasts for information over the networks. There are roughly 18.21 ticks per second for IBM PCs and compatibles. The default is 0, which is fine for Ethernet, Arcnet, Token-Ring, and all fiber media transfer protocols. If you are running Personal NetWare through a serial or modem connection, you may want this number higher, so you don't flood the wire and give the connection time to respond. You can set retries between 0 and 255.

Preferred Workgroup = Name. This entry allows you to designate a name for a Personal NetWare workgroup. The entire parameters for a workgroup name include the name and ID in 16 bytes. This can be very handy when running Personal NetWare under native NetWare.

With a Workgroup Name defined, you can keep your local activities more secure by allowing certain resources to be made available locally. Only those workstation in the same workgroup name can access resources within that group. You can be a member of only one workgroup at a time; however, you can combine workgroups to extend the services users can access.

Workgroup Net = network address:node address. The Workgroup Net parameter can help segment the number of users who have access to your particular resources. The addresses are eight hexadecimal characters, followed by a colon, followed by twelve hexadecimal characters. For example, if you set Workgroup Net = FADEABAB:FFFFFFFF and Workgroup Name = ADMIN, only those workstations who share these two name sets will have access to your resources. (You can use twelve Fs to broadcast to all nodes on the local network.) This parameter defaults to none.

Personal NetWare keeps track of up to 10 different workgroup network segments. Network segments don't need to be an immediate router hop away, but can span the entire internetwork. You also don't need to be on the same physical network segment to be a part of a workgroup network segment.

Responder = On. This entry allows the PNW module to receive broadcasts for information about the workstation, either general information or diagnostic information (for modules such as the NMR VLM). If you set this entry to OFF and typed NET ULIST, you wouldn't see yourself or anyone else who has also set this entry to OFF. Setting this parameter to OFF also cuts down on the amount of memory the Global Swap Block needs to run.

DOS Requester Tips

The following tips cover memory management and performance issues as well as interpreting the diagnostic screen that you see when you type VLM /D <Enter> from the directory containing the DOS Requester. This explanation is followed by some commonly-asked questions and answers about the DOS Requester.

General Rules for Determining VLM Memory Usage

The DOS Requester and EMM386.EXE. Suppose you are running MS- or PC-DOS 5.0 and above and you load HIMEM.SYS and EMM386.EXE but you do not put DOS=UMB in the CONFIG.SYS file. (This entry tells DOS that there is UMB memory that it can use to load TSRs.) If you use such a setup, the DOS Requester communicates directly with the memory manager instead of with DOS and uses the UMB memory.

If you do not use DOS=UMB in the CONFIG.SYS but you want to see if the DOS Requester is using upper memory blocks, you can type VLM /D <Enter> in the directory from where you load the DOS Requester. Look at the memory location in the VLM Transient Block and the VLM Global Seg entries. If the Transient Swap block or Global block are in conventional memory, they will have a memory address beginning with 0 through 9. If the memory address begins with a letter A through F, they are residing in UMB memory. UMBs must be contiguous and large enough to hold either the entire Transient Swap or Global block (or both) before they can load high.

However, it's best to put in the line DOS=UMB and DOS=HIGH so you can load TSRs into UMB memory through the DEVICEHIGH and LOADHIGH command. The DOS=HIGH entry will load as much of the DOS kernel into HMA (High Memory Area) as it can.

If you are using MS-DOS and PC-DOS, you can type MEM /D <Enter> to see a detailed workstation memory summary. You can also type MEM /M:VLM <Enter> to see how much memory the DOS Requester is using once it is loaded into memory. The following information appears when you type MEM /M:VLM:

```
VLM is using the following memory:

  Segment  Region       Total        Type
  -------  ------  ----------------  --------
   00D7F              4864    (5K)   Program
   0CE01       2     34208   (33K)   Data
   0D65B       2      9536    (9K)   Data
                   ----------------
  Total Size:        48608   (47K)
```

In this example, the segment beginning with 00 (VLM.EXE) is loaded into conventional memory, while the 0C segment (the Global block) and the 0D segment (Transient Swap block) are loading into UMBs. (00000-09999 addresses are in conventional memory and 0A000-0FFFF addresses are in UMB memory.) So in this instance, the Global block and the Transient Swap block are loaded into UMBs, while the DOS Requester is loaded into conventional memory.

UMBs must be contiguous and large enough for VLM.EXE, the Transient Swap block, or the Global block to load into UMBs. Sometimes the Transient Swap block will load into UMBs while the Global block won't be able to a find large enough contiguous block to move out of conventional memory. (The Global block tries first to move out of conventional memory, then the Transient Swap block.)

If you are running DRDOS 6.0 or Novell DOS 7.0, type MEM /AP <Enter> to see a detailed memory summary.

The workstation installation program copies about 100 unicode table files for all languages and code pages to the workstation. Users using American English need only the following files:

UNI_COL.001
UNI_MON.001
1252_UNI.001

UNI_1252.001
437_UNI.001
UNI_437.001
850_UNI.001
UNI_850.001

Note: The files you need will vary, depending on the client kit version. For example, the 1.10 kit does not include the 437 or the 850 files. Simply keep all files with the .001 extension.

If English is the only language you are using, you can delete the other unicode tables (all files without a .001 extension) and save on disk space. The total number of unicode files take about 243KB, and the needed files for American English take about 14.7KB (depending on the client kit you are using).

The DOS Requester's Diagnostic Screen

There are a number of items in the diagnostic screen that can help you better understand how the DOS Requester is using the workstation's memory. To see the diagnostic screen, go to the directory where you load the DOS Requester and type VLM /D <Enter>. You will see a screen similar to Figure 3.

Figure 3: DOS Requester diagnostic screen.

```
VLM.EXE      - NetWare virtual loadable module manager  1.10 (931209)
(C) Copyright 1993 Novell, Inc. All Rights Reserved.
Patent pending.

The VLM.EXE file 1.10 is currently loaded
VLM transient switch count : 294
VLM call count             : 844
VLM current ID             : 0040h
VLM memory type               : XMS
VLM modules loaded count      : 12
VLM block ID (0 if CON)    : A908h
VLM transient block           : D65Ch
VLM global seg (0 if CON)     : CE02h
VLM async queue (h, t, s)     : 0000:0000, 0D90:0030, 0
VLM busy queue (h, t, s)      : 0000:0000, 0D90:003C, 0
VLM re-entrance level         : 1
VLM full map count            : 292

VLM diagnostic information             Address        Memory Sizes (decimal)
NAME     ID   Flag Func Maps Call TSeg GSeg Low  High  TSize  GSize  SSize
-------- ---- ---- ---- ---- ---- ---- ---- ---- ----  -----  -----  -----
VLM      0001 A000 0005 0000 0173 0D90 0859 FFFF 0000   4848      0      0
CONN     0010 B000 0011 0000 00BA CE02 CEC6 FFFF FFFF   3136    384   6688
IPXNCP   0021 B000 000B 0000 001B CEDE CFFB FFFF FFFF   4560   2928   1952
TRAN     0020 E000 000B 0001 0029 CEDE CFFB FFFF FFFF    285    183   1952
SECURITY 0061 A000 0005 0007 0006 D65C D0B2 0000 0000   4192      0   3280
NDS      0032 A000 0010 0015 0014 D65C D0B2 1060 0000   5952    896    992
BIND     0031 A000 0010 001F 0008 D65C D0EA 27A0 0000   2992    448    720
NWP      0030 A000 0011 000F 000A D65C D106 3350 0000   2960   1824   1216
FIO      0041 A000 000B 0007 0006 D65C D178 3EE0 0000   6832  10176    400
GENERAL  0043 A000 000A 001A 0017 D65C D3F4 5990 0000   1744    624   1328
REDIR    0040 A000 0009 0072 005F D65C D41B 6060 0000   9520   2400   1216
PRINT    0042 A000 000F 0017 0014 D65C D4B1 8590 0000   3936   2800   1520
NETX     0050 A000 0007 0031 0020 D65C D560 94F0 0000   8992   4016   2112
Total                                                  59664  26496
Maximum                                                 9520  10176   6688
```

The DOS Requester 1.1 diagnostics screen contains two changes. The modules names are now displayed under the Name column at the far left of the bottom screen of information. The three Memory Sizes columns show the module sizes in decimal (actual byte sizes) rather than hexadecimal numbers that you needed to convert to decimal.

Other than that, the actual information has not changed. Here are some tips on interpreting some of the information you see on the diagnostics screen.

Note: If you have installed the DOS Requester 1.10 and you don't see a screen in the same format as the one above, you might be using an old DOSRQSTR.MSG file. To resolve this, go into the \NWCLIENT\NLS\ENGLISH (or your corresponding language) directory and rename the DOSRQSTR.MSG file to something like DOSRQSTR.OLD. The 1.10 screen will then appear as you see above.

To see what type of memory the transient portion of each VLM loads into, look under the VLM Memory Type entry. You will see CON for conventional, XMS for extended memory, or EMS for expanded memory. You can see the transient portion of each module under the "Memory TSize" column in the bottom half of the screen. This is the portion of the module that is swapped in and out of the Transient Swap block. The largest transient module portion (REDIR in the above example) is the size of the Transient Swap block.

The total number of modules and their transient portion sizes under Memory Tsize column are loaded into the memory type that you see listed in the VLM Memory Type entry. The above example shows that XMS memory is being used to hold the transient portions of the modules.

The Maximum row at the bottom of the screen has an entry from the Memory TSize column. This entry is the "worst case" swap from XMS/EMS to conventional memory and matches the Transient Swap block size that must either be located in conventional or in UMB memory.

If the Address Low column for a VLM module is FFFF, it means the module is loaded in conventional memory. By default, VLM.EXE, CONN.VLM and IPXNCP.VLM load low and have their Address Low entry to equal FFFF. When you see this, the transient portion of the modules under the Memory TSize column is actually loading in conventional or UMB and not in XMS/EMS memory.

You can verify this by looking at the Address TSeg column for the VLM, CONN and IPXNCP modules, which shows an address either in conventional memory, or UMB memory (if available). To load the "transient" portion of CONN and IPXNCP into XMS/EMS, add the following lines to NET.CFG:

```
Load Low CONN = OFF  {default is ON}
Load Low IPXNCP = OFF  {default is ON}
```

Note: These parameters decrease conventional/UMB memory usage and affect your overall performance.

VLM.EXE shows 0 under Memory GSize column; however, it takes about 4.8KB of conventional memory (or 4.8KB of UMB memory if you load the program high--LH VLM <Enter>). The VLM.EXE has its entry under the Address Low column equal to FFFF, which means the memory listed under the Memory TSize column is actually loaded in conventional or UMB memory, rather than XMS or EMS memory.

The Memory GSize column lists the global memory requirement of each module, including any changes you make through the NET.CFG parameters. The Memory GSize memory consists of Interrupt handler ESRs (Event Scheduled Routines), buffers passed as pointers, as well as asynchronous events, and must be located in conventional or in UMB memory at all times. Those elements that don't always need to be in conventional or UMBs are placed in the transient portions of the modules.

Commonly Asked Questions

Q. I am seeing a slowdown using packet burst over a wide area network. What can I do?

A. On CompuServe, go to NetWire's NOVLIB Forum, Library 5 and download PBURST.EXE in order to receive the server packet burst update. The file consists of PM312.NLM and PBWANFIX.NLM for NetWare 3.12, PM401.NLM and PBWANFIX.NLM for NetWare 4.01, and a new PBURST.NLM for NetWare 3.11. These new files must be used with the NetWare DOS Requester (VLMs) 1.10 to gain performance on WAN links.

Q. Why do I need to run PATCHMAN with 3.12 or 4.01 in order to use the new packet burst for WAN links?

A. Packet Burst and Large Internet Packet (LIP) support are built into the OS in 3.12 and 4.01. In order to modify the packet burst algorithm and to increase performance over WAN links, the method requires a patch to the operating systems.

Q. Can I disable Packet Burst at the file server?

A. If you are running NetWare 3.11, unload the PBURST.NLM to disable Packet Burst. NetWare 3.12 and NetWare 4.01 currently have no set parameters that allow packet burst to be disabled. You can disable Packet Burst at the workstation by adding the line PB BUFFERS=0 to the NET.CFG file.

Q. Can I disable LIP at the file server?

A. Yes. On a NetWare 3.11 server that has PBURST.NLM loaded, or on NetWare 3.12 or 4.01 servers, type SET ALLOW LIP=OFF <Enter> at the file server console.

Q. Where can I obtain the latest version of the NetWare DOS Requester (VLMs) 1.10?

A. You can get the VLMs (excluding the TCPIP.EXE file and the SNMP and PNW modules) from CompuServe in the NOVFILES forum. The file name is called DOSUP9.EXE. You can also obtain the file from the anonymous Novell FTP server called FTP.NOVELL.COM. On the FTP server, select the NETWIRE\NOVFILES area, and the file is also named DOSUP9.EXE.

Registered NetWare 4.01 and 3.12 users will receive periodic updates. The entire kit (including TCPIP.EXE file and the SNMP and PNW modules) will be part of the 4.01 and 3.12 update.

You can also obtain the entire kit (including the TCPIP.EXE file and the SNMP and PNW modules) by ordering the kit via 1(800) UPDATE1, part number 00662644013411. The charge is $99.00 for a corporate-wide license.

Q. Do I need to update my Windows drivers when using the DOS Requester 1.10?

A. Yes. The new drivers are located in WINUP9.EXE in the NOVFILES area of CompuServe, or on the FTP.NOVELL.COM server under the same file name.

Q. Are the Windows drivers the same for both NETX.EXE and VLM workstations?

A. No. All current Windows drivers are compatible with both NETX and the VLMs except NETWARE.DRV, NETWARE.HLP and NWUSER.EXE files. The README file that comes with WINUP9.EXE explains what files need to be in which directory for both NETX and VLM workstations.

Q. I am still using NETX.EXE and need a version of the shell that supports MS-DOS 6.2, 6.21 or PC-DOS

6.1. Where can I obtain the new shells?

A. Either from DOSUP9.EXE in the NOVFILES area of CompuServe, or from NET33X.EXE in the NOVLIB area of CompuServe, Library 5.

You can also use the work-around explained in the answer to the MS-DOS 6.21 question later in this AppNote.

Q. Auto reconnect does not appear to be working. What can I do?

A. Check the workstation's NET.CFG file and see if it contains the elements shown in Figure 4 (depending on which version of NetWare you are running):

Figure 4: Workstation NET.CFG settings.

NetWare DOS Requester	For	General Information
VLM=AUTO.VLM	Bind & NDS	This module does not load by default.
VLM=RSA.VLM	NDS Only	Needed only for DS connection re-authentication.
Auto Retry= xx	Bind & NDS	XX is a value in seconds between retries.
Bind Reconnect = On	Bind Only	Allows bindery connections to be rebuilt.
Auto Large Table = On	Bind Only	Use for bindery connections if your username\password combination is greater than 32 characters.

Q. When I use MS-DOS 6.21, the workstation gets mapped to the SYS:PUBLIC\IBM_PC\MSDOS\V6.20 directory for DOS utilities and the COMMAND.COM processor. This causes "Invalid COMMAND.COM" or other errors. Why won't the VLMs or NETX map to the correct directory?

A. There is a problem with how MS-DOS 6.21 reports its version number. You find out what DOS version you are running by typing VER <Enter> at the DOS prompt. With MS-DOS 6.21, this returns "MS-DOS Version 6.21."

However, VLMs or NETX determine what version of DOS they are running on by issuing an Int 21h-Function 30h (Get DOS Version) call. When they issue the Int 21h-Function 30h interrupt call, they test the AL register for the major DOS version, and the AH register for the minor DOS version. In the case of MS-DOS 6.21, it returns 06 for the major version and 20 for the minor version.

Because of this, MS-DOS 6.21 internally reports itself as 6.20 instead of 6.21. This is similar to the problem with DOS 4.01, which internally reported itself as DOS 4.00. In other words, this is not a NetWare Shell or a DOS Requester problem, since they are relying on DOS to return the correct DOS version when they issue an Int 21h-Function 30h call.

You can test your current DOS version by using DEBUG. When you type DEBUG <Enter>, the following information appears:

```
a 100               {for assemble}
MOV AX,3000         (for Function 30h--type in ALL CAPS)
INT 21              (for INT 21h--type in ALL CAPS)
<Enter>             (press <Enter> to exit the assembler, and return to the "-" debug prompt)   p
<Enter>
p <Enter>
q <Enter>           (to quit)
```

Once you type the second P and press <Enter>, check the AX= register. For MS-DOS 6.20 it will look like this:

```
AX=1406
```

14 is the minor version where 14 hex=20 decimal, and 06 is the major version where 06 hex = 6 decimal. Therefore, the DOS version reported internally is 6.20.

However, MS-DOS 6.21 also reports AX=0x1406 in the AX register. In this case, 14 is the minor version where 14 hex=20 decimal, and 06 is the major version, where 06 hex = 6 decimal. Therefore, the DOS version reported internally is also 6.20 and not as 6.21.

To be correct, MS-DOS 6.21 should have AX=1506 in the AX register. 15 should be the minor version where 15 hex = 21 decimal, and 06 is the major version, where 06 hex = 6 decimal. The DOS version would then report itself internally as 6.21.

Because of this, login scripts end up mapping MS-DOS 6.21 users to the wrong DOS version. The default login script, as well as many system login script files contain the following commands:

```
MAP INS S1:=SYS:PUBLIC
MAP INS
S2:=SYS:PUBLIC/%MACHINE/%OS/%OS_VERSION
```

The %MACHINE variable applies to the Long Machine Type= <Name> parameter in the NET.CFG file and defaults to IBM_PC. The %OS variable applies to the DOS Name= <Name> parameter in the NET.CFG file and defaults to MS-DOS. The %OS_VERSION variable applies to the DOS Version returned from DOS Int 21h Function 30h, which is the "Get DOS Version" function.

MS-DOS 6.21 users will be mapped to the SYS:PUBLIC\ IBM_PC\MSDOS\V6.20 directory by default because Int 21h-Function 30h returns 6.20 as the DOS version. Until the Int 21 Function 30 call returns the correct DOS version for MS-DOS 6.21, users will have to use the work-arounds that are similar to when you are using both DOS 4.00 and 4.01 versions.

Work-around Option #1. Add the following line to the workstation's CONFIG.SYS file:

```
DEVICE=SETVER.EXE
```

At the DOS prompt, type

```
SETVER VLM.EXE 6.21 <Enter>
```

to add VLM.EXE to the setver table. Then at the DOS prompt, type SETVER <Enter> to list the elements in the setver table, making sure VLM.EXE was correctly added to the table.

Note: You can remove VLM.EXE from the SERVER table by typing SETVER VLM.EXE /D <Enter>. But only do this when you no longer need SETVER to report the correct DOS version to VLM.EXE.

Reboot the workstation, and load the network software. You can use this same work-around for workstations with NETX.EXE. Simply replace VLM.EXE with NETX.EXE for steps in work around option #1.

Work-around Option #2. Upgrade all workstations from MS-DOS 6.20 to MS-DOS 6.21, and place the MS-DOS 6.21 files in the SYS:PUBLIC\IBM_PC\MSDOS\V6.20 directory. This allows the default mapping of SYS:PUBLIC\IBM_PC\MSDOS\V6.20 to work for 6.21 MS-DOS users.

Summary

The new versions of the DOS Requester include a number of expanded NET.CFG settings. These settings allow for reconnection services, memory adjustments, and tighter control over the loading of VLMs. Changes to default NET.CFG settings also bring improved performance. In addition, Personal NetWare comes with a number of NET.CFG settings to help set up and maintain connections and define the environment.