Novell(R) LANalyzer(R) for Windows(tm) 2.1 LZREAD.ME File

This LZREAD.ME file contains additional information about Novell LANalyzer for Windows
2.1. It consists of the following sections:

1. System requirements
2. Additional information about the installation process
3. Suggestions to improve overall performance
4. Questions and answers (after installation)
5. Known problems
6. Running LANalyzer for Windows from a NetWare(R) server
7. How the Station Monitor sorts
8. How the Station Monitor works
9. Performance

Section 1: System requirements

The following hardware and software are minimum requirements for running LANalyzer for Windows 2.1:

  o 80386- or 80486-based PC/AT* or PS/2*-compatible computer with at least 5 MB of disk space available for LANalyzer for Windows,
     4 MB of RAM, and one 5.25-inch or 3.5-inch high-density floppy diskette
  o DR DOS(R) 6.0, Novell DOS(tm) 7.0 or later, or MS-DOS* 3.3 or later
  o Microsoft* (MS) Windows 3.1
  o An Ethernet or token ring network adapter (with the corresponding driver)

Section 2: Additional information about the installation process

The installation is a three-step process:

1. LANalyzer for Windows software installation
     o Expand and copy product files to the specified directory (hereafter referred to as <product> directory).
     o Copy the LANalyzer for Windows LZFW.INI file to the WINDOWS directory.

2. System setup

After installing all necessary files, SETUP updates the following files:
o NET.CFG, as needed
o SYSTEM.INI (Windows) to include the two virtual drivers, VCAFT.386 and VTXRX.386, as needed
o AUTOEXEC.BAT to include the two TSRs DI.COM and APPLE.EXE as needed

For each file to be modified, you have two choices:
o Let SETUP back up the current file and update the file accordingly.
o Leave the file untouched and have SETUP provide a sample file.

SETUP creates a program group and icons for LANalyzer for Windows. If they already exist, they are replaced.

3. NetWare Expert(tm) Tutorial Installation
    The installation allows you to install the NetWare Expert Tutorial. If you choose not to install the tutorial, you can install it later. You need about 5 MB of disk space to install the tutorial.

If you are updating LANalyzer, make sure that drivers from the previous version are not used with version 2.1. Although the installation process ensures this in most cases, you might be required to update some batch files. If you place commands in your AUTOEXEC.BAT file to load DI and APPLE automatically, make sure these commands point to the new version of DI and APPLE. LANalyzer for Windows does not work with previous versions of these drivers.

Section 3: Suggestions to improve overall performance

For better overall system performance, you should minimize your usage of DOS conventional
memory and provide as much extended memory as possible.

Sample CONFIG.SYS and AUTOEXEC.BAT files for systems with MS-DOS 5.0 follow. Depending on your system configuration, you can use all or some of the suggestions.

Sample CONFIG.SYS file:

```
DEVICE              = C:\DOS\HIMEM.SYS
DEVICE              = C:\DOS\EMM386.EXE NOEMS
DOS          = HIGH,UMB
BREAK               = ON
BUFFERS      = 10
FILES        = 30
STACKS              = 9,256
DEVICEHIGH   = C:\DOS\ANSI.SYS
DEVICEHIGH   = C:\DOS\SMARTDRV.SYS 1024
DEVICEHIGH   = C:\DOS\RAMDRIVE.SYS 1024 /e
SHELL        = C:\DOS\COMMAND.COM C:\DOS\ /e:1024 /p
LASTDRIVE    = f
```

In your AUTOEXEC.BAT file, you might want to add the following lines to load the drivers
into high memory (assuming that you have your driver directory on your PATH).

```
LOADHIGH C:\NWCLIENT\LSL
LOADHIGH C:\NWCLIENT\NE2000
LOADHIGH C:\NWCLIENT\IPXODI
LOADHIGH C:\NWCLIENT\VLM
LOADHIGH C:\LZFW\APPLE
LOADHIGH C:\LZFW\DI
```

If you get the error message "cannot execute <program name>" or other errors when loading
these drivers high, try loading some of them normally, in low memory.

Section 4: Questions and answers (after installation)

This section answers common questions that you might have after you complete the installation:

1. **What do I need to load before I run Windows and LANalyzer for Windows?**

   You must load the following software:
   o LSL.COM (version 2.0 or later)
   o The driver for the network adapter you have installed in your PC
   o IPXODI.COM (version 2.01 or later)
   o VLM.EXE or NETX.EXE
   o DI (LANalyzer for Windows 2.1 terminate-and-stay-resident (TSR) file)
   o APPLE (LANalyzer for Windows 2.1 TSR)

   To check the version for a driver, run it using a question mark (?). For example: LSL ?

2. **Can I run LANalyzer for Windows without VLM.EXE and IPXODI.COM?**

   Yes. However, some of the LANalyzer for Windows functionality is disabled. If you do not load VLM.EXE before running Windows, you cannot gather NetWare names on Ethernet or token ring networks. If you do not load IPXODI.COM before running Windows, you do not get IPX(tm) server or router alarms and the server and router monitor screens are disabled.

3. **Why do I get the following messages when I load Windows?**

   ```
   VCAFT: LANalyzer for Windows requires DI TSR to be loaded
        PRIOR to running Windows.
   ```

   You must load the DI.COM TSR before you run Windows, as explained in the
   answer for question #1.

4. **Why do I get the message "LSL is not loaded" when I try to load DI or APPLE?**

You must load the ODI drivers before you load DI and APPLE, as explained in the answer for question #1.

5. **Why do I get the messages "No supported drivers found," or "No MLID driver loaded"**
   When I try to load DI or APPLE?

Either you have not loaded the driver for your network card or you have not used a driver that support the 'promiscuous' mode that is needed for LANalyzer for Windows.

6. Why do I get the message "VCAFT.386 is not loaded...." or "VTXRX.386 is not loaded...." when invoking LANalyzer for Windows?

You should have the following lines in your SYSTEM.INI file, in the [386Enh] section:

device=<product>\vcaft.386
device=<product>\vtxrx.386

where <product> is the directory in which you installed LANalyzer for Windows. Also check to ensure that these files are in your LANalyzer for Windows directory.

Otherwise, the problem might be caused by not loading the DI or APPLE TSRs before running Windows.

7. Can I use LAN WorkPlace for DOS while running LANalyzer for Windows?

Yes.

8. Do I need to be logged in to a NetWare server to run LANalyzer for Windows?

No. However, you must log in if you want to access the server while you are running LANalyzer for Windows.

Section 5: Known problems

1. LANalyzer for Windows might not run correctly in some PCs if you use either an EXOS(tm) 205 adapter or an Ethernet LANalyzer adapter in a 16-bit slot. In these cases, you can install the adapter in a 16-bit slot but force the adapter to work in 8-bit mode. Please refer to your hardware installation manual to configure your adapter accordingly.

2. If you use either an EXOS adapter or an Ethernet LANalyzer adapter in an EISA- or MCA-
based PC, and you don't specify the optional MEM parameter in your NET.CFG file, you
must insert a statement in your SYSTEM.INI file, in the [386Enh] section, to exclude
the memory area used by your adapter. For example:

EMMEXCLUDE=CC00-CFFF for an EXOS adapter
EMMEXCLUDE=D000-DFFF for an Ethernet LANalyzer adapter

3. When using a shared memory Ethernet adapter, ensure that the adapter interrupt level is set lower than that of the mouse. Therefore, if the mouse is on COM1, its interrupt is IRQ4. The adapter interrupt should be IRQ3 or less.

4. LANalyzer for Windows does not set any display options for LANalyzer 3.11 when saving a trace file. You can load the LANalyzer for Windows trace file with LANalyzer 3.11. To set screen options select 'decode options' and then select 'Display Options.'

5. If you are using a COMPAQ* 386/33L or COMPAQ DESKPRO* 386/20e with the LANZENET adapter, LANalyzer for Windows might crash at high network loads.

6. If you are using the EXOS205 or LANZENET network interface adapters, you might see good packets erroneously reported as Undersize Errors.

7. Setting a very large capture buffer causes Windows to page memory in order to accommodate the buffer, causing other applications to be paged out of memory. This might cause problems for these other applications.

Section 6: Running LANalyzer for Windows from a NetWare server

You can install LANalyzer for Windows on a NetWare server and invoke it from your
NetWare workstation. The following steps are required to complete the installation:

1. Install LANalyzer for Windows as you would normally on your PC. Specify the target to be a directory on your server.

2. After installation is completed, edit the LZFW.INI file in your local Windows directory and change the DataPath line to point to a local directory on your workstation (for example, DataPath=c:\lzfw\data). This directs LANalyzer for Windows to output data files, such as trend files (with extension .TRD) and name files (with extension .CSV), to your local directory.

3. If you want to run LANalyzer for Windows from a second workstation, you only need to install the workstation software, specifying

where you previously installed the LANalyzer for Windows software. After installation is completed, repeat Step 2 on the second workstation. Although you can run copies from any workstation on the network, you can only have as many copies running simultaneously as you have purchased copies.

Section 7: How the Station Monitor sorts

The Station Monitor performs an automatic sort every 15 seconds. If the sort is an ASCII type field (the name or address fields), the name or address with the lowest ASCII value is sorted first. For example:

    Zoo
    Arthur
    00-00-1B-47-74-47

is sorted as

    00-00-1B-47-74-47
    Arthur
    Zoo

The dynamic rate data fields are sorted in a different way. Over the 15-second period between sorts, the total activity is accumulated and the sort is performed on the accumulated number. For example, station Arthur might have a constant transmit rate of 2 packets per second over the sort period. Another station, Zoo, transmits a burst of 15 packets in the last second before the sort and no other transmit activity during the sort period. After the sort, Arthur is sorted above Zoo.

Other fields, such as total packets and bytes, are sorted in the normal descending fashion.

Section 8: How the Station Monitor works

New stations are added to the Station Monitor table as they appear on the network, until the table becomes full. You can specify the maximum number of stations (up to 1000) by changing the "Maximum Stations" parameter in the LZFW.INI file. Specifying a smaller number uses less memory. A new station is added to the Station Monitor only when its address appears as the source or destination address in an error-free packet. Thereafter, that station's statistics are updated for each relevant packet, whether that packet is good or has errors.

A new station is added only when its address is seen in a good packet because of collision fragments, which are a normal occurrence on an Ethernet network. A collision fragment is formed when two or more stations try to transmit at the same time, detect the collision, and then transmit a jam pattern to ensure that all other parties also detect a collision. Depending on how late in the packet the collision occurs, the source and destination address fields typically contain garbage. It serves no useful purpose to fill the Station Monitor table with these garbage addresses.

There are two consequences of this algorithm that you should be aware of:

1. If a station's address never appears in an error-free packet, the station does not appear in the Station Monitor table.

2. You might see nonzero transmit counts for the broadcast address. This apparent anomaly occurs because many fragments contain the jam pattern (all ones) in the address fields. An address of all ones is, by convention, the broadcast address, which is almost always seen in an error-free packet.

Station Monitor data is gathered constantly, whether or not the Station Monitor window is open. Therefore, you can open and close the Station Monitor window at will, without fear of losing data.

Section 9: Performance

LANalyzer for Windows has been carefully designed to take maximum advantage of the hardware you install it on. In general, the following hardware factors affect performance:

   o CPU speed. The higher the clock speed, the better the performance.

o CPU type. A 486 gives almost twice the performance of a 386 running at the same clock speed. A 386DX gives better performance than a 386 SX(tm) because it has a 32-bit rather than a 16-bit address bus and LANalyzer for Windows takes advantage of that. Note, however, that the 486DX and 486SX both have 32-bit busses; the 486SX simply lacks the integrated floating point unit of the 486DX. This does not affect LANalyzer for Windows.

o Bus type. An EISA or Micro Channel* bus gives better performance than an ISA bus.

o Network adapter card and driver. A 32-bit adapter gives better performance than a 16-bit adapter, and a 16-bit adapter gives better performance than an 8-bit adapter. The quality of the driver is also a very important factor.

o RAM. Not having sufficient RAM makes the user interface sluggish and might severely impact packet capture performance, as explained in the following paragraphs.

LANalyzer for Windows attempts to keep up with the traffic on your network. However, if you have very high sustained loads, or if you installed the product on too slow a machine, it is unable to do so. When such an overload occurs, LANalyzer for Windows periodically (every 5 to 10 seconds) and temporarily disables capturing and statistics-gathering long enough to allow the user interface to update. If you are capturing packets and have the "don't wrap capture buffer" option set, the overload protection mechanism (which causes packets to be dropped) does not kick in until the buffer is full and capture turns itself off.

If you are benchmarking LANalyzer for Windows to determine what class of machine to install it on, note that the type of network load affects performance. LANalyzer for Windows gives optimum performance on real networks, where packets are of different sizes and arrive with differing interpacket spacing. Therefore, try to benchmark against such a load rather than a homogeneous stream of identically sized packets with identical interpacket gaps that can give you misleading results. If you are using a Novell LANalyzer to generate the load, use RANDLOAD rather than GENLOAD to generate the test load.

Packet capture is probably the most performance-sensitive area of the product. However, there are several things you can do to maximize performance on whatever hardware platform you have chosen:

o Do not turn on packet capture needlessly.

o Set the tightest capture filter you can. The fewer packets you capture, the better the performance (the less data you must look at

also!).

o Set the smallest applicable Slice Size. This not only reduces the amount of time LANalyzer for Windows must spend copying data, it also allows you to store more packets in the same size capture buffer. In almost all cases, the most interesting information (for troubleshooting) is contained in the packet header rather than the packet data, so it is not worthwhile capturing the whole packet. A slice length of 64 bytes gives optimal performance, but might not always be long enough to include all interesting information. 128 bytes is probably a good compromise.

o Do not make the capture buffer larger than necessary. You can make the capture buffer as large as you like (so long as it fits in Windows virtual memory) by adjusting the "CaptureSize" parameter in the LZFW.INI file. However, you should try to keep it down to a size that fits in real memory (actual RAM). When you change the capture buffer size from within the product, if you select too large a buffer to fit in memory, the message displayed tells you the maximum optimum buffer size.

You should choose a number less than this for best performance. A 256 KB capture buffer is guaranteed to give optimal performance. A larger buffer might not, unless you have sufficient RAM on your system. If the disk light keeps coming on while you are capturing, your buffer is probably too big to fit in RAM and is being paged to disk by Windows, a relatively slow operation.

If you make the buffer so big that it can't be locked in real memory during capture, it is subject to paging to disk by Windows. LANalyzer for Windows has fancy algorithms to optimize performance under these conditions. However; if the sustained data capture rate is higher than the disk transfer rate, it drops packets.

How big is too big? It depends on how your system is configured. At the time you start capture, LANalyzer for Windows tries to lock as much of the capture buffer into real memory as it can. It always locks at least 256 KB; if you have more than 2 MB of real memory under control of the Windows pager, it uses that excess to lock more, up to a maximum of 8 MB. When the capture buffer is subject to paging, performance degrades significantly once the buffer has wrapped. This can be avoided by using the "Don't wrap capture buffer" option.