



NATIONAL SOFTWARE TESTING LABORATORIES

NSTL FINAL REPORT

FOR MADGE NETWORKS

BLUE+ 16/4 ISA TOKEN-RING ADAPTER

May, 1995

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EXECUTIVE SUMMARY

Madge Networks submitted the Blue+ 16/4 ISA Token-Ring adapter with the Madge Token-Ring driver for certification in NSTL's Compatibility Certification Program for LAN Server/NDIS-OS/2 Network Adapters. NSTL is the authorized independent testing facility for IBM LAN Server/NDIS certification.

The Blue+ 16/4 ISA adapter was also tested for basic functionality as a Workstation/Client adapter attached to a Banyan Vines server using the DOS NDIS protocol.

Finally the Blue+ 16/4 ISA Token Ring adapter and driver was tested for performance against the IBM Auto 16/4 ISA Token Ring adapter and driver.

Testing was conducted at the NSTL testing facilities in Plymouth Meeting, PA in which the adapter met all test requirements for basic functionality as a workstation adapter on a Banyan Vines network as well as obtaining NDIS certification by meeting all test requirements imposed by the full range of NSTL's Server/NDIS application tests and network stress tests. The Madge Blue+ 16/4 ISA significantly outperformed the IBM Auto 16/4 ISA Token Ring adapter in every one of the tests conducted which included both real world application testing and low level throughput tests.

NDIS TEST RESULTS

The Madge Blue+ 16/4 Token-Ring ISA network adapter is designed to operate with both Madge and IBM NDIS drivers. Since the adapter is interchangeable with IBM Token Ring adapters (that are compatible with the TROPIC chip), both the Madge driver and the IBM driver were tested for certification. Both drivers ran the network stress and Server/NDIS application tests flawlessly.

To obtain certification, the Madge Blue+ 16/4 ISA Token-Ring network adapter and appropriate driver must run the stress test consisting of constant network usage, which includes heavy network loads, for a period of at least 48 hours. The Blue+ 16/4 ISA adapter, coupled with the IBM driver, ran the stress test for 48 hours with no problems. The Blue+ 16/4 ISA adapter, coupled with the Madge driver, ran a preliminary 24 hour test as well as the full 48 hour test. The adapter handled both stress tests with no problems.

BANYAN VINES TEST RESULTS

The Blue+ 16/4 ISA adapter with the Madge NDIS driver was installed on a workstation that was connected to a Banyan Vines server. The server used Banyan Vines NDIS protocol files while the workstations was configured with Madge's NDIS driver. The tests included file manipulation, printing, program execution on the server, as well as particular application functions executed on the server from the workstation. These tests establish the basic functionality of the adapter and its driver.

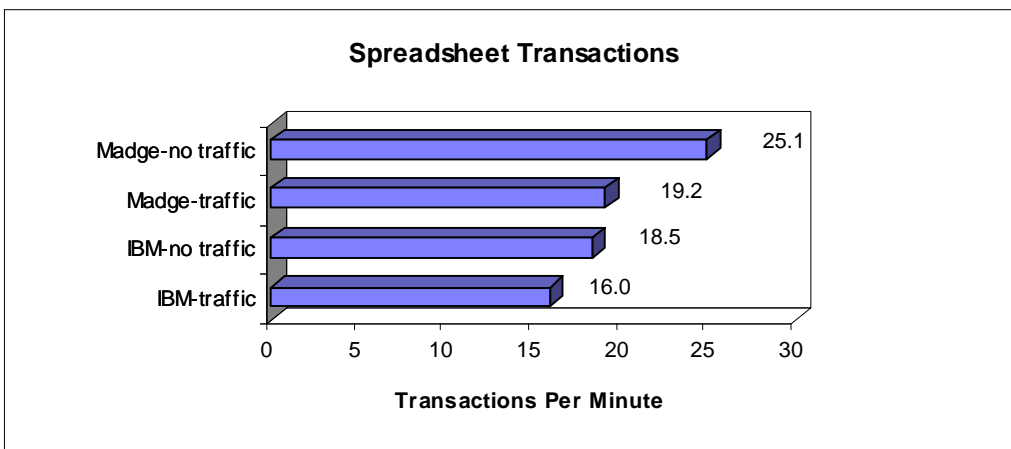


The Madge Blue+ 16/4 ISA adapter with the Madge NDIS driver accomplished all test requirements of basic functionality as a workstation adapter on a Banyan Vines network.

Performance Results

The performance tests were run on a Dell Dimension XPS workstation with a Pentium processor running at 75 MHz. The workstation contained 8 MB of RAM. The server, a Compaq Deskpro /M with a Pentium processor running at 66 MHz, contained 16 MB of RAM. Nine different tests were run including application or high level tests and low level throughput tests. Each test was run with no other traffic on the network and again with background traffic generated to fill 25% of the total network bandwidth.

The tests are designed using systems and components with sufficient speed and processing power as well as large caches to ensure that the network adapter is the bottleneck in the transaction testing. The performance differences between the adapters is more of a result of the driver that comes with the adapter rather than the adapter itself.



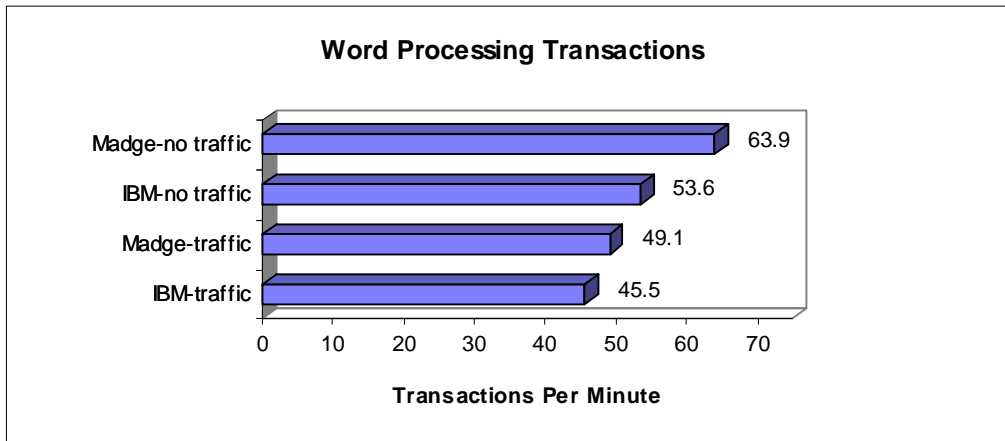
Source: NSTL, May 1995

Spreadsheet Transactions

The spreadsheet test is a replication of the file system access of Microsoft Excel 4.0. Each call is recreated, including the file, location in the file, and size of the operation, in detail, to read and write small (20 KB) and large (100 KB) spreadsheets. This benchmark shows how a network adapter operates under typical spreadsheet usage.



The Madge adapter and driver outperforms the IBM Auto 16/4 ISA Token Ring adapter and driver even when the Madge Blue+ 16/4 ISA adapter is running with traffic and the IBM Auto 16/4 ISA Token Ring adapter is not.

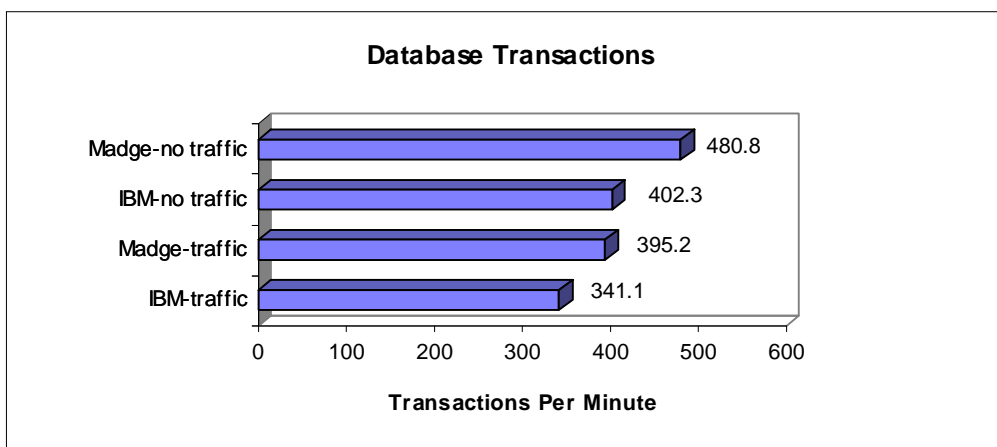


Source: NSTL, May 1995

Word Processing Transactions

The word processing test replicates WordPerfect for Windows 5.1 file I/O. Both Microsoft Excel and WordPerfect read and write files in 2 KB pieces. However, they differ in the order they read files and their techniques for handling file header information.

Although the IBM Auto 16/4 ISA Token Ring adapter performed better against the Madge adapter and driver in this test than in the Spreadsheet test, the Madge Blue+ 16/4 ISA Token Ring card still registers more transactions per minute than the Token Ring card from IBM in both tests.



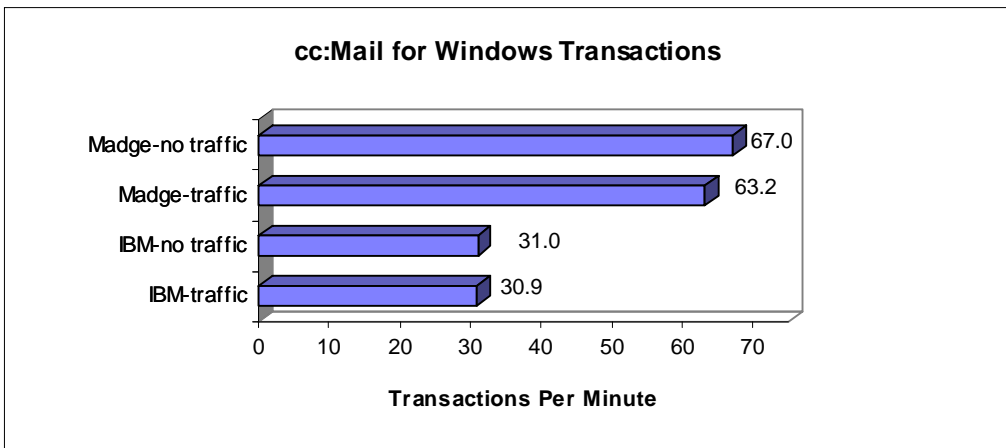
Source: NSTL, May 1995



Database Transactions

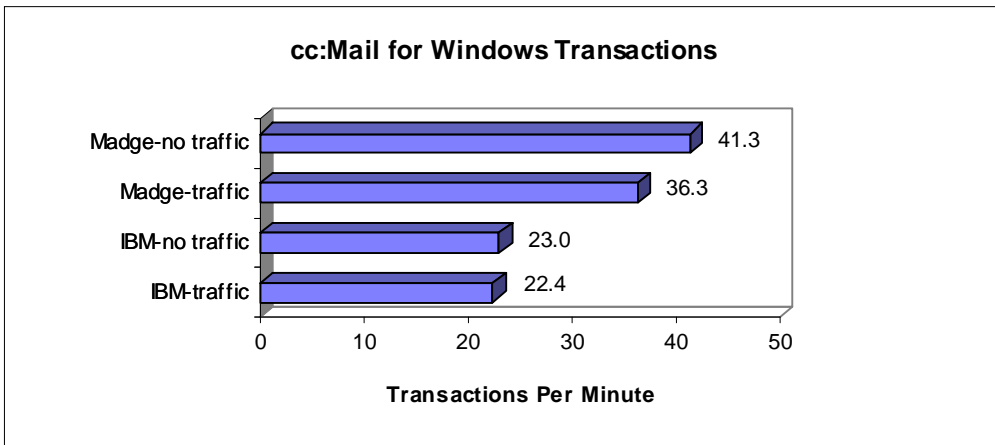
The Windows database benchmark reads and writes an indexed database, displaying selected information from the records. The database system stresses the network adapter and driver showing how it functions in a database-intensive environment.

The Madge Blue+ 16/4 ISA outperforms the IBM Auto 16/4 ISA Token Ring adapter by approximately 15%.



Source: NSTL, May 1995

cc:Mail for Windows Transactions with a small attached file



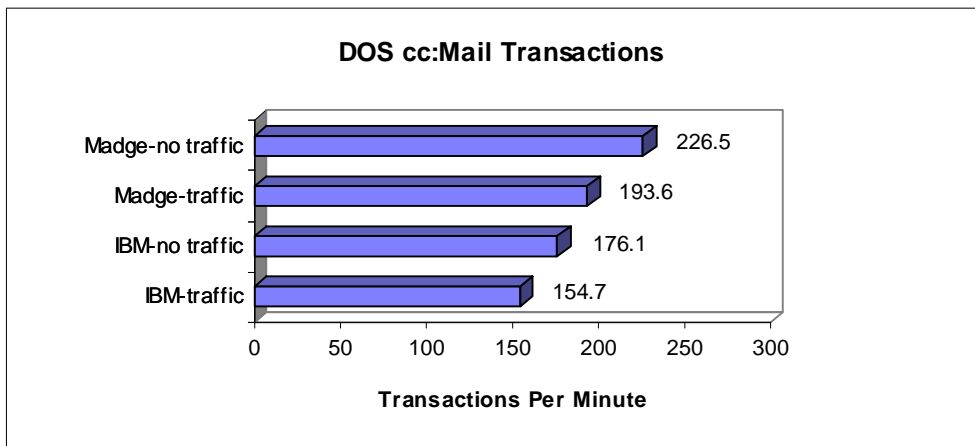
Source: NSTL, May 1995

cc:Mail for Windows Transactions with a large attached file



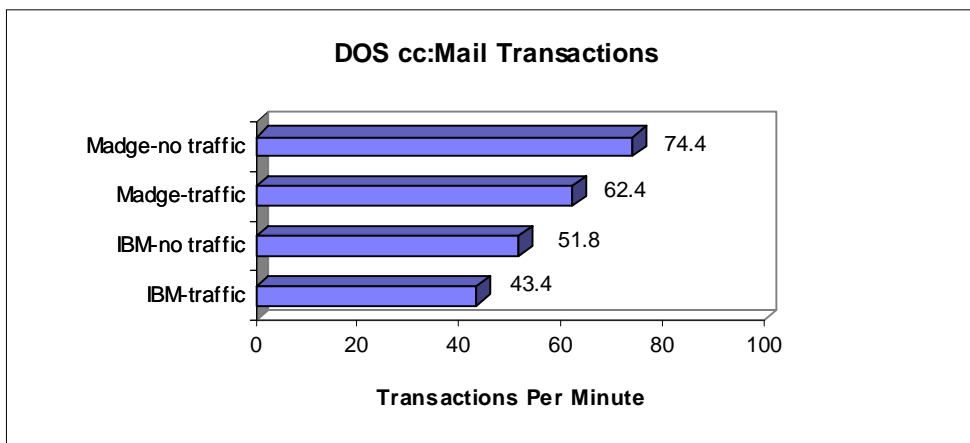
Two benchmarks run under cc:Mail for Windows. Each test sends a message with an attached file to a specified user. One test attaches a small, representative text file, while the other benchmark attaches a larger spreadsheet.

The Blue+ 16/4 ISA Token-Ring adapter and driver outperforms the IBM Auto 16/4 ISA Token Ring adapter and driver in both tests with and without generated traffic. For the more common smaller attachments the difference is even more pronounced as the Madge Blue+ 16/4 ISA adapter performs twice as many transactions as the IBM Auto 16/4 ISA Token Ring adapter.



Source: NSTL, May 1995

cc:Mail for DOS Transactions with a small attached file



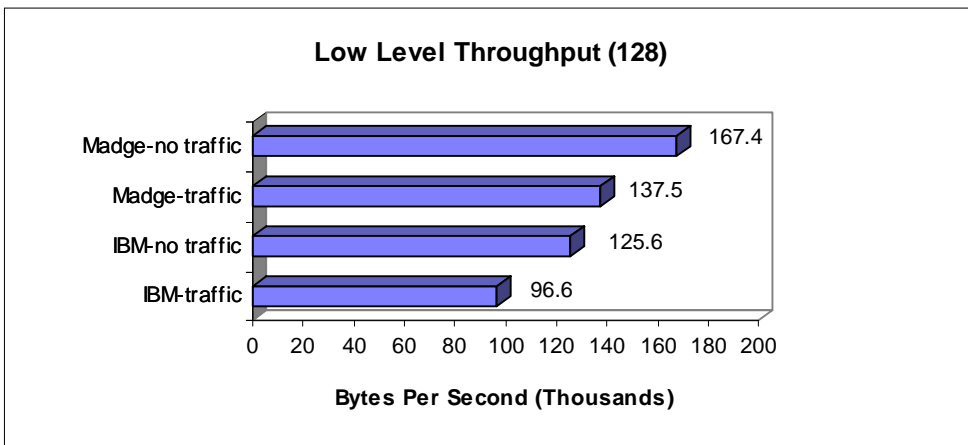
Source: NSTL, May 1995

cc:Mail for DOS Transactions with a large attached file

The DOS cc:Mail tests show how the network adapter and driver operates in a DOS environment with larger files. The tests use cc:Mail to send small or large attached files to a specified user.

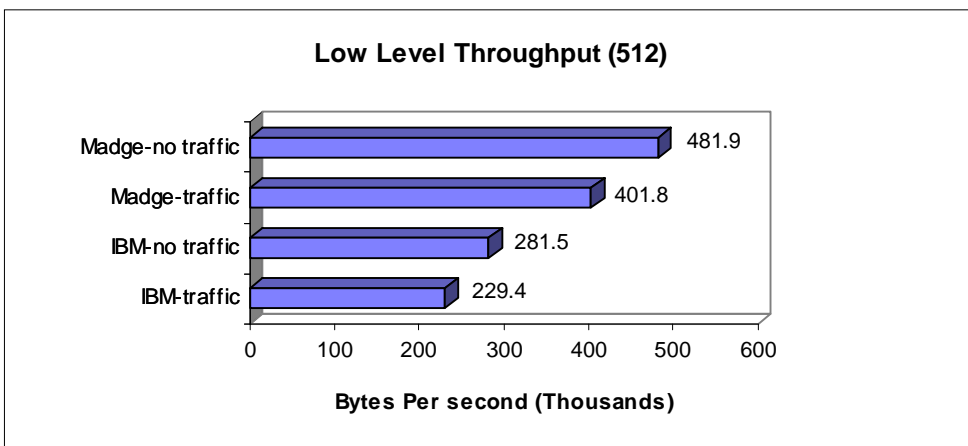


The IBM Auto 16/4 ISA Token Ring adapter and driver fares better when compared to the Madge adapter and driver when using DOS rather than the Windows version of cc:Mail. However, Madge's Blue+ 16/4 ISA adapter is still able to perform more transactions with background traffic filling 25% of the bandwidth than the IBM Auto 16/4 ISA Token Ring adapter is able to accomplish with no other traffic generated.



Source: NSTL, May 1995

Low Level Throughput using 128 byte frame size



Source: NSTL, May 1995

Low Level Throughput using 512 byte frame size

This test uses DOS calls to perform file I/O. Although considered low level, the tests are low level in that they are not application specific, they are not, for instance low level in reference to addressing the registers of the NIC directly.

The Madge driver and adapter again outperform the IBM driver and adapter by being able to transmit significantly more bytes per second even with traffic in the background.



NSTL LAN SERVER - NDIS CERTIFICATION

TEST METHODOLOGY

The approach in NSTL's LAN Server NDIS Certification tests is heavily oriented to real world, application-based testing. The NSTL Certification Program utilizes a test suite to exercise the combination of network interface card(s) and NDIS driver software. The test suite simulates a real user environment by loading a network with application driver traffic and testing the network hardware and software for extended periods of time.

When tested as a workstation adapter, the test adapters are installed on four workstations. A fifth workstation contains a certified adapter, installed for control purposes.

When tested as a server adapter, the test adapter is installed on one server. Cabled to this server are four workstations, each containing a certified adapter.

After all the systems in the network are configured, the compatibility of the adapter and driver is assessed by placing constant activity on the network. NSTL created this activity using tests that included the following:

- Microsoft Excel for OS/2, operating over the network
- Microsoft Word, operating over the network
- OS/2 SQL Database (retrieval tests), operating over the network
- Copying files over the network, with verification of transmission
- Continuous messaging over the network

Each of these tests is run utilizing scripts or batch files developed by NSTL that allow constant usage of the network and producing heavy network loads. This is achieved by concurrently running any two or three of the above tests on each of the five workstations. The successful running of these tests for a period of 48 hours determines LAN Server- NDIS Certification.

NSTL will, at its option, run a preliminary (and less intensive) 24-hour test wherein only two of the above test scripts are run concurrently on each workstation.



DESCRIPTION OF TESTS

Microsoft Excel for OS/2

The Excel test for the NDIS suite uses a macro on each workstation to consolidate data from several input data files on the file server, placing the consolidated data into a file also on the file server.

Microsoft Word

The Word test in this suite uses each workstation to repetitively load a Word document from the file server, thus using the network interface cards and drivers in the typical Word I/O pattern.

Xcopy

The Xcopy test in this suite uses a batch file on each workstation to copy a directory tree of files from the workstation to the server and from the server to the workstation, using the network for relatively large blocks of file data as well as smaller I/Os for directory searches.

Message Sending

For this test one workstation acts as the sender and the others are receivers. A message generation script running on the sender dispatches a message to one of the other workstations, waits 90 seconds, and then (randomly) selects the next target receiver and sends again, continuing the process as long as desired (typically at least an hour) while checking that each message is properly sent. This messaging is intrinsically a network function, using several of the features such as broadcast address reception of the network protocol stack.

Database Benchmarks

This test is based on a book-wholesaler database model supporting various transactions. These operations are performed:

- Order transaction keyed on ISBN number
- Order transaction keyed on author name
- Order transaction keyed on book title
- Payment transaction
- Shipment transaction
- Single table query using range
- Single table query with list of values
- Three table join
- Five table join
- Grouped query with outer join

Multiple workstations execute these transactions simultaneously to increase the utilization of the network and thus stress the drivers and cards.



BANYAN VINES COMPATIBILITY TESTS

TEST METHODOLOGY

with

DOS/WINDOWS WORKSTATION

NSTL's purpose was to test the basic functionality of the Blue + adapter and its Madge driver on a DOS/Windows workstation attached to a Banyan Vines server. Banyan Vines NDIS protocol files and Madges's NDIS driver were to be utilized.

After attachment to the server, file transfers were initiated back and forth from workstation to server. Lotus 1-2-3 was then installed onto the server from the workstation, and program execution of Lotus 1-2-3 was undertaken from the workstation. Most of the major functions of Lotus, were exercised, including specifically loading files from the server, saving to the server, and printing through the server via redirection. These tests established the basic functionality of the adapter and its driver. By agreement with Madge Networks, Ltd, tests were limited to one workstation.



Madge Networks, Ltd Madge Blue + 16/4 ISA Adapter with Madge Driver

Description: A Token-Ring ISA adapter designed to operate with both Madge and IBM drivers. The adapter is interchangeable with IBM Token Ring adapters that are compatible with the Tropic chip.

Adapter Type: Token-Ring
Bus: ISA
Protocol: NDIS
NDIS Version: 2.01
Driver: BLUTOK.DOS
Driver Version: 1.0
Driver Size: 44824 bytes
Driver File Date: 4-3-95

Tested as a : Workstation Adapter
Special Settings: None

Passed tests as a Banyan Vines

Workstation: Yes

Date Completed: 4/28/95
Test Engineer: R. C. Rudisill
Testing Lab Location: NSTL, Conshocken, Pa.

SOFTWARE

Network O.S.: Banyan Vines
Network Version: 5.52(5)
DOS Version: 6.62
Windows Version: 3.10
Test Software: Lotus 1-2-3 for Windows
Version: 1.1

HARDWARE

Server: Compaq DeskPro 66M-(EISA)
Server Adapter: IBM Token Ring 16/4
Workstation: Dell 433s/M

COMMENTS:

The Blue + 16/4 adapter with Madge NDIS driver met test requirements of basic functionality as a workstation adapter on a Banyan Vines network.
