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Open Transport 1.0.8: Performance Q & A (3/96)

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TOPIC -----

This article is a series of questions and answers on performance for Apple Open Transport.

Open Transport 1.1 is now available, and Apple recommends upgrading to it. Also refer to Open Transport 1.1 Reference Questions and Answers Tech Info Library articles for the most recent information.

DISCUSSION -----

Question: Is Open Transport native on Power Macintosh? Does this make networking faster?

Answer: Open Transport is written to take advantage of the PowerPC processor -- it is native code. This provides the necessary foundation for increased networking performance in the Mac OS. To realize performance gains, however, it is equally important that networking applications also be accelerated for Power Macintosh, and that applications adopt the new Open Transport XTI-based programming interfaces.

The built-in "backward compatibility" support for existing AppleTalk and TCP/IP applications must continue to run as 680x0 code in emulation on Power Macintosh. This protects a customer's investment in networking applications, but also obscures underlying performance increases from the native protocol implementations.

Question: Will existing networking applications see performance improvements with Open Transport on Power Macintosh?

Answer: In general, current Mac OS networking applications are written for the 680x0 processor, and use the "classic" (680x0-based) networking programming

interfaces. These are not likely to see performance boosts with Open Transport, as most of the performance potential is based on the move to native code for the PowerPC processor. Even for Power Macintosh native applications, a continued use of the Open Transport backward compatibility libraries offsets most of the performance gains in the low level protocol handling.

Users that select Power Macintosh native applications that are Open Transport-ready will realize the greatest performance gains. Performance of specific network applications may also be significantly influenced by the underlying processor speed of the system. Customers with demanding, network I/O intensive applications should give strong consideration to the higher performance PowerPC-based Macintosh systems.

However, even with 680x0 emulated applications using backward compatibility, TCP/IP users are more likely to see some performance improvements with Open Transport. This is because of the differences in the way compatibility is provided for MacTCP vs. AppleTalk, and differences in the two protocol architectures.

Question: Does the native code include Ethernet drivers for Macintosh onboard Ethernet adapters?

Answer: PCI-bus Power Macintosh systems ship with a PowerPC native DLPI Ethernet driver for built-in Ethernet. Power Macintosh 6100, 7100, and 8100 models currently have 680x0-based drivers.

Question: When will new or updated applications that support the native Open Transport APIs become available?

Answer: New applications and updated versions of existing applications that are native and use Open Transport are available now. Users are urged to contact the specific third party vendor of interest for more details on their specific product release plans.

Question: How much faster will native Open Transport applications be?

Answer: Networking performance is influenced by many factors. As noted above, customers will see the highest performance networking when using Power Macintosh native applications that fully support Open Transport APIs. Performance will be greater with protocols that use larger datagram sizes, such as TCP/IP, than with AppleTalk (which has a fixed and limited datagram size). On high-speed datalinks such as fast Ethernet, FDDI, and ATM, the performance of the network interface card (NIC) driver code is also a significant factor. Comparative shopping for NICs -- based on price, service, reliability, and performance -- will be in order.

Open Transport -- running on the built-in Ethernet of the Power Macintosh 9500 -- has been clocked at 9.3 Mbps throughput using low-level TCP/IP benchmarks. A pre-release version of a third party Open Transport-native implementation of 'NFS' protocols was benchmarked at 8.4 Mbps. Both figures approach theoretical

maximum performance for 10 Mbps Ethernet. AppleTalk performance is somewhat lower, with low-level benchmarking coming in at a bit over 7.5 Mbps throughput.

Question: What about high-speed networking connections like fast Ethernet, ATM, and FDDI?

Answer: The Open Transport engineering team is continuing to work with NIC developers to realize high-performance DLPI drivers for high-speed datalinks. This is a cooperative effort, with work being done on both driver code and on Open Transport. We expect that high-speed datalink NIC drivers based on Open Transport v1.1 can be fully competitive with other PCI networking products. Of course, performance tuning will be an ongoing priority, as Apple intends to always offer a platform capable of industry leading network performance.

Benchmarking on these types of datalinks, with pre-release Open Transport v1.1 is in progress. Preliminary testing results are very promising:

- 48 Mbps with a Rockwell fast Ethernet card and driver
- 75 Mbps with a Rockwell FDDI card and driver
- 93 Mbps with an Interphase ATM-155 card and driver

These tests are based on Open Transport/TCP running on a Power Macintosh 950/132, and reflect memory to memory, point to point transfers on a dedicated test bed. Additional upside is anticipated as performance tuning continues in preparation for the final release of Open Transport 1.1.

AppleTalk performance is expected to be lower than TCP/IP performance due to various technical issues, including DDP packet size, and the ATP retry-acknowledgment algorithm. Current testing on fast Ethernet is turning in figures around 35-40 Mbps with a PowerPC native AFP server running against a group of still emulated AFP clients. This is a significant performance improvement over current AppleTalk solutions, and further progress should be realized as client code is revised to take advantage of Open Transport and PowerPC.

Question: Will developers ship NICs for fast datalinks based on Open Transport v1.0.x, or wait for tuning planned for v1.1?

Answer: Each developer will make an independent decision to bring their product to market at such time as they are satisfied with the combined performance and reliability of their product with Open Transport. Several vendors are currently shipping PCI solutions for 100BaseTX, ATM, and FDDI. Contact the developer of interest for current availability information (see Developer Adoption).

Article Change History:

- 26 Mar 1996 - Added statement on Open Transport 1.1 release.
- 15 Nov 1995 - Updated several answers.
- 27 Oct 1995 - Updated for OT 1.0.8.

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