Network Working Group
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BARRY WESSLER
Telenet Communications
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18457

REVELATIONS IN NETWORK HOST MEASUREMENTS

The purpose of RFC 392 was to identify a problem we had encountered in using the ARPANET at Utah. The primary thrust of the paper was supposed to be: "Here is a place to make the Network better" rather than: "Look, isn't the Network terrible." The accepted use of 392 seems to be the latter rather than the former. A second purpose of 392 was to stimulate he undertaking of measurement experiments on other computers and operating systems in addition to TENEX. Very little in the way of measurements has been reported (other than Hal Murray's RFC 415 measuring TENEX).

Since the Publication of RFC 392, BBN has done a considerable amount of work to improve Host-Net performance on TENEX. They reported new measurement results in their April 1973 Quarterly Progress Report No. 10. I feel it is important to circulate those results to the RFC community.

Don Allen at BBN borrowed Greg Hicks' RJS program and 1) updated it to take advantage of recent changes in TENEX, 2) improved the code near the input/output JSYs and 3) used considerably faster network monitor code. The result was approximately 400% improvement from 75-85 seconds of CPU time per megabit (~$10) to 19 seconds per megabit (~$2.50). Of the 19 seconds, 13 were spent in the RJS program and 6 in TENEX network output. The six seconds seem to relate very well to BBN FTP measurements where 8.2 cpu seconds per megabit were required

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(~$1.08) for 8 bit byte transfers. (Going to 32 or 36 bit bytes improves this figure by a factor of 4, resulting in a cost of $.33 per megabit.)

Of the 13 seconds left in RJS no attempt was made to improve or even discover where the time was spent. This extra effort was not expended because RJS is soon to be replaced by the RJE protocol which uses FTP as its transfer mechanism.

In summary, I believe that the original RFC #392 and the recent BBN results show that the Network, including the Host cost, is intrinsically effective. If care is not taken in monitor and user code, the system may not look very attractive. I hope everyone now goes out and measures how good (or bad) they are doing vis à vis network transfers. Please send me the results personally if they are too embarrassing to distribute via RFC. It would be nice to hear from all systems.

All the data is courtesy of Don Allen and Jerry Burchfiel at BBN.