DISAPPEARING DIAL-UP
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Are you planning to move your data processing center?
No doubt you have ordered the raised floor, halogen fire
suppression system, environmental unit, patch panel, ups,
isolator/regulator, vacuum cleaner, and microwave oven, but
have you installed and tested the new dial-up service from
your local telephone company?   This simple "standard"
element of your system has tremendous problem potential.
Our recent experience with a deteriorating communications
network may help you to avoid the pitfalls which we leaped
into.

Our organization has a dial-up network of HP150
microcomputers located at widely scattered transfer sites.
Each of these 150s call our HP3000 twice each night: once
to upload the day's transactions then later to download a
newly updated customer file.   We use ADVANCELINK as our
communication software.   Recently, after much preparation,
we moved our data center to an adjacent municipality. Prior
to the move, our electrical engineer checked the power
supply and the environmental systems, and we had verified
that the new dial-up lines were live, (ie: we had used a
telephone to make calls to and from the new site.

The move was accomplished, and the computer was set up
and operational the same day. Our administrative users, who
did not move with us, were up and running at 9600 baud via
leased line and 8 channel muxes that same day.   The first
week the success rate of uploads and downloads on the dial-
up network slipped from its' previous high percentage, but
we did not become alarmed.   There were many other issues
related to the move occupying us, and we were accustomed to
missing a site now and then due to excessive line noise, cut
cables, or operator error.   However, after two weeks the
success rate dropped rapidly, and by the end of six weeks
was around ten percent!

The symptoms varied, but the essence was that the
HP150's could not maintain the line connection long enough
to complete the data transmission.   Most of the time the
ADVANCELINK error message was "connection failed".
Occasionally we would get a "no carrier" message, or the
transmission would stop mid-file with the 150 just sitting
there and the modem at the HP3000 remaining in a busy state.

A data analyzer could have shown us just what was coming across the line, but as we were not experiencing bad data, just no data, we did not try to obtain one. Well, intuition told us that the problem had to lie with the new telephone lines. They and the AC power supply were the only new elements in the system, and the AC had checked okay. However, after the telephone company technician tested our lines, he informed us that our lines were within specifications for "voice" grade service (dial-up) and there was nothing he could do. We checked with the phone company business office and received the same response. There was nothing they could do to improve our service.

Since relief from the phone company did not appear imminent, and the data had to be moved daily, we devised a three part plan to attack the problem: (1) implement an alternative method of moving the data for immediate relief, (2) find a way to use the dial-up lines as they were for the short haul, and (3) pursue with determination convincing the phone company to improve our service as a permanent solution.

In our case, the alternative to the telephone lines was a "sneaker net" with 3.5" diskettes as the medium. Our courier visited all but two of the sites daily, and transfer trucks visiting those two sites could deliver diskettes to a common location where the courier could pick them up. We quickly produced operating procedures for the diskette upload and download processes and installed corresponding command files on the remote computers. One problem with this solution was that the sites presented a hostile environment to the 150's, and some of the diskette drives were no longer operable. Success with the telephone network had made the expense of maintaining the diskette drives no longer seem necessary.

Our bridges hadn't been burned, just allowed to decay! Replacement and repair of the drives was accomplished as rapidly as possible. In the interim, some sites had to be visited daily to collect the previous days' transactions. A fixed drive was connected to the transfer sites' 150 and the transactions were copied from their fixed disc to the portable drive. The collected data was then uploadaed to the HP3000 back at the Data Center.

In trying to make the degraded phone service work we discovered that if the transfer site operator executed ADVANCELINK and typed in the telephone number, instead of letting a command file establish connection, we could get a 20 to 30 percent connect rate. Once connected, the file

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transfer usually completed successfully. This confirmed our belief that our hardware and software were not the source of these problems. This operator intervention required us to transmit during working hours, which often resulted in customers waiting in line at the site. Still, it was better than driving to the site with a fixed drive! Trial and error in modifying the command files disclosed that eliminating having the 150 wait for the HP3000 to respond with the terminator character (ctrl/Q) and slowing the 150s down improved the transmission success rate to about 60 percent and made daytime transmission unnecessary. Pauses were inserted after commands such as "HELLO" and "BYE", extra newlines sent to the 3000 before and after "HELLO", "&DSCOPY", "BYE", etc., and the character delay times increased to achieve the improvement.

     The third area of effort was directed at the telephone company. We called the business repair office repeatedly with complaints of a degradation of service compared with that at our previous location. Their technician was called back to check our lines again, with the same results. A former telephone company employee had informed us that different levels of service existed for each line type, and suggested that we inquire as to our service level. Oh yes, we had consulted many persons and organizations during the course of the problem. Part of our problem solving procedure is to search the available experience bank. While doing so we received one solid lead, much sympathy, and two offers of a complete communications evaluation; for a fee. We followed the lead and escalated our complaints to the manager of the local central office with requests for a service upgrade. Suggestions by the phone company that we install leased data circuits were rejected with the insistent request that they provide us dial-up service equal to that which we had previously. We did not want the monthly expense of multiple data circuits, or the vulnerability of one multipoint circuit linking sites in eight cities and counties and crossing two telephone companies at that time. In addition, all of our modems were dial-up and would have to have been replaced with non-dialing units. By this time the telephone companys' business office, maintenance office, engineering section, and public relations office had all been brought into the discussions with our organization.

     In support of our efforts with the phone company, and in devising workarounds, we went through the standard problem identification steps, evaluating the hardware, software, procedures, and environment. One element at a

time every link in the dial-up network except the HP3000 was
replaced. On our order, the phone company installed one of
their data jacks on our line, with no results. From the
phone company entry panel, we ran new twisted pair to the
computer room via a different route, replaced the remote
modem, the local modem, the modem and telephone cables at
each end, and replaced the HP150. We also tried different
versions and different copies of ADVANCELINK and the
ADVANCELINK command files. We discovered that dialing any
other computer from our remote sites worked fine, and that
dialing out on one of our new lines and back in on the other
compounded the problem so badly that we could not use an
HP150 in the data center to test modems, etc. Testing had
to be done from a remote site. Of course, all of these
efforts confirmed our belief that the dial-up service was
the problem, but more importantly, the tests supported our
negotiations with the phone company, and assured management
that every avenue of relief was being explored. Some
improvement in connectivity was gained by using the same
make of modem at the host site and the remote site.
Previously we had not done this. We also found that MNP
error correction modems and modems with adaptive
equalization will not solve all ommunications line problems.
Modems with these features were obtained on approval from
vendors for some of our tests.

     The phone company had measured our lines several times
and reported to us that the decibel (power) level and slope
(decibel loss), while within their "voice" grade specs,
definitely would not support "high speed" data transfer,
(1200 baud). We were at the end of that particular service
line, the wires were old, etc. They also told us that there
was no tariff within their rate structure which would allow
them to upgrade our service. Our next step was to request
that they quote us a price for upgrading the equipment or
devising a new tariff and to let them know that we were
willing to bear the cost of correcting our problem.
Persistence pays! After five months of discussion at
various levels between our organization and the phone
company they announced that they were going to fix the
problem, and they did, within two weeks! In essence, the
phone company solved our problems by installing MFT's,
(metal frame terminators), on our lines in their
central office. An MFT increases line frequency. We had
been asking whether MFT's might help our situation since
learning of their existence from their former employee. A
simple solution at the end of a complex path. No special
charges or rate changes were levied against us by the phone
company!

In conclusion I would suggest that: (1) New dial-up
service   be   thoroughly tested   with   your   production
configuration,   or as close as you can manage, in advance of
the   move.   We may have discovered our problem sooner if we
had   taken a 150 to the new center and   tried   communicating
with   a remote site.   If your new service will not be ready
prior   to   the   move it may be feasible to   test   the   phone
service from another organization located near your new data
center and on the same service line.   (2) Try tweaking   the
communications   software or command files while waiting   for
the   phone company to correct the situation.   Some   service
was   better   than   no   service   in   our   case.   And   (3)
Comprehensive testing,   and presenting an organized case are
helpful   in dealing with the telephone company   bureaucracy.

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