SNA•ps 3287 Slow Print Problem (12/93)

Article Created: 10 December 1993

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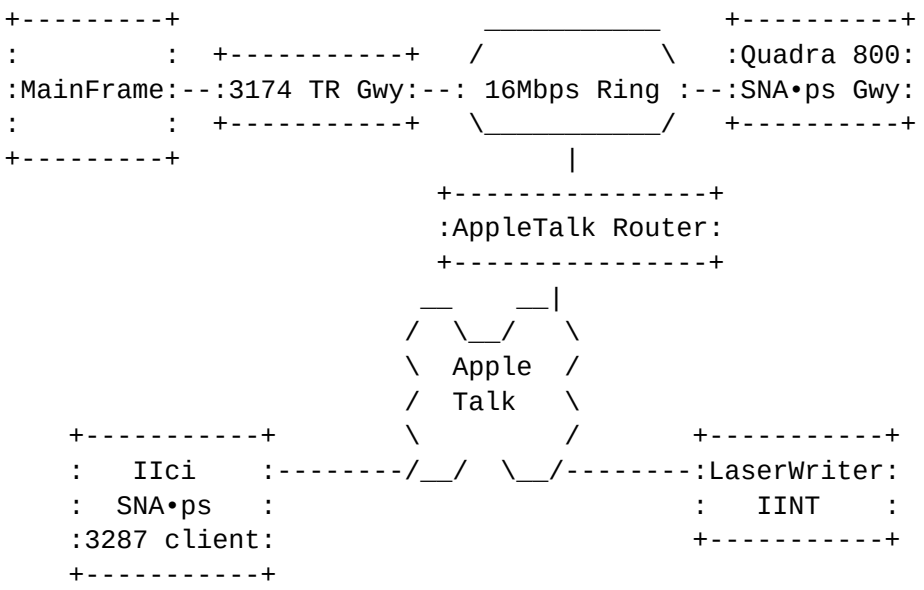
TOPIC ---

My problem centers around a complaint related to the length of time it takes for a mainframe print job to complete through SNA•ps 3287. Briefly, the problem is when I print one of my mainframe e'mail messages through a SNA•ps 3287 print client, it has taken up to 20 minutes to print - printing the same document through a Coax attached LaserJet takes less than a minute.

I have performed some timing tests related to how quickly the mainframe's CICS application delivers the print job to the SNA•ps 3287 client. And some end-to-end timing tests for different configurations of the AppleTalk network and the SNA•ps 3287 client. These tests basically replicated and/or confirmed the perceived long delay in printing through the SNA•ps system.

Here is an ASCII picture of the configuration:



Some of the tested configurations for the 'AppleTalk Network Cloud' in the

above drawing have been:

1) A Banyan VINES server routing between Token Ring and LocalTalk, with both the SNA•ps client and the printer on the same LocalTalk segment.

2) Same router but SNA•ps client on the Token Ring.

3) Wellfleet LN as the AppleTalk router between Token Ring and an Ethernet segment, then a Cayman GatorBox as the router between Ethernet and LocalTalk. The SNA•ps 3287 client variously connected to the Token Ring, Ethernet, or LocalTalk segments. The printer attached to the LocalTalk segment.

4) Various combinations of AppleTalk through VINES tunneling and Token Ring, Ethernet, and LocalTalk segments.

While there are minor changes in the response time between these different configurations, the differences are marginal (seconds) when compared to the overall response time (minutes).

The configuration for the direct connected LaserJet is a serial connection to a DCA IRMAPrint connected by 3270 Coax to a 3174.

Following are the timing tests I performed:

The following times were obtained in a test of SYSM printing using the SNA•ps gateway:

	Mainframe	SNA•ps 3278->Spooler	Print Completed
Single Page:	00:57	1:33	3:48
6 - Single Page: (30 second time out)	00:33	1:07	7:07
6 - Single Page: (End Bracket time out)	00:38	0:42	9:33

The tests were performed between 12:30 PM and 1:00 PM, using a Macintosh IIci attached to the Token Ring. The only application running in the Macintosh IIci was the SNA•ps 3287 printer client. The single page print jobs were all SYSM meeting notices consisting of approximately 20 lines of text.

A second test was performed at the same time of day sending a 7 page document of 11,400 characters. No VTAM trace was performed, only end-to-end times were recorded.

	SNA•ps 3278->Spooler	Print Started	Print Complete
7 Page Document	0:56	3:38	5:58

The Token Ring attach is a similar configuration to that found in the executive suite area, in fact the path length is virtually identical. However, since the majority of the time delay appeared to be between the

Macintosh IIci and the printer, a third test was performed to see if a path length problem existed between the Macintosh and the printer. In a third test, a comparison was made for the same print job (4 - Single Page) with the Macintosh IIci attached to first Token Ring and then to the same LocalTalk/PhoneNet hub as the printer. No VTAM trace was run for these tests, only end-to-end timing was performed.

	Token Ring Attach	LocalTalk/PhoneNet Attach
4 - Single Page	5:48	5:39

Since the times in this third test were virtually the same, the conclusion is that the attachment method and the path length between the Macintosh and the printer is not a concern.

Observations
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1) For multiple queued print jobs, it would appear that a 30 second time out is preferable to end bracket time out for signaling the end of the print job. The Macintosh IIci used in the test was incapable of both receiving a SNA•ps print job and sending a print job to the printer at the same time, so all of the jobs were held until there was a break in the print stream. It also appears that there is more overhead in the Macintosh for spooling and printing the multiple jobs than there is for printing a single large job resulting from the 30 second time-out. It is not apparent if this condition would also hold for a test of multiple individual print jobs queued 20 seconds a part.

2) The printer seems to be the slowest part of the process. There is often a delay of several seconds between the first sheet and the second sheet. It would also appear that there is a lot more than just text being sent to the printer (the typical job was 1100-1200 bytes). The printer light blinks for nearly a minute for each single page print job.

One possible solution would be to use a faster printer. My guess is that the LaserWriter used was spending a long time rasterizing the printout.

DISCUSSION ----------

To summarize what is stated below, the testing we conducted lead to the conclusion that the LaserWriter (LW) IINT is too slow and does not have built-in TrueType Rasterizer which slows down the printing, a newer printer would help this. The Network delays are fairly fixed, within 5-10 seconds, and the Coax IRMAPrint will be faster than LAN based gateways. Finally you should upgrade to SNA•ps Print. Read further for greater detail.

The first thing we recommend is for you to get a free upgrade to SNA•ps Print. Contact Cheryl Mariano at 408-862-3385 in Apple Business Systems (ABS). There were many bug fixes in SNA•ps Print over SNA•ps 3287 that affected end of bracket and overall spooling speed.

Some of your problems may be due to too small an application size for SNA•ps 3287. Seems the spooling is done within the RAM space available

between the Application and the total assigned. SNA•ps Print however, does not do that.

Here is how SNA•ps Print (or 3287) actually prints. It by default uses NOIRO TrueType font or other TrueType fonts. While you can select other fonts to print with using Custom Formatting, be sure it is mono-spaced like Courier or Monaco. Be warned that there are some mainframe printed characters (such as DUP) which are not in Courier, but will print in NOIRO font (that is why it was invented). Now with an older LW IINT, there is no on-board TrueType rasterizer. So every print job sent to the LW IINT from SNA•ps will load the TrueType Rasterizer in Printer RAM, then the NOIRO TrueType font, and then start sending the data. Newer printers (starting with the LW IIf, or LW IIg) have the TrueType Resterizer built into the printer ROM, so that VERY LENGTHY step is skipped and only the NOIRO font is downloaded, then data. You will see from some of my tests with SNA•ps Print later in this article.

I would also like to speak to some of the your observations:

1) You should be encouraged to recall the difference between the response time and throughput between a coax cable on a channel attached 3174 and passing data through a multi-protocol LAN environment. Also, are there any Bridges or routers in the Token Ring? What other protocols are running on the Token Ring or Ethernet, IPX, TCP/IP, NetBIOS?

   You also stated that, "SNA•ps took 20 minutes and IRMAPrint took less than a minute." Now both are extremes stretched beyond belief. SNA•ps would never take 20 minutes for 1-4 pages unless some routers are badly configured. IRMAPrint cannot take less than a minute, your tests showed the Mainframe delays between 57 and 33 seconds. The Coax transport is faster then the LAN but the LaserJet engine is comparable.

2) There were several routers tested, BANYAN VINES, WellFleet, Cayman GatorBox (so, so). These tests (and ours) seem to show that the Network introduces delay and the more network pieces, the more delay, but the increases are in seconds not minutes (I agree with your findings). But in all cases, the LAN connections will have more delay than a 3270 Coax.

3) We disagree completely with the conclusion that the End-of-Bracket signaling is not desired over a 30 second delay. First to explain these TIMEOUTs in SNA•ps Print (3287). The SNA•ps application must determine when a print job from the host has ended. It can use a commonly sent signal (end-of-bracket) which is sent at the end of the job but depends on the printing environment on the host. If the end-of-bracket is not sent, then a variable timeout is used. The timeout should be set lower than 30 seconds, in our opinion, to allow separation of quick, short jobs but not too long to delay the printing process. Recall that print spooling to the PrintMonitor, does not start until this delay has expired. If the delay were lowered to 5 seconds, that may be too low since the host may delay in sending print data to SNA•ps Print, and then SNA•ps would decide (incorrectly) that the print job ended. We usually set our TIMEOUT for 10 seconds and also turn-on the End-of-Bracket as well. SNA•ps Print also has a Number of pages received to start

printing (50 or 100 typical), so this prevents print jobs from overrunning the RAM area set aside for the stored print document.

4) The Printer is definitely the main reason for the slow printing. It does not have the TrueType Rasterizer in ROM and it is slow to image pages as well. While this is simple ASCII text to be printed, the printing technology is complex enough to warrant a better printer.

We have some questions:

1) What version of the Macintosh OS and printer driver are used in the Macintosh IIci running SNA•ps 3287?

2) Can you write a word processing document using NIORO font and direct it to the LW IINT and some better printer to get a feeling for the printing delay? This will support the claim that the print emulation is receiving data as quickly as possible (if the timeouts are lowered) convert the saved data into Postscript, and spool it to the PrintMonitor fairly quickly thus showing the printer delay.

3) How are the documents printed with respect to landscape or portrait and what % reduced if any?

4) Are you also using any AppleShare spoolers in this environment?

We did some tests with SNA•ps Print and several documents of 2 pages and 45 pages in length. We used an AS/400 as the document generator. Our SNA•ps gateway is on a 4 Mbps Token Ring, it distributes to the Apple IS&T Ethernet. A Macintosh IIfx was used for the SNA•ps Print client over Ethernet. A LW IINTX was on LocalTalk, and a LW IIg was on Ethernet. (We don't have a working LW IINT, so we substituted a LW IINTX.)

With 30 Second Timeout and NOIRO
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a) 2 pages to NTX, took 2:10 minutes to first page, 15 seconds for second for a total time of 2:25. The page was done when the page hit the paper tray.

b) 2 pages to IIg, took 1:10 minutes to the first page, 15 seconds for second for a total of 1:25. (No TrueType Rasterizer download)

If the 30 SECOND TIMEOUT is reduced to 10 seconds, then the overall printout time should drop by 15-20 seconds.

Courier Font With 30 Second Timeout

c) IINTX took 1:55 minutes
d) IIg took 1:25 minutes

I then tried a 45 page pair of duplicate documents with 10 second timeout and NOIRO font:

e) IINTX took 10:20 minutes TOTAL Time. Downloading and spooling to

PrintMonitor done in 3:30 minutes, a 40 second delay before printing started (the rasterizer), and the remainder of the time printing (about 6 minutes to do 45 pages, not bad)

f) IIg took 9:15 minutes TOTAL Time. Downloading and spooling to Print Monitor done in 3:30 minutes, no delay in printing, and the remainder of the time printing (about 5:45 to do 45 pages, not bad)

Printing a word processing document (4 pages in NOIRO)
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a) IINTX, first page dropped to the tray in 80 seconds.
b) IIg, first page dropped to the tray in 30 seconds

Printing a word processing document (4 pages in Courier)
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a) IINTX, first page dropped to the tray in 65 seconds.
b) IIg, first page dropped to the tray in 25 seconds

Keywords: <None>

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19960215 11:05:19.00
Tech Info Library Article Number: 14231