

Technical UNIX® User Gastropod

April 1989
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(cheap!)

newsletter of the
Technical UNIX®
User Group

This month ...

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Late Breaking News...
Next Meeting to be held at UNISYS
See inside for details

Editor's Note

by Darren Besler, Editor

April is upon us now and winter still doesn't seem to want to go away. I only hope it goes away real soon. I am starting to forget what grass looks like.

I would like to take this time to apologize for the numerous editorial errors that have occurred in the last few newsletters. With working full-time, working on my Master's degree, and acting as newsletter editor, I barely have time to do the newsletter composition. Editing the newsletter to ensure all spelling mistakes are removed sometimes has to be neglected considering time allowances.

Again, I request membership contributions for the newsletter. Contributions are accepted both on paper or in machine-readable form. The preferred method of submission is in machine readable form if the article is very long. If you have something you would like to contribute, give me a call and we will see if we can work out a convenient method of submission.

Let's hope those April showers aren't made of the white stuff and I'll see you at the April 11th meeting.

Group Information

The Technical Unix User Group meets at 7:30 pm the second Tuesday of every month, except July and August. The newsletter is mailed to all paid up members 1 week prior to the meeting. Membership dues are \$20 annually and are due at the October meeting. Membership dues are accepted by mail and dues for new members will be pro-rated accordingly.

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ANNOUNCEMENT...

Meeting Location Change:

For April's meeting, we will be gathering at UNISYS, 300 - 1661 Portage Avenue. In order to have an idea of the number of people to expect, please RSVP if you are planning on coming out to the meeting. This can be done by phoning Susan Zuk at 786-8483 and leaving a message that you will be attending the meeting. This can be done up until 5:00 pm on April 11, 1989.

Resident Coroner

by Gilbert Detillieux, President

Well, I guess it's better late than never... Our local industry psychic, Jean U. Nixen, has just come out of a four month long coma brought on by excessive meditation, and now presents her list of predictions for 1989. We apologize for any hardships created by the delay.

- 1) IBM will announce that MVS and MS-DOS will be phased out in favour of AIX, and that AIX will be the only operating system for its entire product line by 1995.
- 2) Microsoft will unveil a working version of Excel for OS/2 in mid September.
- 3) Microsoft's OS/2 Excel will complete it's first recalculation in early October.
- 4) Unix International and the OSF will kiss and make up. The Mach International Group will be formed by dissenters from both camps.
- 5) Unisys will buy out NCR, Arix, Concurrent, Bull, Prime, MAI, and Fujitsu, and will begin merger negotiations with IBM.
- 6) John C. Dvorak (PC Magazine regular) will buy a UNIX machine this year... And love it!
- 7) Hell will freeze over. (Sorry we were late on this one.)
- 8) The Technical UNIX User Group will grow to 500 members, and begin looking for a larger meeting room.

Our psychic will be back with more predictions, when she's all better.

And now, for something a little less silly. Due to some small gremlins in our newsletter production process, various shell program listings that appeared in past issues were "not exactly as illustrated." The problem was mainly due to the way PageMaker translates quotation marks, which appear by the zillions in your average shell script. In the back pages of this issue, you will find corrected listings of all shell programs that appeared in previous newsletters. Share and enjoy!

* * * * *

The March meeting featured a lively workshop on communications. Most of the time was spent on describing the various confusing files used in setting up UUCP. For the April meeting, we will continue with UUCP, and actually establish a connection to another UUCP-ready site in town. After that, the floor will be open for other communication related topics, time permitting. We will be meeting at Unisys (300-1661 Portage, between St. James St. and Route 90), starting at 7:30 PM sharp.

Wow! Talk about organized. We now have all our meetings planned, more or less, until the summer break. The May meeting will feature another workshop, dealing primarily with printers and spoolers. The location for this meeting has yet to be confirmed, so stay tuned.

As for the June meeting, which will be the last one before the summer (we meet again in September), we wanted something less formal, and more of a social get-together. One member suggested a barbecue, and is willing to host it (not confirmed yet, either). I think this is a great idea, and a good way to close off the year of meetings. What do you all think? Let us know.

Hope to see you at the next meeting (April 11). A happy springtime to all!

The fortune file

This month's fortune comes care of Gilles Detillieux. (Taken from the Masscomp Fortunes program. Really.)

Them Toad Suckers

How 'bout them toad suckers, ain't they clods?
Sittin' there suckin' them green toady frogs!

Suckin' them hop toads, suckin' them chunkers,
Suckin' them a leapy type, suckin' them flunkers.

Look at them toad suckers, ain't they snappy?
Suckin' them bog frogs sure make's 'em happy!

Them hugger mugger toad suckers, way down south,
Stickin' them sucky toads in they mouth!

How to be a toad sucker, no way to duck it,
Get yourself a toad, rear back, and suck it!

— Mason Williams

System Tuning

by Susan Zuk

All system administrators want their systems to run as efficiently as possible. In February our workshop topic discussed one way to monitor the efficiency of the UNIX operating system. We examined a utility called the system activity reporter or *sar*. This article will explain what to watch out for and how to reconfigure the system while receiving data from *sar* reports.

First we will look at how to set-up *sar* to capture the information required. The *sar* command is used to both collect information from the system as well as display its findings.

Let's see how to gather information. *sar* will take samples at any number of seconds (*s1*) a total of (*s2*) times. The reports can be displayed on screen or be redirected to a file.

```
eg. sar s1 s2 -o filename
    sar 2 200 -o sarfile
```

The italicized example states that at 2 second intervals for 200 times snapshots of kernel information will be gathered and placed into the file named *sarfile*. The *-o* option placed the data into the file.

To view the information collected the administrator can select specific or all reports of activity depending on what options are typed. The following are samples of activity reports, what valuable information they produce, as well as what to do with values which may be causing problems with the system.

1. CPU Usage.

```
sar -uf sarfile
```

This command illustrates the percentage of time the CPU is being utilized in four areas:

- a. executing user code
- b. executing system code
- c. waiting I/O
- d. idle time

Report Generated :

	%usr	%sys	%wio	%idle
14:03:46				
14:03:48	20	19	6	55
14:03:50	21	20	7	52
14:03:52	12	11	13	54
14:03:54	10	12	11	67
Average	16	16	9	57

%sys Percent of the time the CPU executed in system mode

%usr Percent of the time the CPU executed in user mode

%wio Percent of time the CPU was idle, but waiting for I/O to complete

%idle Percent of time the CPU was idle

When examining this report it must be noted that the %wio should be <7, %usr and %sys should be close to each other and %idle should be >10.

This report states that there is possibly a disk bottleneck. The file system should be checked to balance I/O across disks.

Other ways to correct the above problem would be to:

- increase buffers
- create a separate /tmp directory
- optimize with *dcopy*
- add a disk device
- set sticky bits

The primary choice would be to check the buffers which are set in the system configuration file. There are tunable parameters in this file. The ones we are interested in are *BUFFERS* and *HASHBUF*. Check your machine's configuration manual for the minimum and maximum *BUFFERS* value to use. For example, on a UNISYS 5000/50 the maximum *BUFFERS* would be 1000 and the maximum *HASHBUF* would be 256 (Note: *HASHBUF* must be a power of 2). For the UNISYS 5000/95 the maximum *BUFFERS* value is 1000 and the maximum *HASHBUF* value is 1024. You should try to keep the *HASHBUF* value close to the *BUFFERS* value.

Since you are changing the configuration of the kernel you must remember to remake the kernel to reset these values. If when you reboot the system you receive the message **panic : binit** lower the *BUFFERS* value as it is too large for other kernel structures and drivers. It is requiring more than the maximum logical address space for the kernel.

dcopy is a utility used to optimize a fragmented file system by copying it to another file system of the same size. What it does is reorganise the free block chain. The same thing can be accomplished by archiving the file system to a tape which does not copy inodes, superblocks or whole file systems (ie. *tar* and *cpio* can be used).

If your system has an application which creates and removes large numbers of files, this may solve your problem for a short time. If you do have applications that result in this, then you might want to partition your disk so that the fragmentation is confined to a small area of the disk. This would also be a time to create a separate partition for /tmp. Remember not to make /tmp too small, as many programs are loaded into this area before they are placed into their designated location.

If you have programs which are used frequently you might want to set the sticky bit (chmod +t). This would copy the image of the program to the swap area and allow the program to be accessed more quickly.

If %idle is <10 it indicates that the system is having difficulty keeping up with the load and you should consider reducing the system load or moving some activity to another system.

2. System Buffer Activity

sar -bf sarfile

This command measures the efficiency of the system buffer area. The system buffer is used to minimize the I/O which occurs to read and write files. The efficiency is determined by the percent by which the system can avoid I/O since the data blocks are already in the buffer.

The Report area we are interested in :

Time	%rcache	%wcache
14:03:46		
14:03:48	90	100
14:03:50	98	100
14:03:52	100	100
14:03:54	98	100
Average	97	100

%rcache Fraction of logical read requests for which the block was found in the buffer area

%wcache Fraction of logical write requests for which the write was performed in the buffer area

%rcache should be >90 and %wcache should be >80. If this is not the case, follow the same sequence of events as with sar -u. This again would be a place to check the BUFFERS and HASHBUF values and adjust as required. Be careful when adjusting these values as it may increase swapping which would have significant affects on performance. The effects can be observed by looking at the next 2 reports.

3. Swapping and Switching Activity

sar -wf sarfile

sar -w measures the amount of actual swapping and switching activity. When there isn't enough room in memory for all processes in the system the swap area is used. If there is excessive swapping system performance is degraded since the process must be loaded into memory to be executed.

The system switches between processes when it allocates the CPU to another process. Excessive switching also degrades system performance because the increased overhead for switching means the CPU has less time for executing user processes.

The Report area we are interested in:

Time	swpin/s	swpot/s
14:03:46		
14:03:48	0.00	3.75
14:03:50	0.00	0.00
14:03:52	0.00	0.00
14:03:54	0.00	0.00
Average	0.00	.93

swpin/s Average number of transfer requests into memory per second

swpot/s Average number of transfer requests from memory to the swap area per second.

If swpot/s is >1.0 the amount of system memory should be increased or the size of the BUFFERS should be decreased.

swpin/s is mentioned here to note a difference. swpin/s includes the initial loading of programs whereas swpot/s doesn't so it is better to watch swpot/s for your information.

4. Queue Activity

sar -qf sarfile

The above command measures the use of Run Queue and the Swap Queue. The Run Queue is a list of all processes which are ready to execute and are waiting for the CPU. The Swap Queue is a list of all processes which are swapped out (in the swap area) but are ready to execute.

Report Format:

14:03:46	runq-sz	swpq-sz	%swpocc
14:03:48	2.3		
14:03:50	2.2	1.0	20
14:03:52	2.3	1.0	33
14:03:54	2.3		
Average	2.3	1.0	13

runq-sz Average number of processes in the Run Queue per second

swpq-sz Average number of processes in the Swap Queue per second

%swpocc Percent of time the Swap area was occupied by at least one process

If %swpocc is >90 and the runq-sz is >2 the report is indicating that the CPU is heavily loaded and the response time for users is decreasing. If this starts occurring reduce the system load, add another CPU or spread the activity over more than 1 system.

If %swpocc is consistently >10 the system is indicating that excessive swapping is occurring and more system memory should be added or the size of BUFFERS should be decreased.

5. System Table Activity

sar -vf sarfile

This command shows various tables and if they are nearing the overflow point or have already been overflowing.

The Report :

14:03:46	text-sz	proc-sz	inod-sz	file-sz
14:03:48	11/40	58/70	99/150	140/150
14:03:50	15/40	48/70	110/150	130/150
14:03:52	25/40	52/70	149/150	113/150
14:03:54	14/40	35/70	144/150	129/150

text-sz the number of entries in use at the time of the sample and the total size of the Text Table

proc-sz the number of entries in use at the time of the sample and the total size of the Process Table

inod-sz the number of entries in use at the time of the sample and the total size of the Inode Table

file-sz the number of entries in use at the time of the sample and the total size of the System Open File Table

The above listed parameters are also accompanied by their respective overflow parameters (ie. text-ov). If there is a value below, for example text-ov, the text parameter would need to be increased in the configuration file and the kernel remade. This would be the same procedure as with changing the BUFFERS and HASHBUF values. The values should be increased as soon as the threshold is being neared. Also, if any of the table sizes are too large decrease the values to save memory. If you ever start to observe overflow errors on the console this is the first area to check for remedies.

The reports listed would be generated using only 4 snapshots. Do not use such a short period of time to sample your system. Pick times when your system is busy and then let the process run for 100 or more snapshots. This will give you a better idea on how well your system is operating.

The previous 5 samples of the sar command should help you to understand your system better. Systems are created with default tunable parameters. You then have the opportunity to tune your system to perform efficiently with whatever applications you are using. This means that you will need to try various configurations before you know what is best for your system.

Treasurer's Report

Gilles Detillieux, Treasurer

Balance Sheet (as of Mar. 31, 1989)

Assets:	
bank account	324.83
Liabilities:	
accounts payable	
- postage	75.26
- paper	22.50

Total	97.76
Equity:	
net income	227.07

Total liabilities + equity	324.83
	=====

Income and Expenses (Oct. 1, 1988 to Mar. 31, 1989)

Income:	
membership dues	478.00
Expenses:	
bank service charges	4.05
cheque printing	32.11
name search + notation	30.00
postage	75.26
stationery	
- envelopes	33.17
- rubber stamp	19.87
- mailing labels	33.97
- paper	22.50

Total	109.51
Total expenses	250.93

Net income	227.07
	=====



Minutes From the Business Meeting March 14, 1989

1. Minutes:

MOTION : (Susan Zuk) The minutes from the March 14, 1989 meeting be approved.

SECONDED : (Darren Besler)

In Favour : 15

Opposed : 0

Carried

2. Membership Report:

A membership form will be ready soon for all new as well as current members to fill out. The form will include a question asking if member's will allow outside companies or organizations access to their mailing address.

3. Newsletter Report:

Nothing to report.

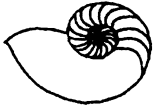
4. Treasurers Report:

October is the start of the year. The April newsletter will include statements as of the end of March.

5. Miscellaneous:

The Chamber of Commerce Business Show will be held from April 25-27 not April 26-29 as stated in last month's minutes.

Richard Willacy discussed that it would be nice to review UNIX packages at future meetings. Matt Binnie then stated that he could show the group a product called Uqueue, a spooler package, at the May meeting. Future meetings can also have members demonstrating their packages. Let us know if you any ideas.



Technical UNIX User Group

Agenda
for
Tuesday, April 11, 1989
7:30pm
UNISYS
Canadian Indemnity Building
300-1661 Portage Avenue

- | | |
|--|------|
| 1. Round Table | 7:30 |
| 2. Business Meeting | 8:00 |
| a) Minutes of ^{March} January 's Meeting | |
| b) Membership Secretary's Report | |
| c) Newsletter Report | |
| d) Treasurer's Report | |
| 3. Break | 8:30 |
| 4. Presented Topic | 8:40 |
| System Administration Workshop | |
| Communications - uucp & cu | |
| 5. Adjourn | 9:30 |