PROGRESS EXCHANGE 2013

DISCOVER. DEVELOP. DELIVER.

OpenEdge Database Performance Tuning

PROGRESS

Contents

Purpose

This document accompanies the Progress Exchange 2013 Performance Tuning Workshop. It provides step-by-step instructions for the hands-on portions of the Workshop.

Disclaimer

This document is not a manual. It provides examples of OpenEdge features and methods for monitoring database performance. Complete documentation for using the OpenEdge can be found online here http://communities.progress.com/pcom/docs/DOC-16074. Progress Software cannot be held responsible for the content of this document nor for any damage that may occur to your environment.

Overview

In this workshop, you provide hands-on experience using common tools to analyze performance with an OpenEdge database. This workshop will also provide demonstrations and ways to test using some new performance tuning options for the OpenEdge database.

LAB 0 Setting up Putty for Connection to the Progress Cloud machines.

Objective

Configure putty to connect to the Amazon cloud machines using an authentication key file.

Duration

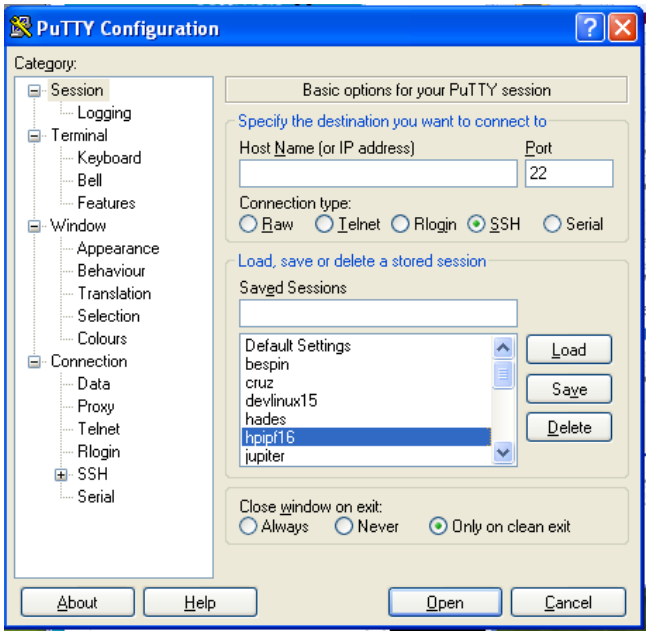
5 Minutes

Goals

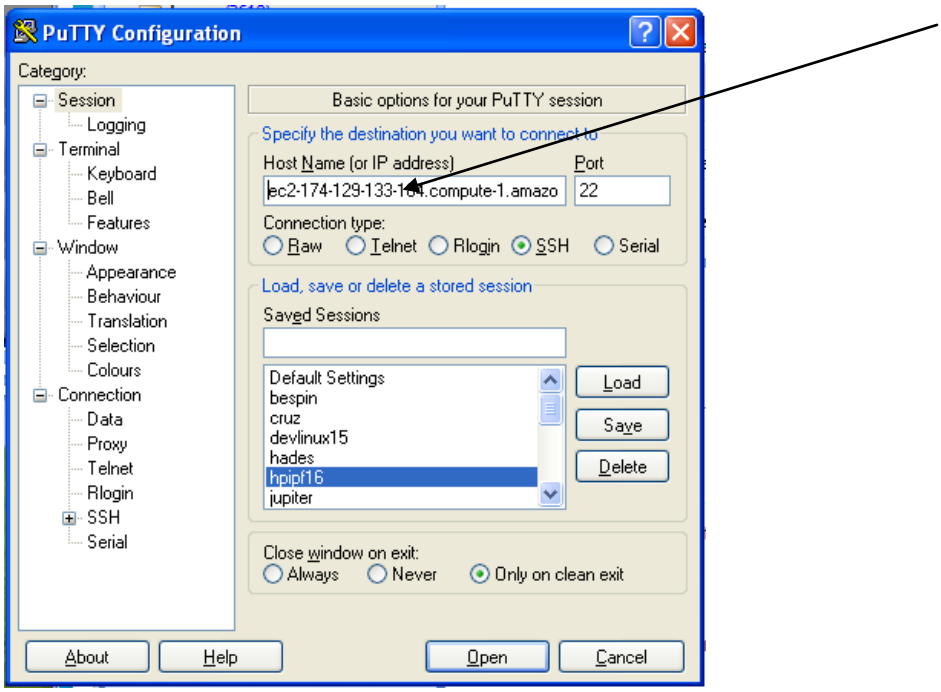
Configure putty to connect to the Amazon cloud machines using an authentication key file.

Instructions

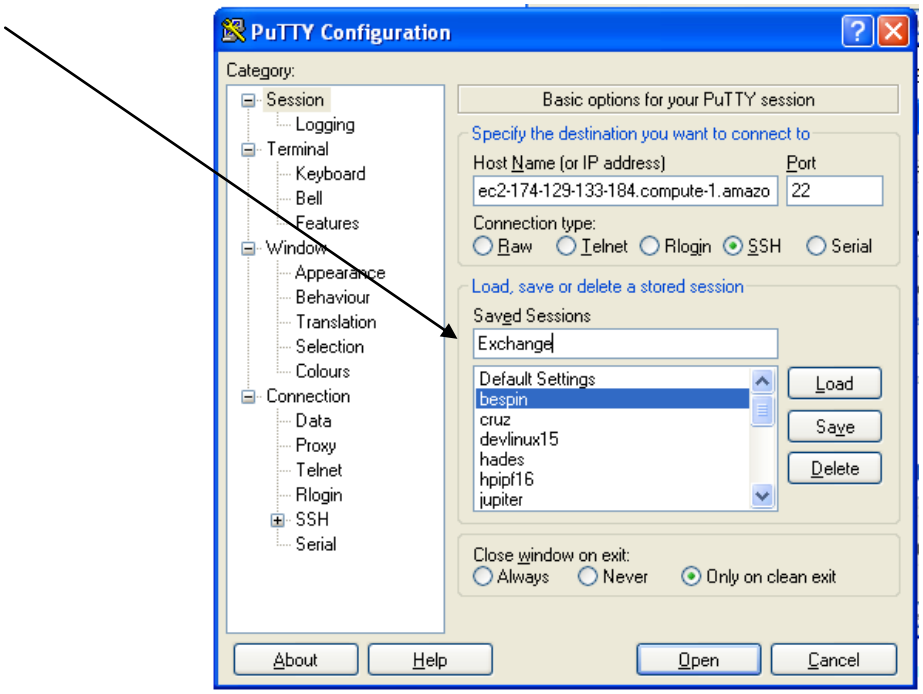
1) A putty.ppk file should have been sent to you by email.
2) Save this file to a directory on disk that you can easily find afterwards.
3) Open putty.exe
4) The initial configuration screen for putty should look like this:



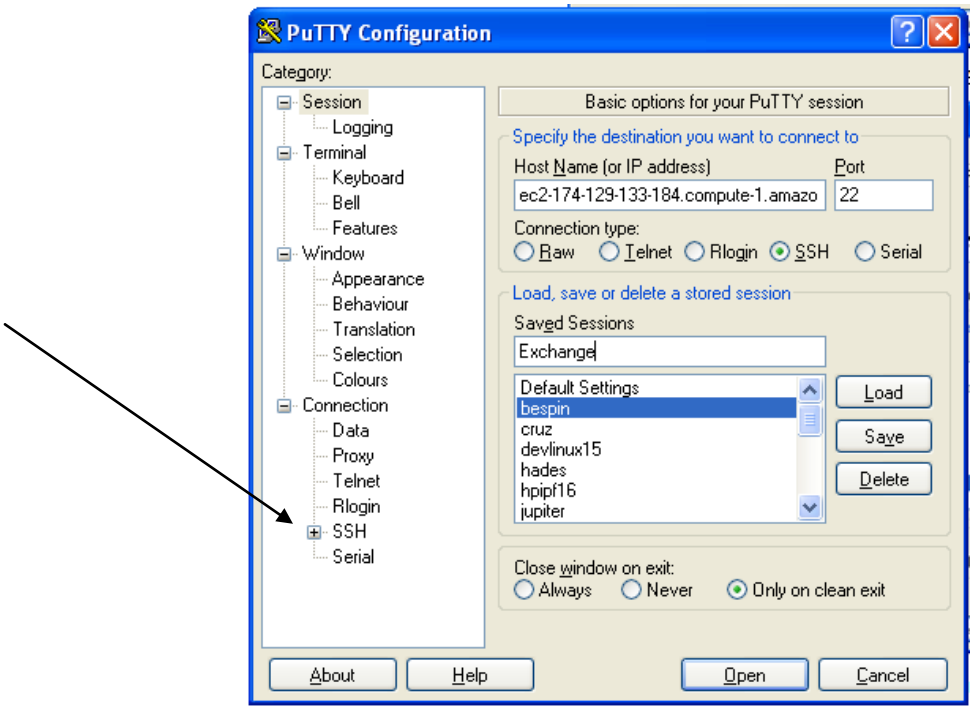
5) Enter the hostname or IP address for the Amazon Cloud system in the Host (or IP address) field



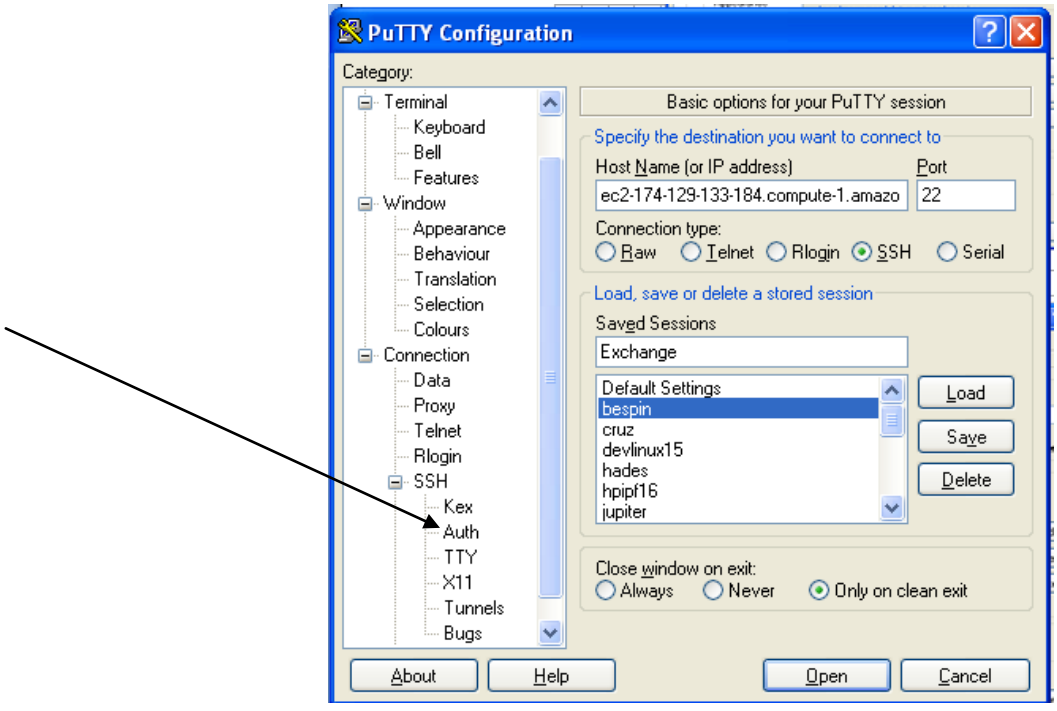
6) After entering the host you can define a saved session name



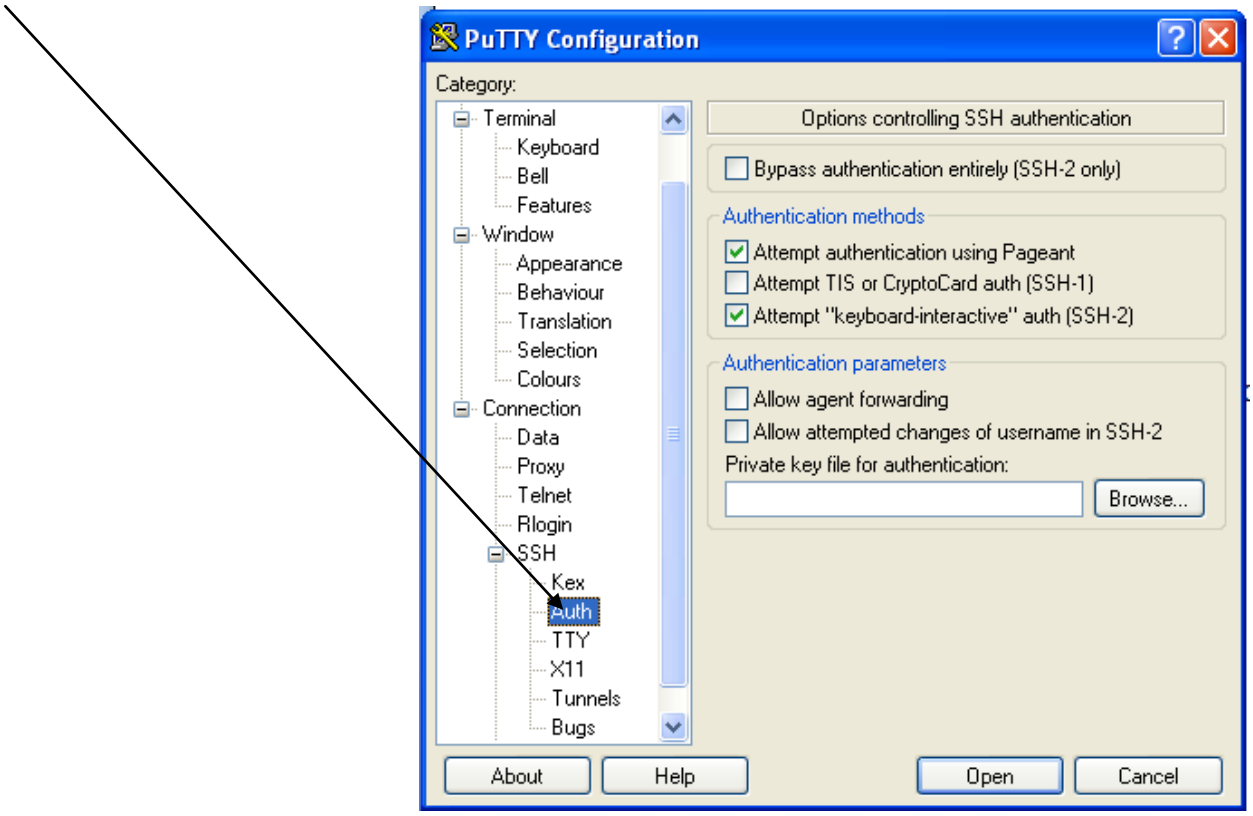
7) Then expand the SSH option in the left pane by clicking on the expand toggle



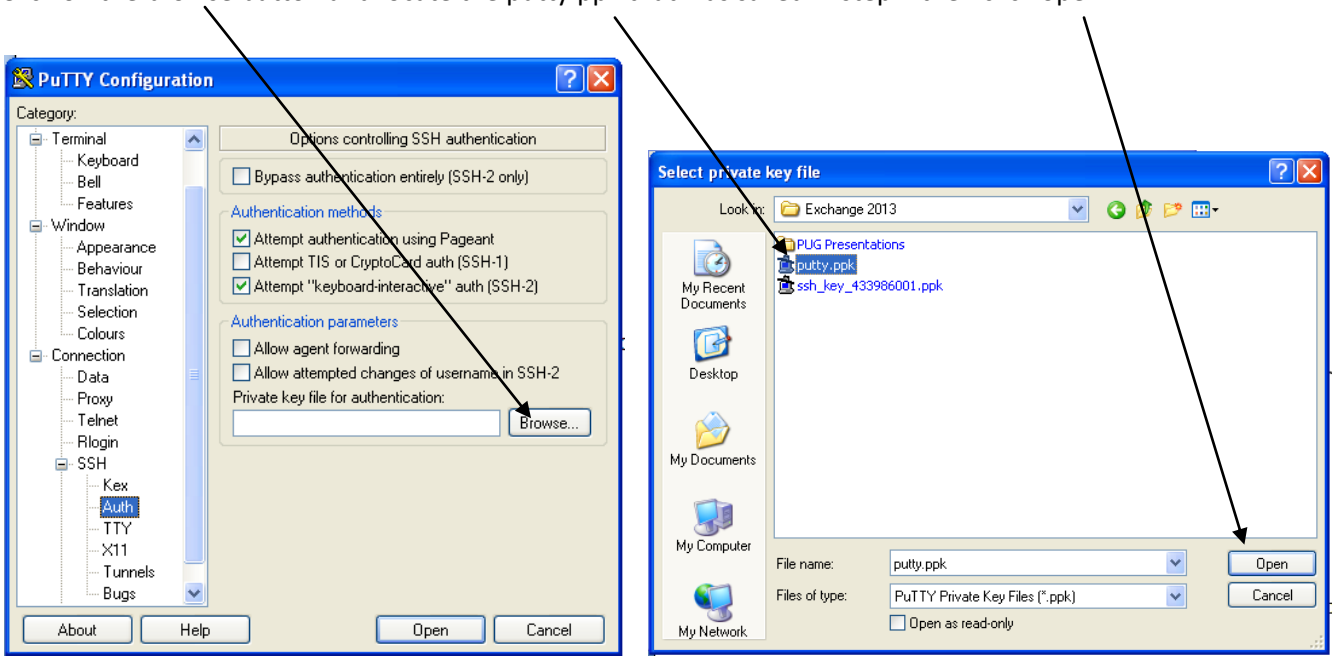
8) The Auth portion of the SSH configuration will now be visible



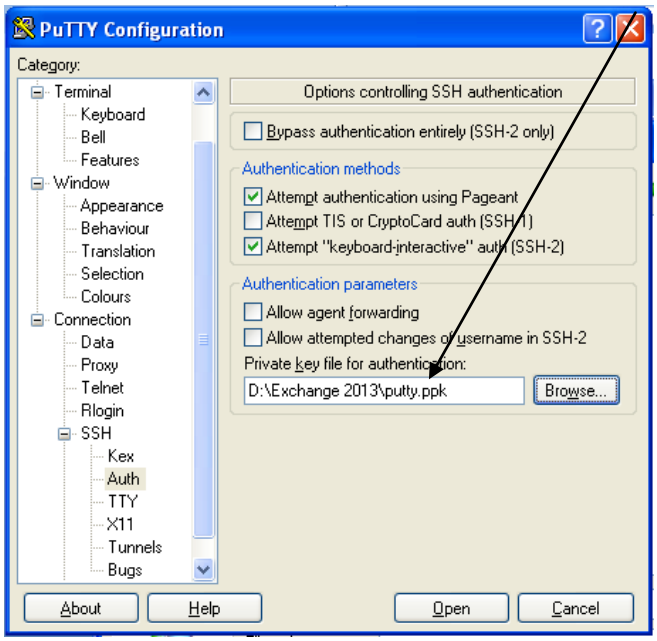
9) Click on the Auth option



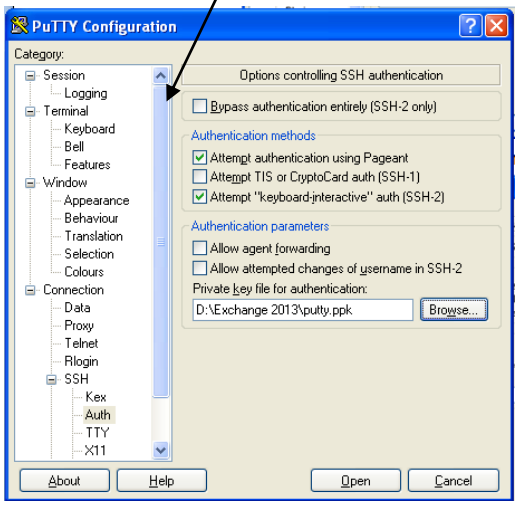
10) Click on the browse button and locate the putty.ppk that was saved in step 2 then click open

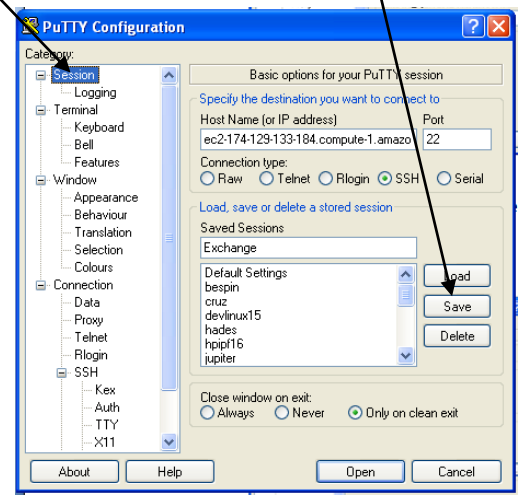


11) The private key file for authentication should now be selected

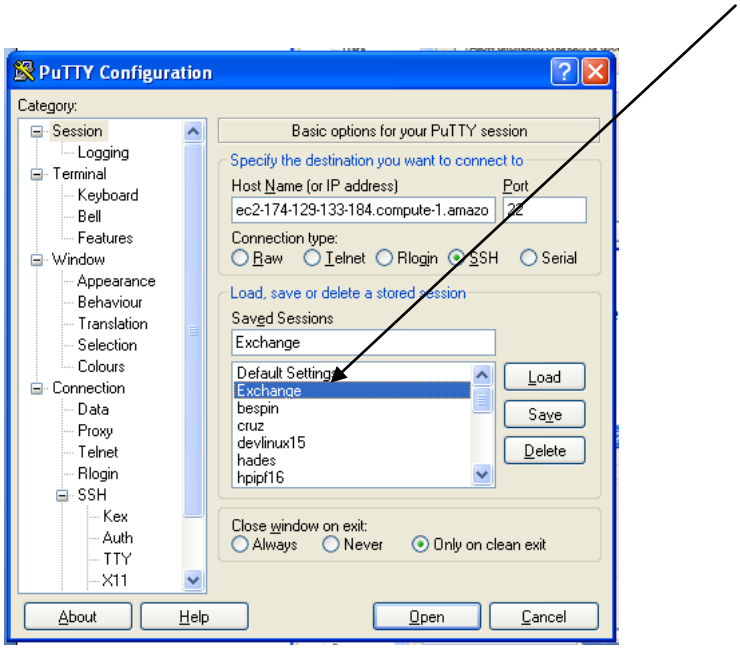


12) To save this configuration you must now scroll up in the left pane of the putty configuration window until Session is visible then click on Session then click on the save button

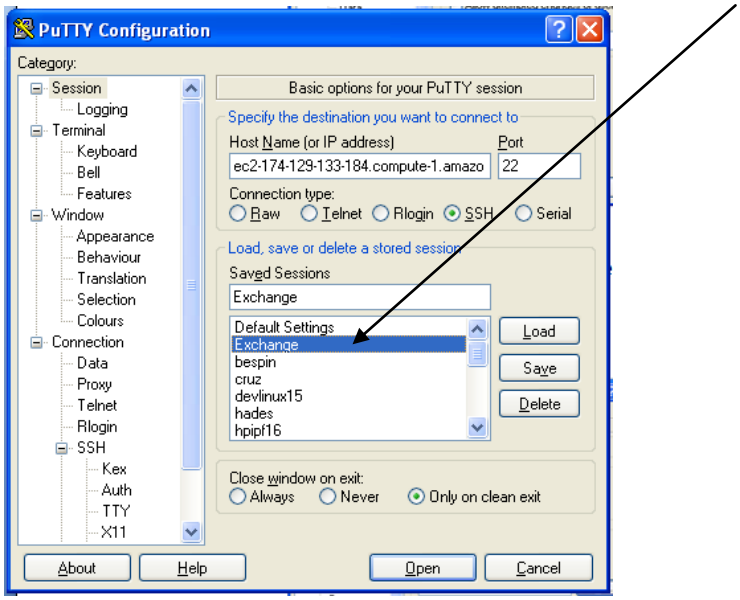




13) This will store the configuration under the name chosen in step 6



14) Throughout the rest of this workshop whenever you are asked to start a new putty session open putty, highlight the named session you saved, then click on open



15) For all putty sessions the root login will be used. No password is necessary.

Lab 1 Performance Monitoring

Objectives

In parts a, b, and c of this lab you will learn how to monitor the OpenEdge database with various tools.

- You will learn to monitor the database with the promon gather script:
- You will learn what the gather script does s and does not do for the database administrator?
- Learn common operating system utilities and their role in identifying performance problems.

Part (1a) Promon and the Gather Script

Duration

20 minutes

Goals

- In Lab1a you will learn how to monitor the progress database with promon and the gather script which comprehensively collects data to analyze performance and help detect problems.

Instructions

Open two or more shell sessions for this exercise.

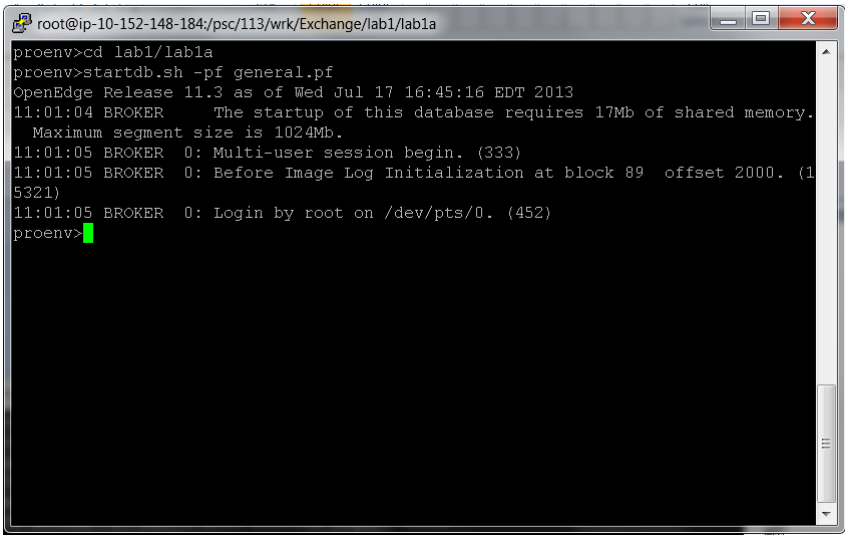
1) Open three putty sessions and type the following commands in both sessions:

   ./proenv

   cd lab1/lab1a

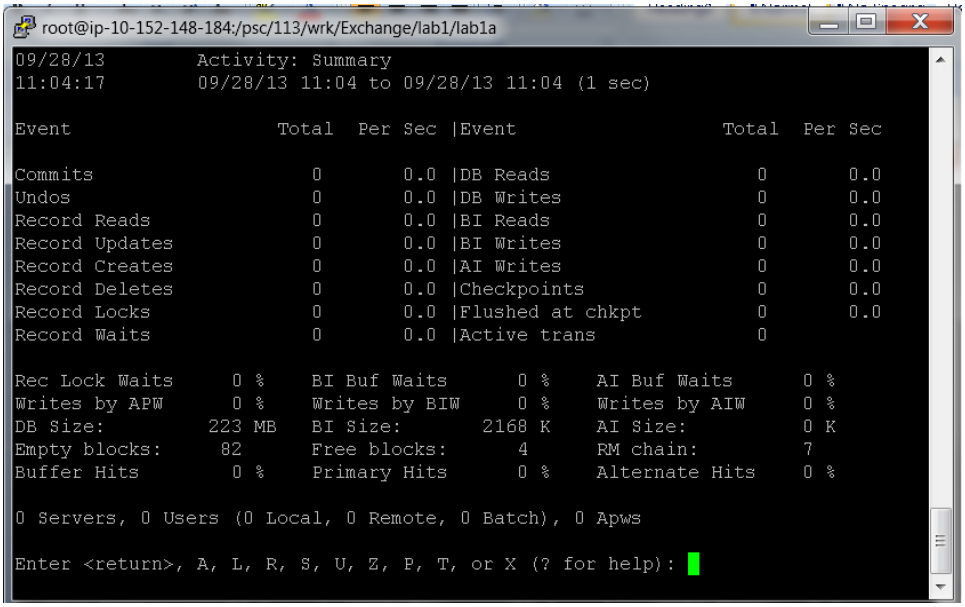
2) In the first session type this command to start the database with some general parameters:

startdb.sh -pf general.pf



3) in the second session type these command to run Promon against the database and look at the database activity:

promon.sh
Enter R&D (R&D. Advanced options)
Enter 2 (2. Activity Displays ...)
Enter 1 (1. Summary)
Enter Z to zero out the counters



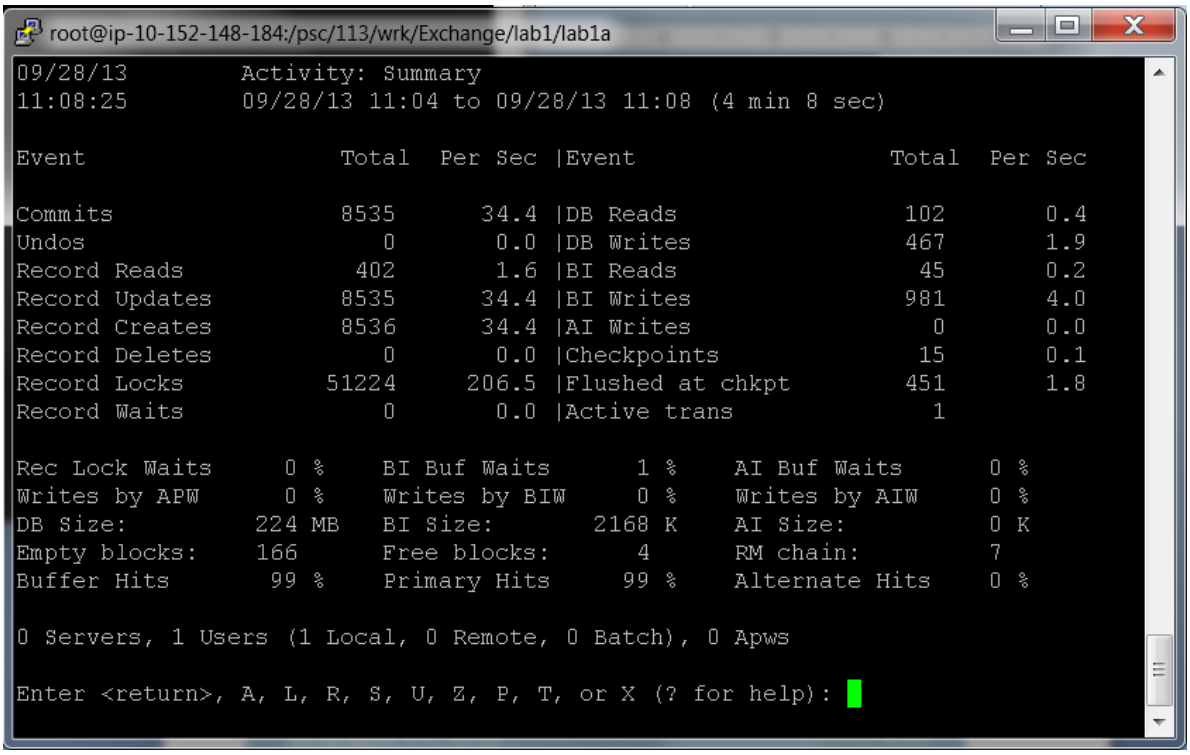
9) In the first session type this command to create some activity against the database:

multiuser.sh -p busywork-no-pause1.p

10) When the program finishes it will say "Press space bar to continue." which will finish the program.

11) At this point go to the second putty session which is running promon

12) press U for update

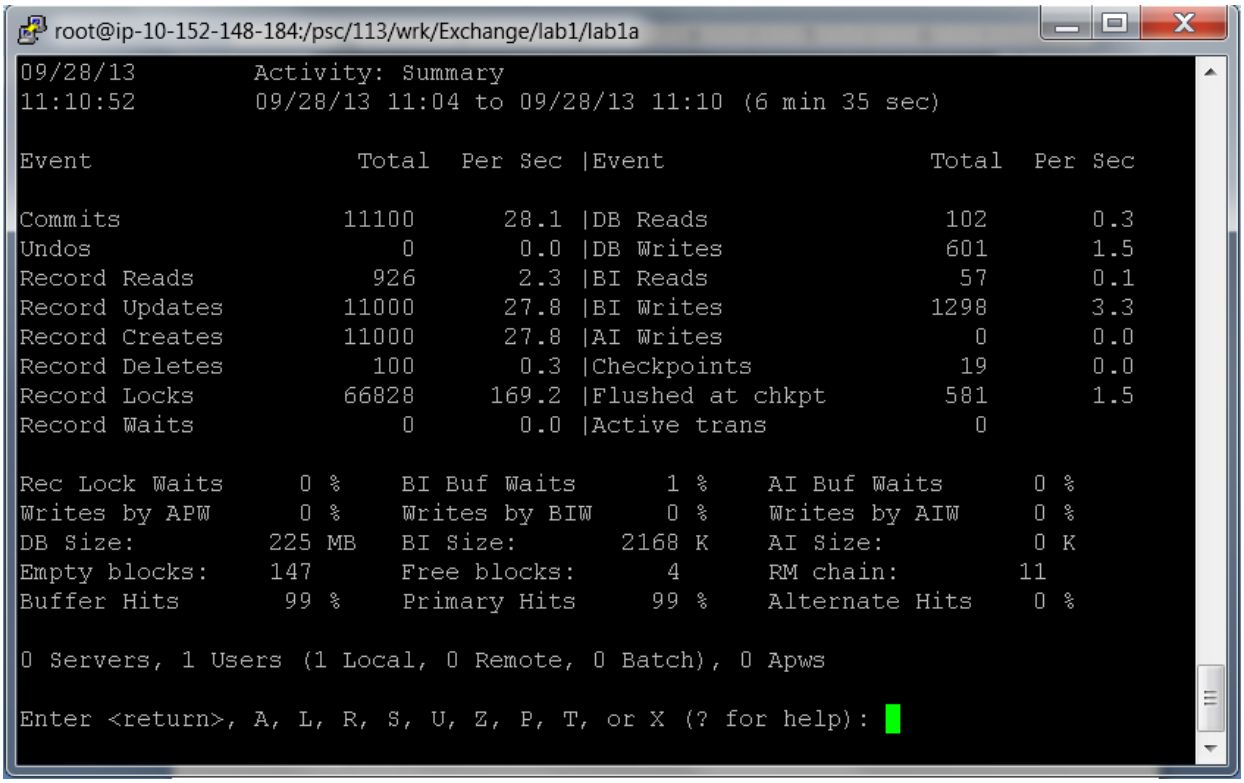


13) In the third putty session and issue the following commands:

multiuser.sh -p busywork-with-pause.p

14) press space bar to begin the first phase of work in the third putty session

15) go back to promon and press U for update



16) Disconnect both client sessions

press space bar in each of the client sessions until you return to the proenv prompt

In some cases because the client is in a tight loop it may be necessary to kill the session and start a new client session.

17) Connect both client sessions again and run busywork-no-pause1.p

multiuser.sh -p busywork-no-pause1.p

18) Use the same promon screen to monitor the data

Press u several times note how quickly the information is changing which makes analysis more difficult.

Note how quickly the information is changing which makes analysis more difficult.

When taken in isolation, promon can easily see everything any one process does and that is clearly visible to you the DBA.

19) Press X to exit the promon session

When more than one client is performing work it can cloud the stream of data and make it more challenging to identify what is happening at a minute, granular level.

20) Use the gather.sh (gather.sh on Unix) script against the database. Issue the following command in the putty session where promon was running:
gather.sh perf

The perf option is available for the Unix version of the gather script.

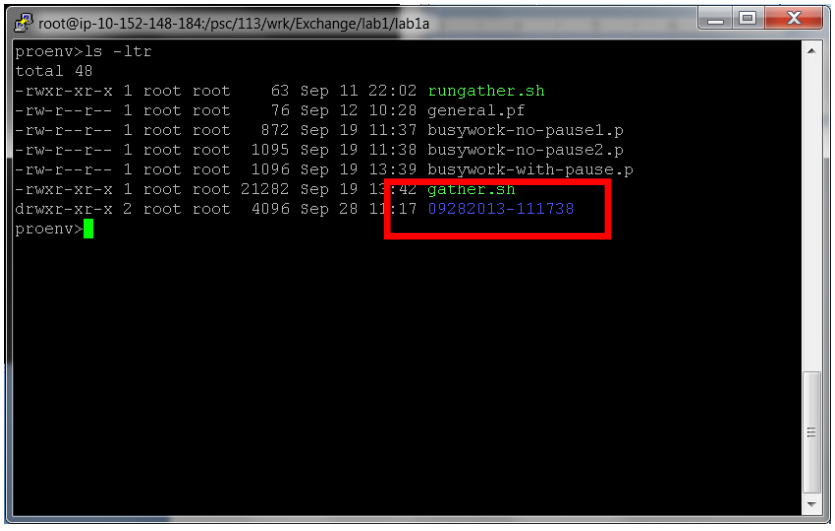
This limits the gather to collect performance monitoring data only.

The script for this workshop has been customized to embed a specific database name within the script.

Issue this command from the proenv prompt:

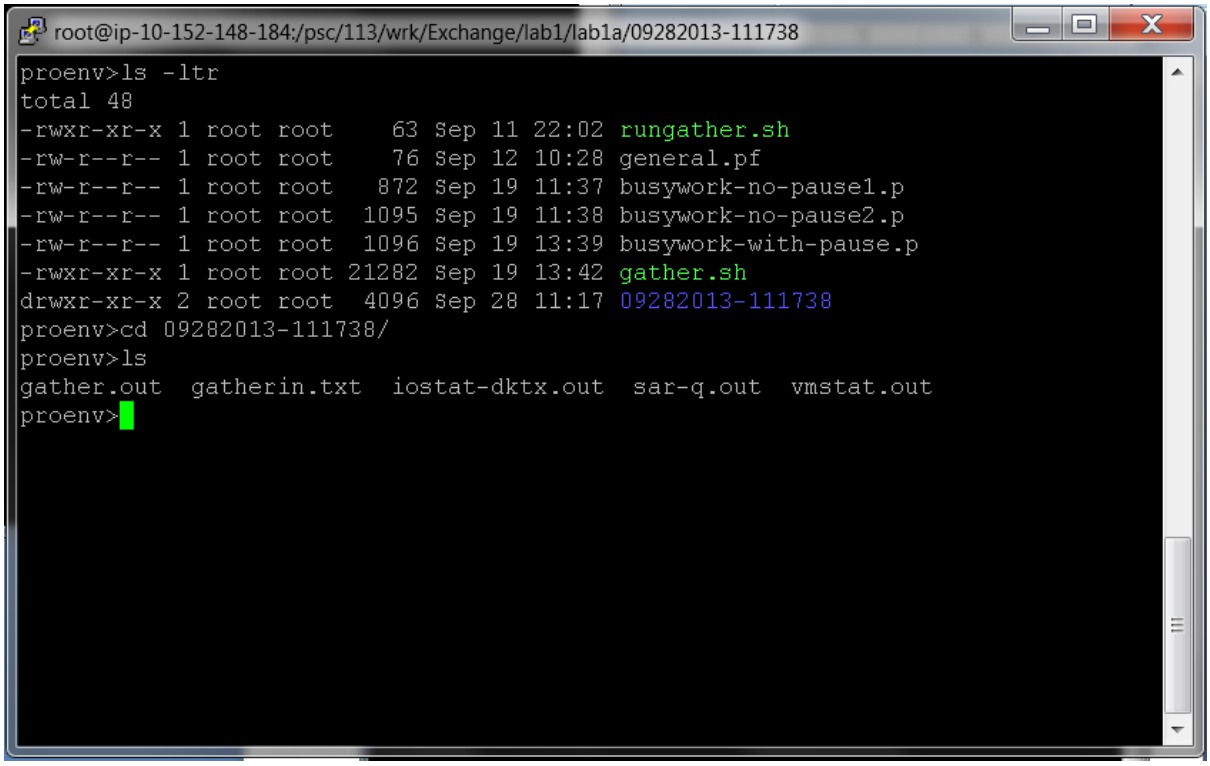
21) Hit the Enter key at least once after the gather script has been started as it will typically not signify it is completed.
22) When the command has returned to the proenv prompt issue the following command:
ls -ltr

You should see a directory which will be the date and timestamp when the gather script command was run similar to what is pictured here:



23) Use the cd to switch directories into the directory created by the gather script

24) Issue the ls command to view the list of files created by the gather script.
The screen shot below is just an example of the files that gather creates.



25) Close all putty sessions.

Without the perf option the gather script on Unix will collect a list of Progress processes running on the system and send non-destructive signals to each process to get stack trace information.

Why is gather so long? Because it is better to throw the kitchen sink at it than hunt and peck for answers when an emergency is occurring. All the files gather created in one simple script instead of starting them manually.

For targeted situations when no critical time crunch is present, hunting and pecking in promon might be better however for emergencies, the gather script collects most of what is needed for problem analysis by Technical Support and Development or general performance tuning investigations.

Part (1b) prostack (Unix) and Progetstack

(Windows progetstack is not part of this workshop demonstration)

Duration

5 minutes

Goals

- In Lab1b you will learn how to trigger OpenEdge executables to create a stack trace which can help in the isolation of performance problems and process hangs.

Instructions

Prostack and progetstack are Progress tools introduced in 10.1C and written to connect to a running process and trigger the process, if it is responsive, to drop a stack trace including both 4GL and C code stack.

prostack syntax on Unix is:

prostack { -r | -a Pid } ImageFile [CoreFile]

Example against _progres if the PID was 2849:

prostack -a 2849 /psc/113/dlc/bin/_progres

progetstack syntax on Windows is:

progetstack {PID}

Sending a Signal to the Process

On Unix other command line tools can be used to trigger the generation of a stack:

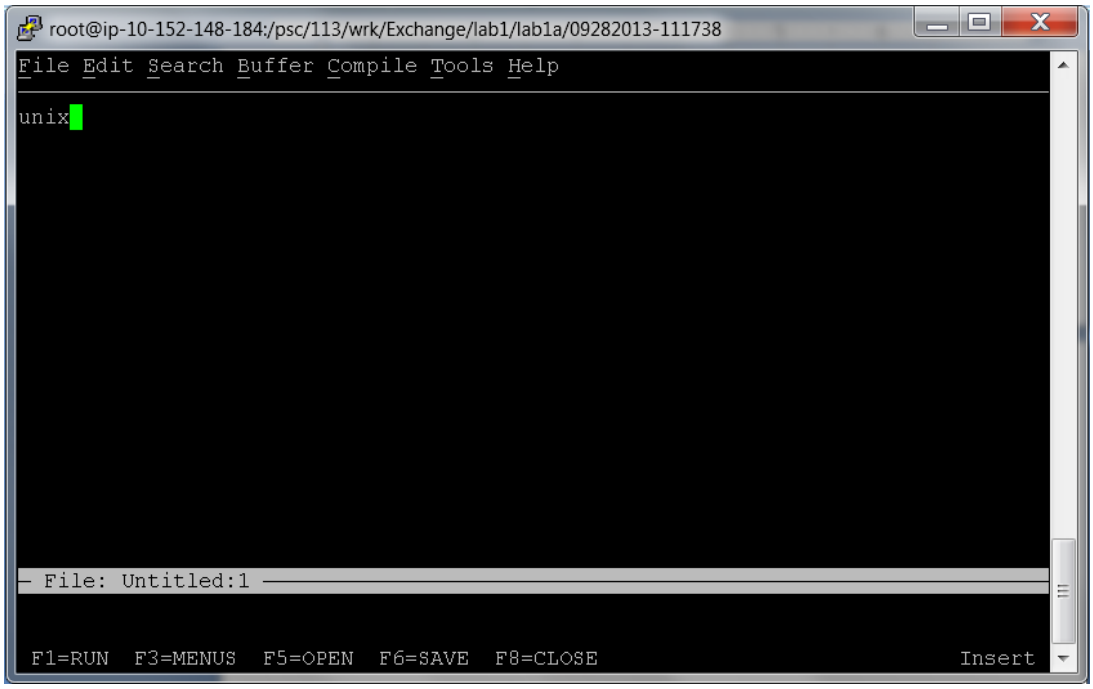
1) Start a putty session and type the following commands:

./proenv

cd lab1/lab1b

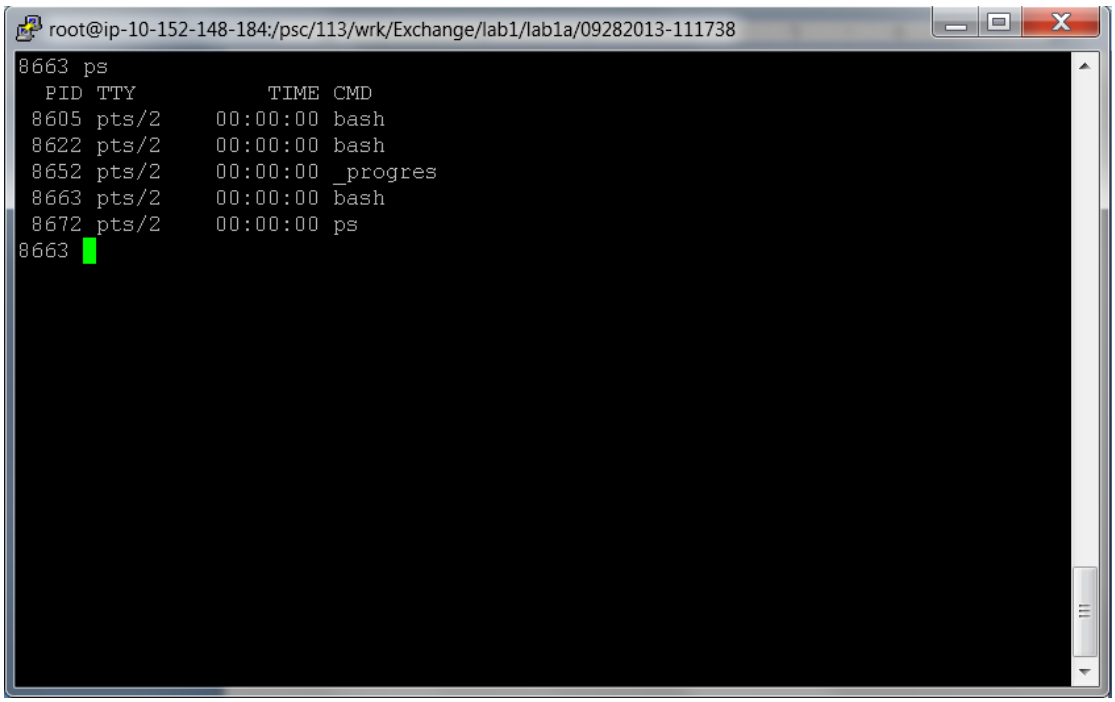
pro

2) Type unix



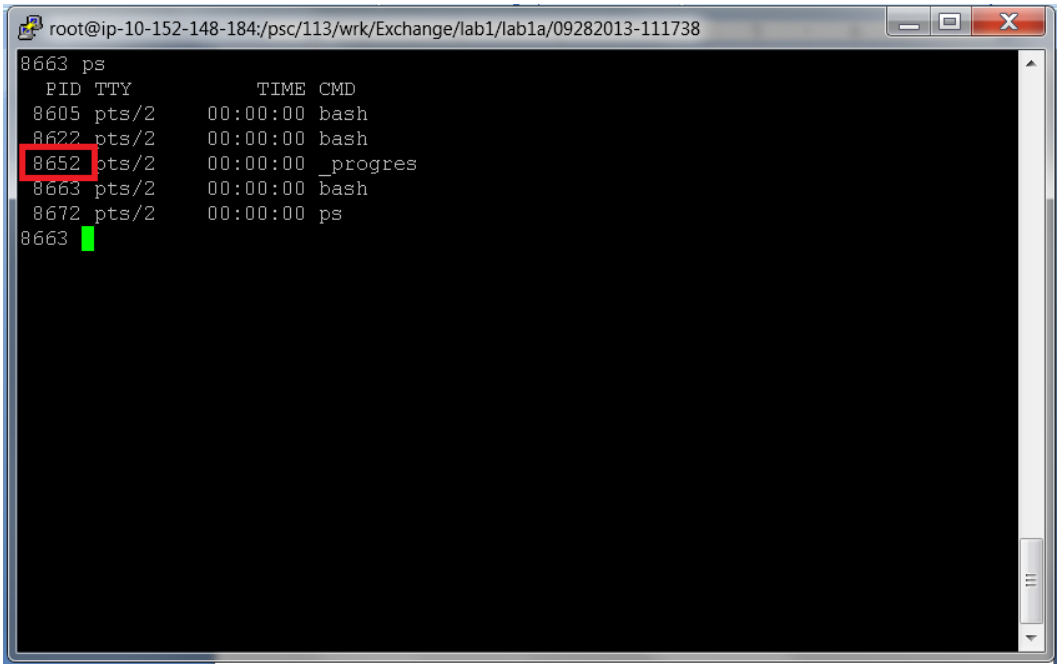
3) Type control + x to enter a subshell within the Progress session

4) Type ps to get a list of jobs



5) Identify the PID for the _progres session which is found in the first column.

Example:

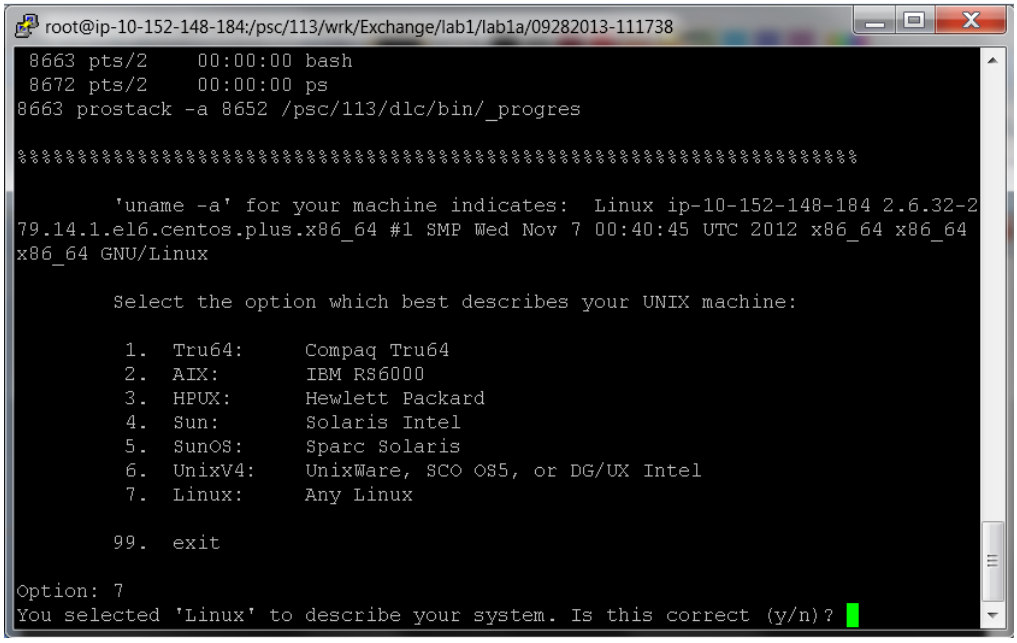


6) Type prostack -a <PID of the _progres session> /psc/113/dlc/bin/_progres

Example:

prostack -a 8652 /psc/113/dlc/bin/_progres

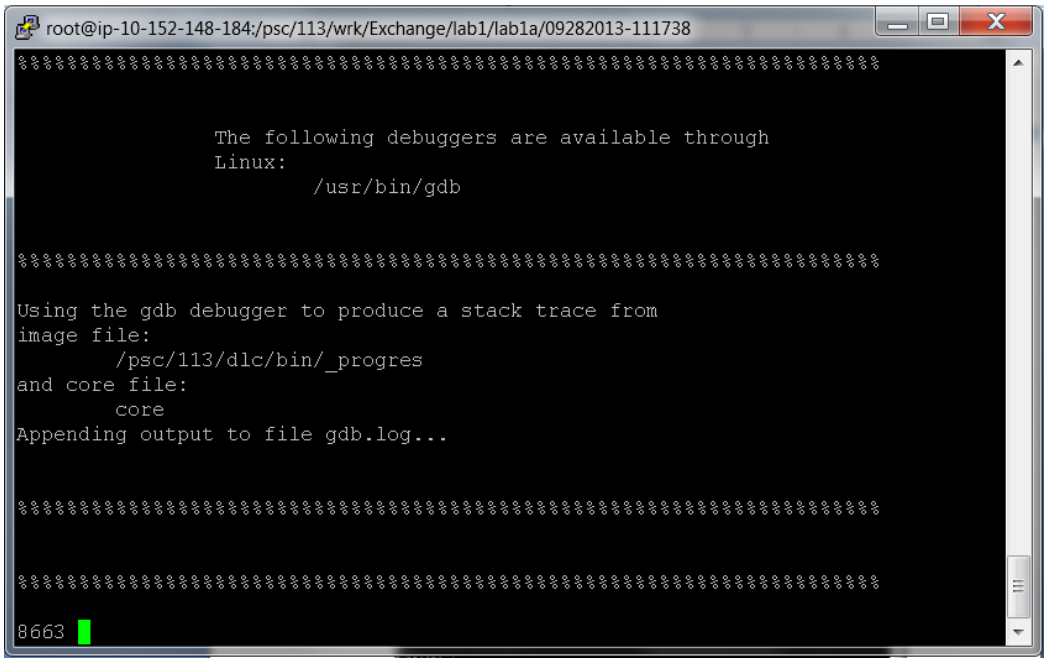
7) This will bring up a menu system for asking you to choose the operating system you are running on.



Choose 7 (for Linux which is used for the Exchange labs)

Then enter Y to signify that this choice is correct.

8) For the Linux operating system the GDB debugger will normally be used and this output will be generated:



9) Type exit to exit the subshell and return to the Progress client session and press the space bar to end the procedure.

10) Press the escape key and the M key to enter the menu

ESC + M

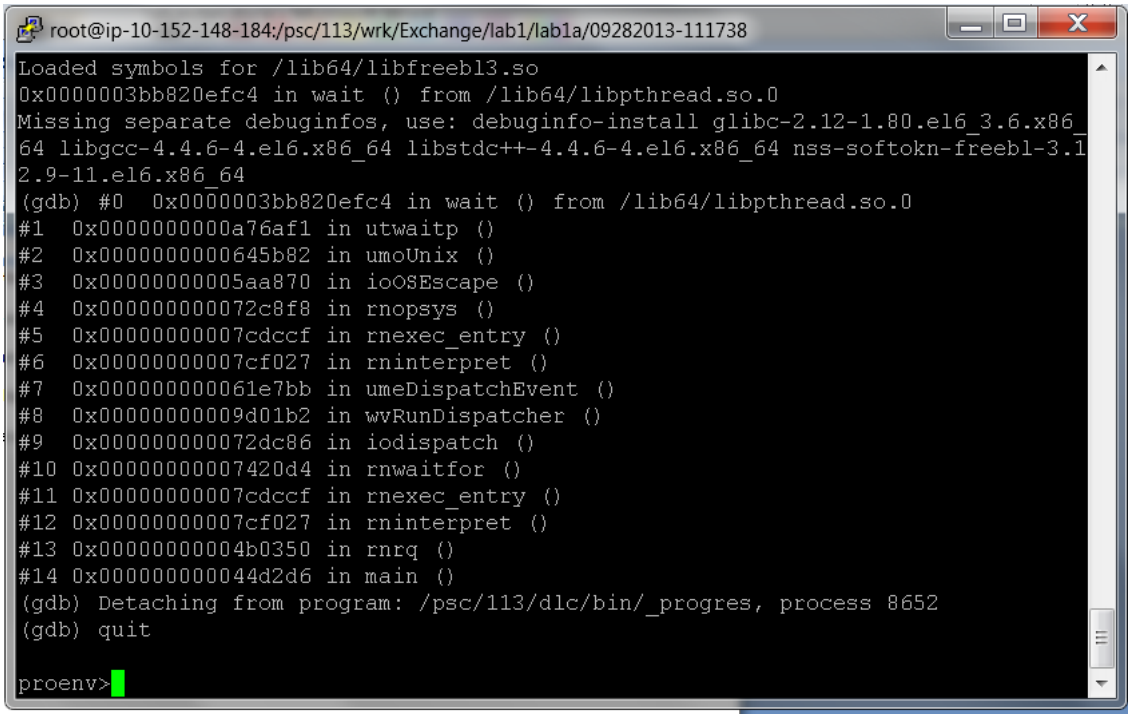
11) Hit the down arrow button on your keyboard and select X for Exit

12) Press the N key to indicate that no code should be saved.

13) Issue the following commands:

cat gdb.log

Example excerpt of gdb.log output:



Part (1c) Operating System Tools

Duration

10 minutes

Goals

In Lab1c you will learn how to monitor the system the Progress database is running on with various operating system tools

Instructions

1) open four putty sessions to the server

2) arrange the sessions so that each can be seen

3) type the following in each session

```
./proenv
cd lab1/lab1c
```

4) In the first of the four putty sessions give this command

```
sar -q 5 100
```

6) In the second of the four putty sessions give this command

```
iostat -dktx 5 100
```

7) In the third of the four putty sessions give this command

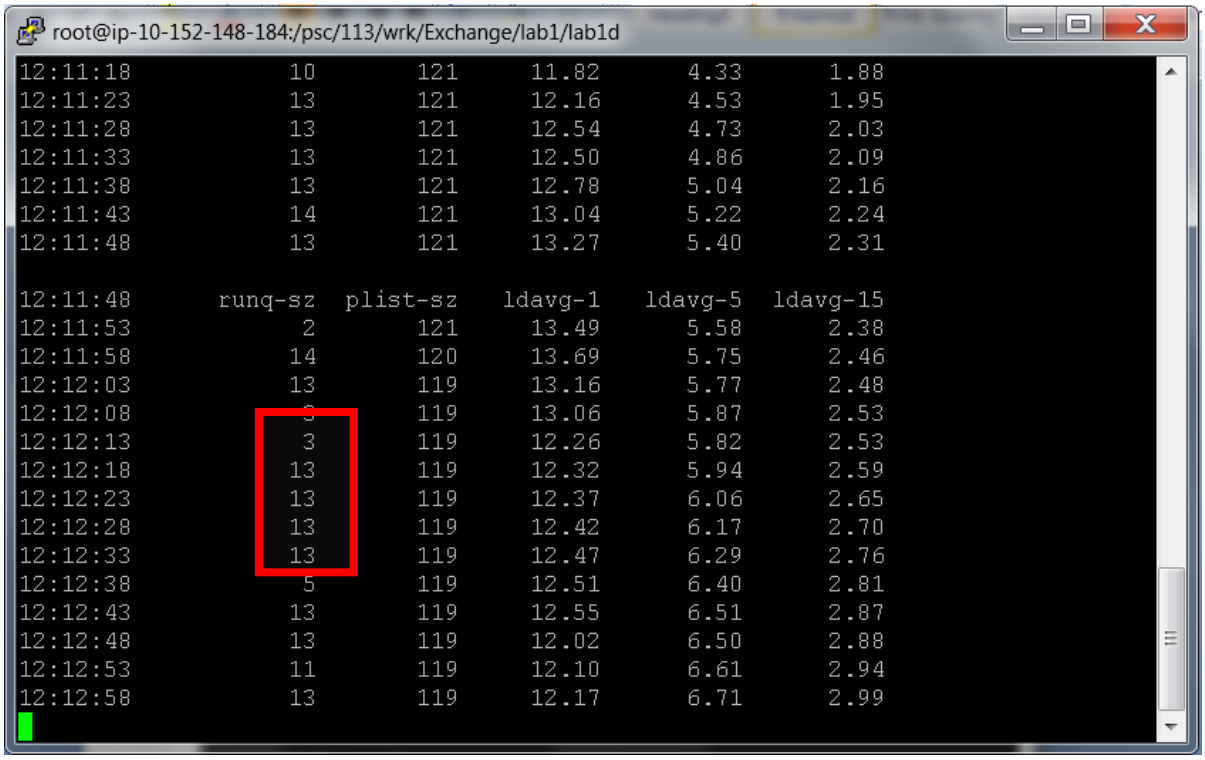
```
vmstat 5 100
```

8) In the fourth of the four putty sessions give this command

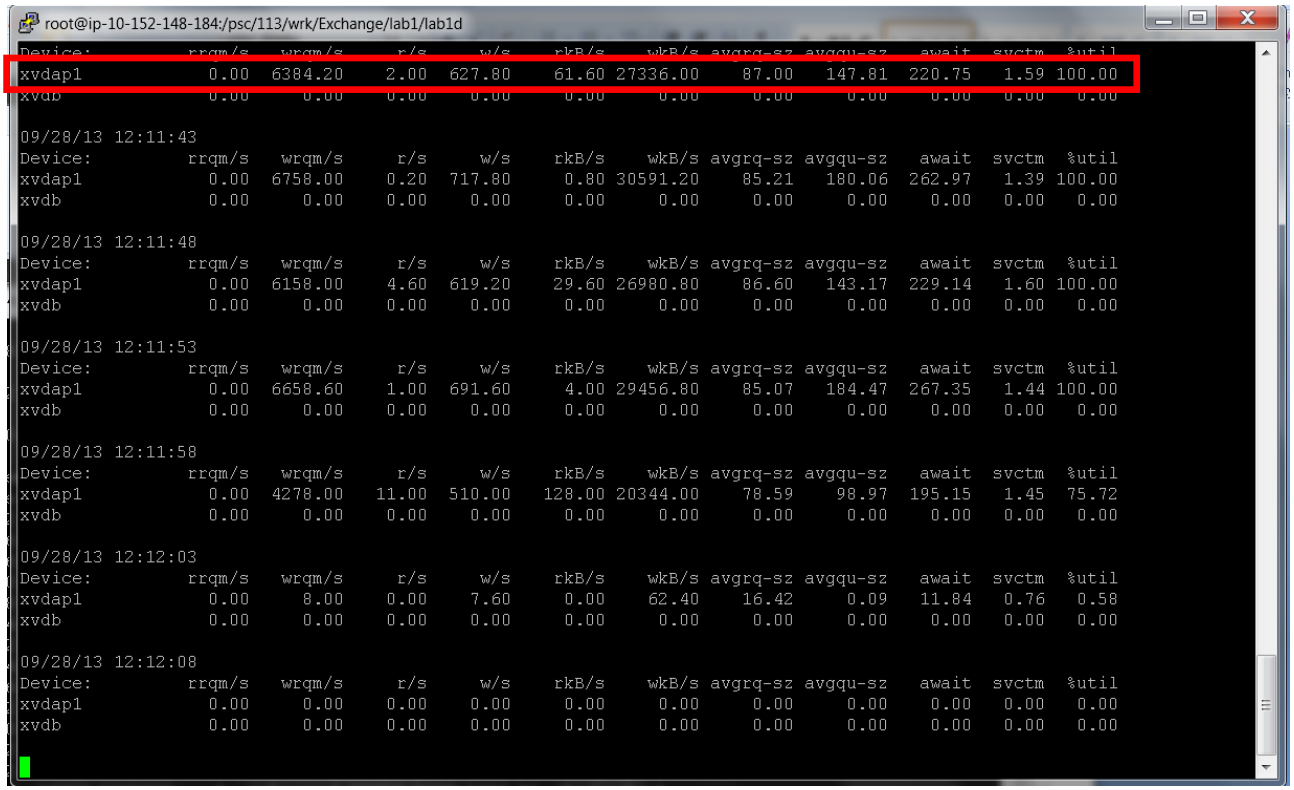
```
./busywork.sh
```

NOTE: It may be beneficial to resize each of the sessions to prevent line wrap for each of the tools.

9) In the session with sar -q notice the high runq-sz



10) In the session with the iostat observe the %util



11) In the session with the vmstat watch the following columns:

r: The number of processes waiting for run time.

b: The number of processes in uninterruptible sleep.

free: the amount of idle memory (kB).

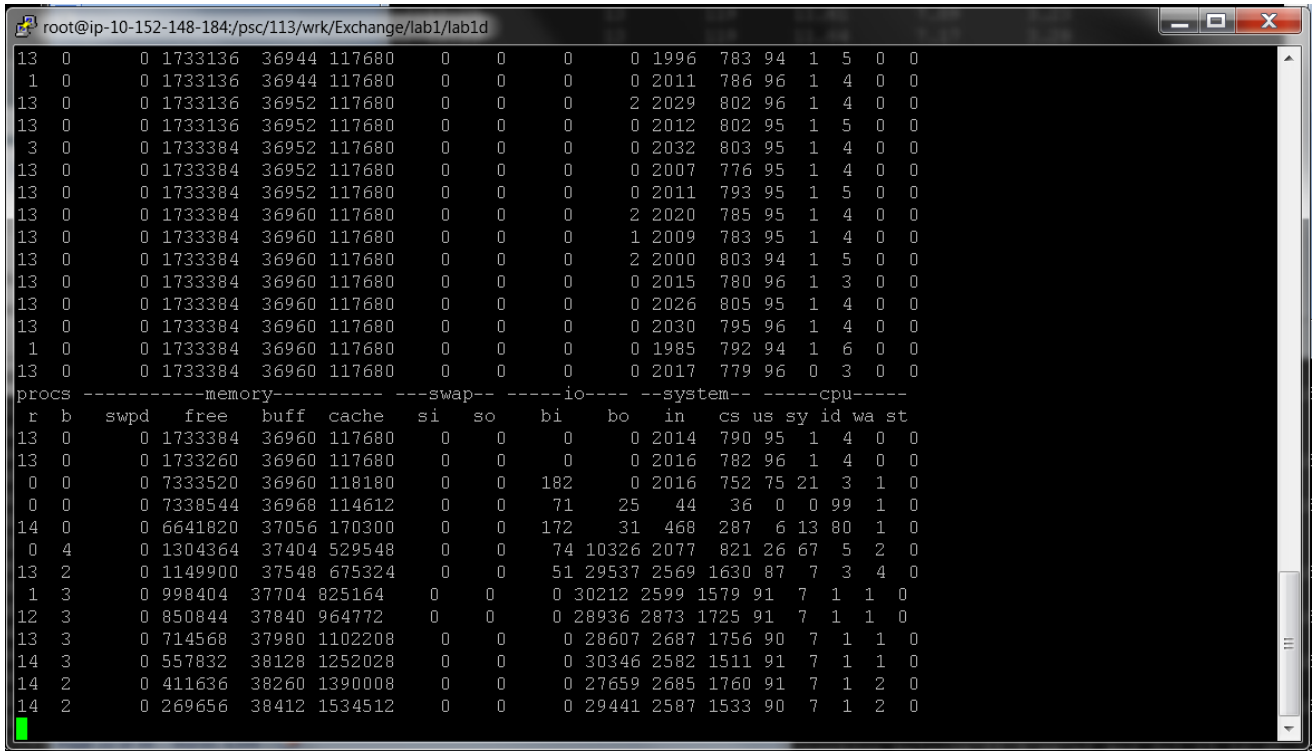
pi aka bi: Blocks sent to a block device (blocks/s).

po aka bo: Blocks received from a block device (blocks/s).

us user time

sy system time

wa: Time spent waiting for IO.



Windows perfmon (not part of Workshop--intended for information only)

Windows perfmon can be controlled through its graphic interface or from command line.

perfmon launches the graphic interface where counters can be selected for the OS to monitor.

Physical Disk

Logical Disk

Memory

CPU (processors)

Processes

Can all be monitored. For some of these things it is beneficial to monitor all instances.

Some like Physical and Logical disks it is important to monitor each instance (disk) separately for proper performance analysis.

Windows logman (not part of Workshop--intended for information only)

The Windows command line tool logman can be used to control the starting and stopping of Perfmon data collection in Windows.

UNIX sar, iostat, vmstat: The Unix trilogy of tools.

Sar -u collects data regarding CPU usage

Sar -q collects queue depth for processors

Sar -d collects disk usage information

Iostat (does not exist on all platforms) can also collect data on disk / device usage.

Vmstat collects data on virtual memory usage but also has some useful information on CPU utilization and blocked process counts.

Part (1d) db request statement cache

Duration

10 minutes

Goals

- In Lab1d you will learn how to identify performance problems caused by code which might lock excessive records; read more records than expected; or similar performance degrading behavior.
- Learn how to identify the user and ultimately the procedure and perhaps even the line of code responsible.

Instructions

1) start two putty sessions with the following commands

   ./proenv
   cd lab1/lab1d

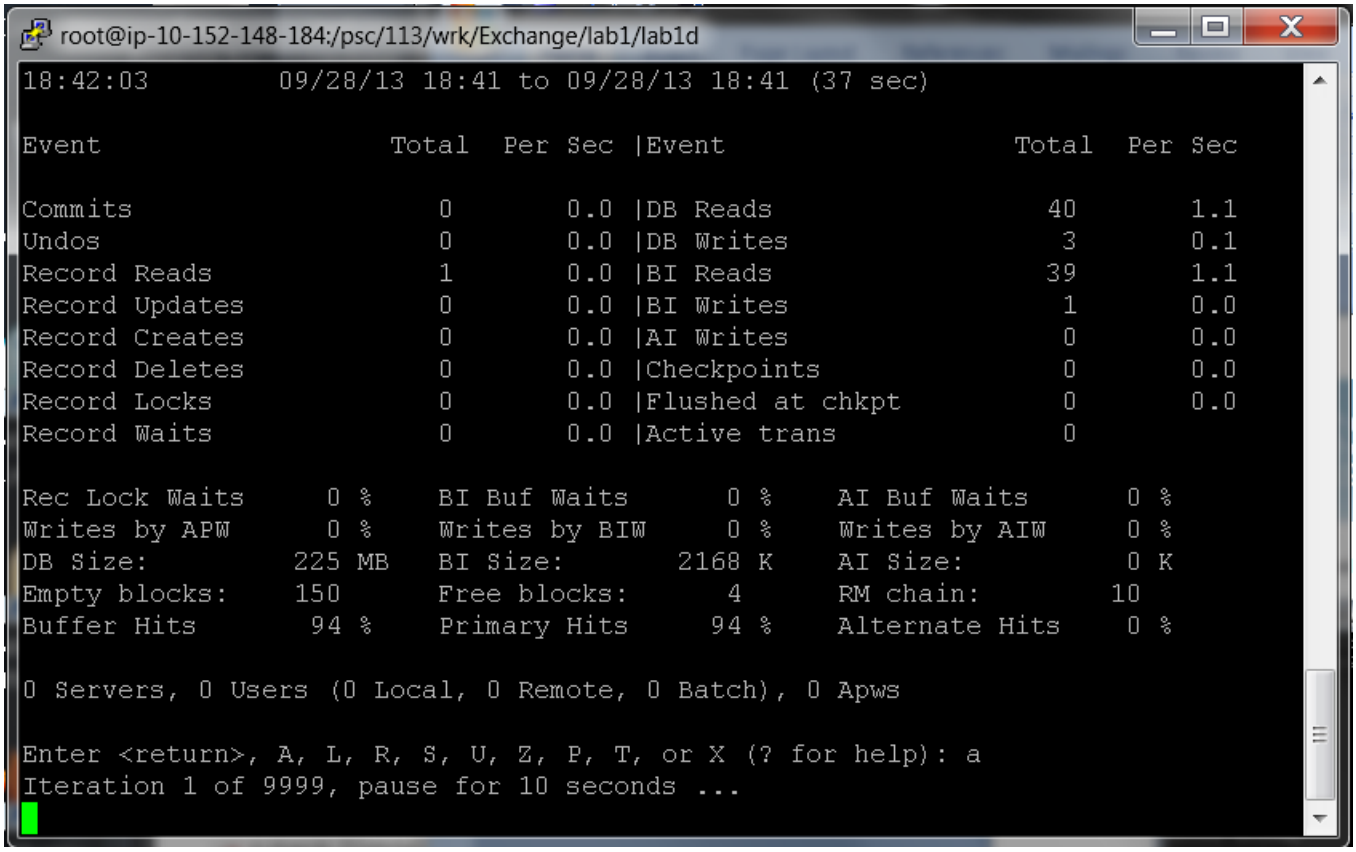
2) In putty session 1 start the database and have it listen on a port
   ./dbstart.sh

3) Start a promon session against the database on your machine

   promon.sh

4) Enter the following commands in promon

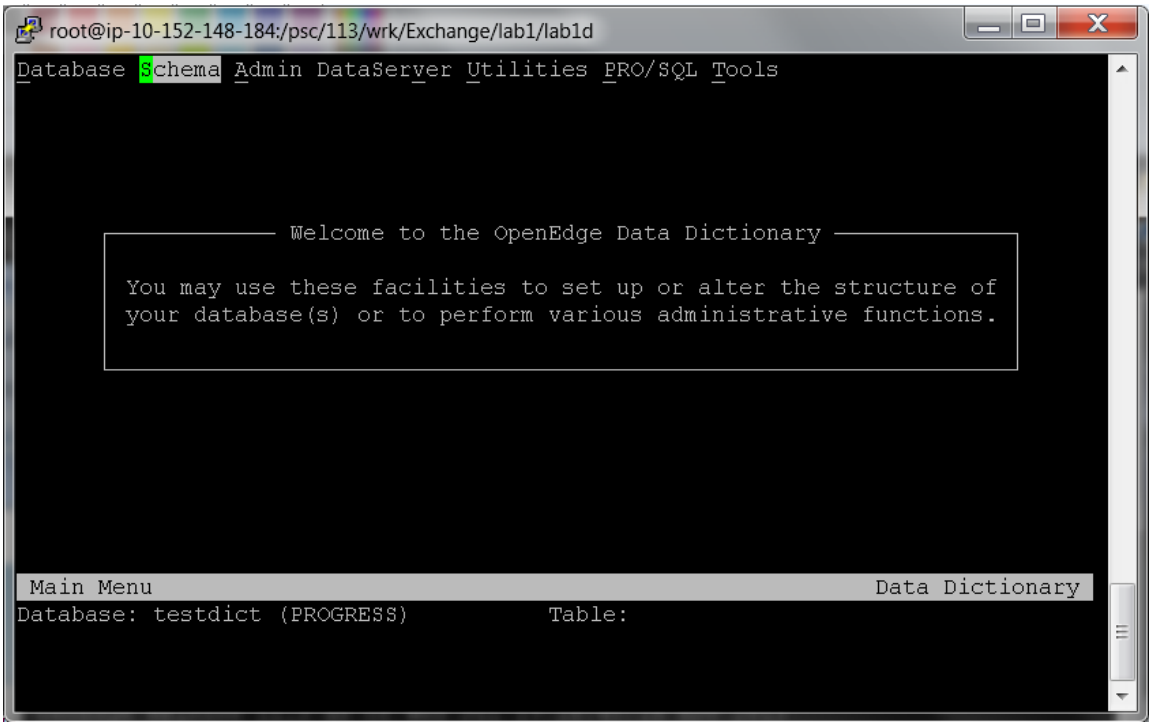
Enter R&D (R&D. Advanced options)
Enter 2 (2. Activity Displays ...)
Enter 1 (1. Summary)
Enter Z to zero the counters
Enter A to turn on automatic iterations



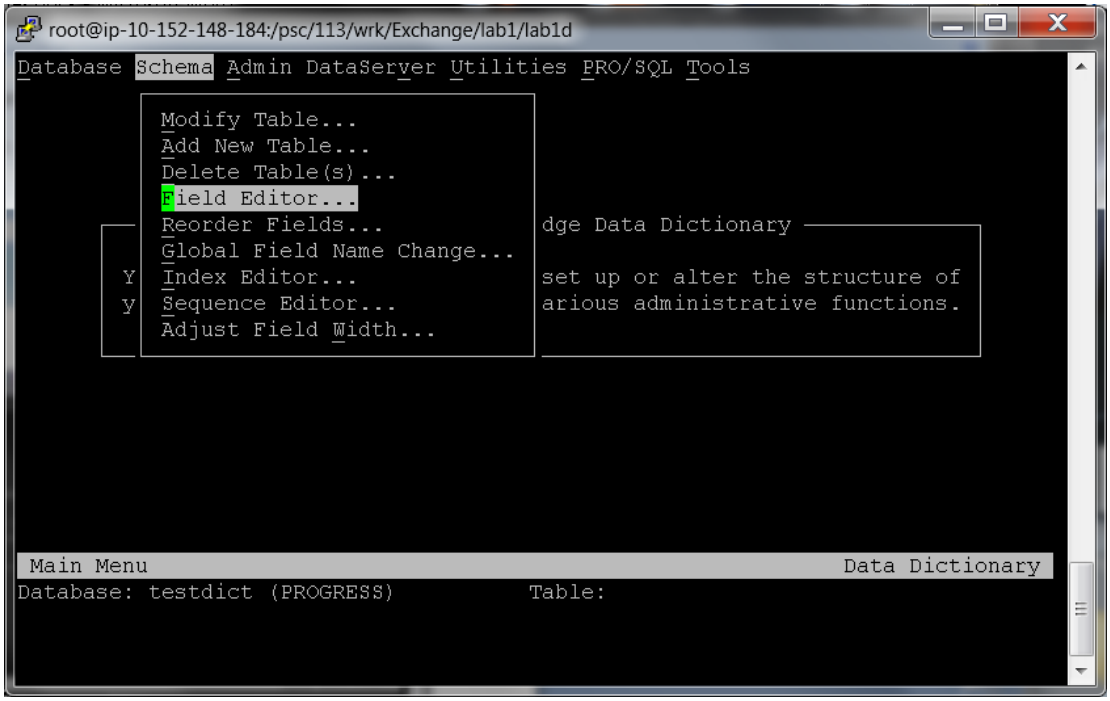
5) In the second putty session start a client session against the database and run the Data Dictionary with this command:

./clientstart.sh

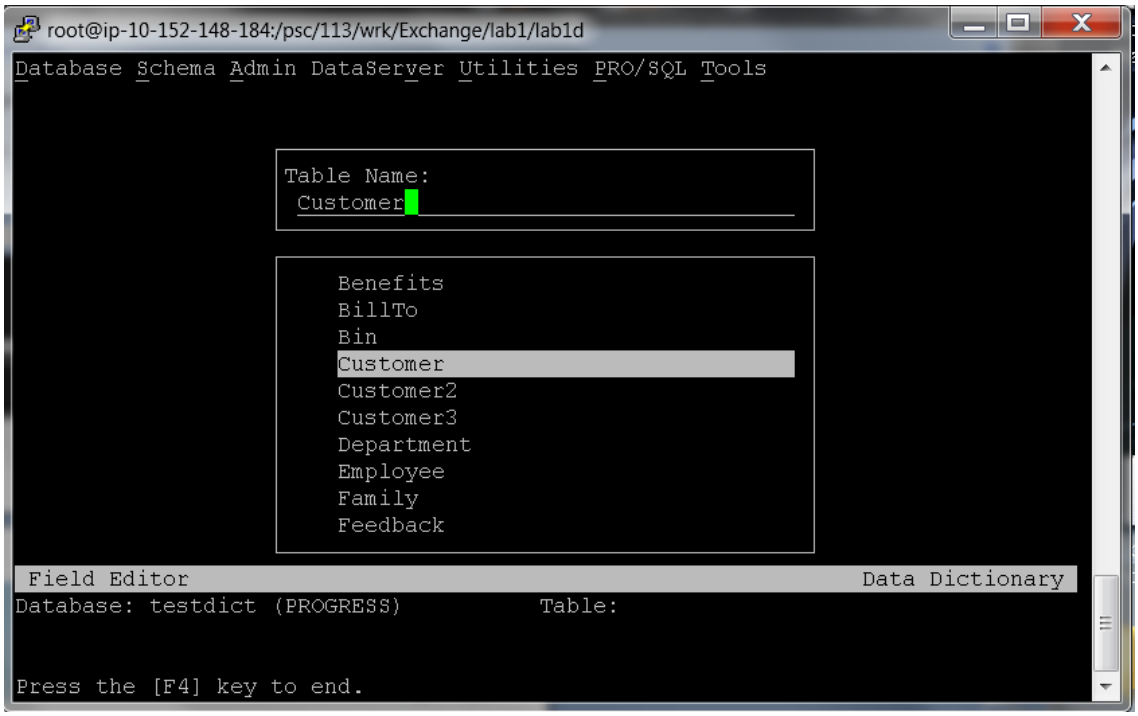
6) Select the Schema Menu



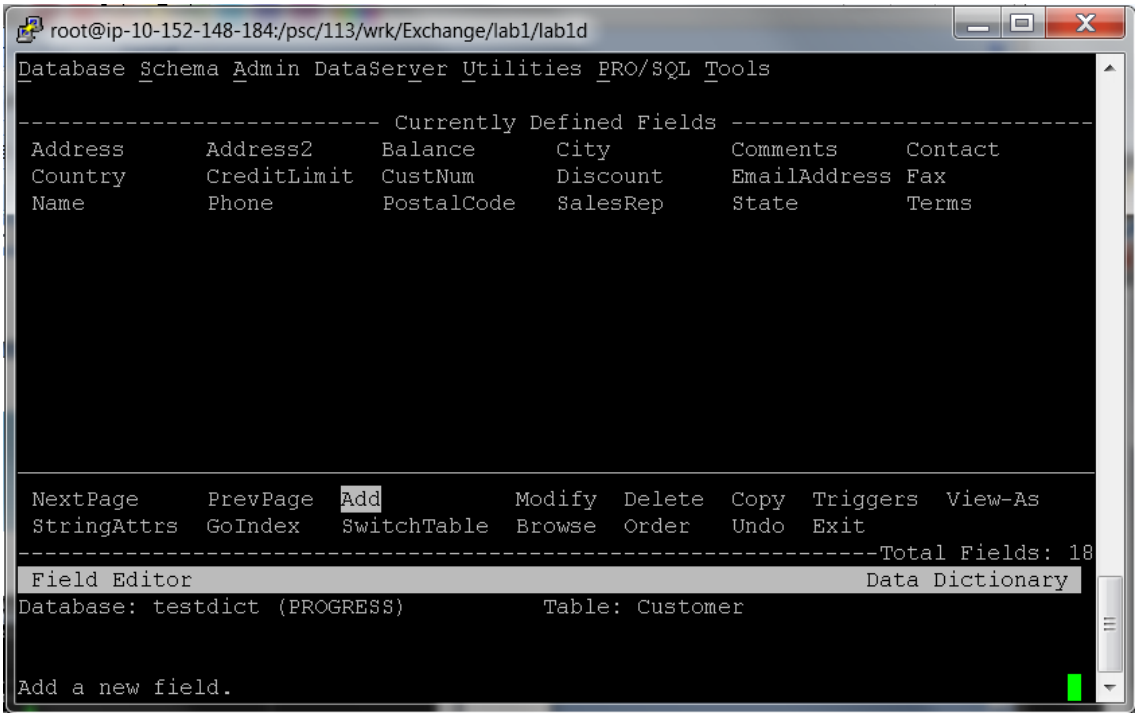
7) Hit the down arrow on the keyboard and select Field Editor



8) Select the Customer table

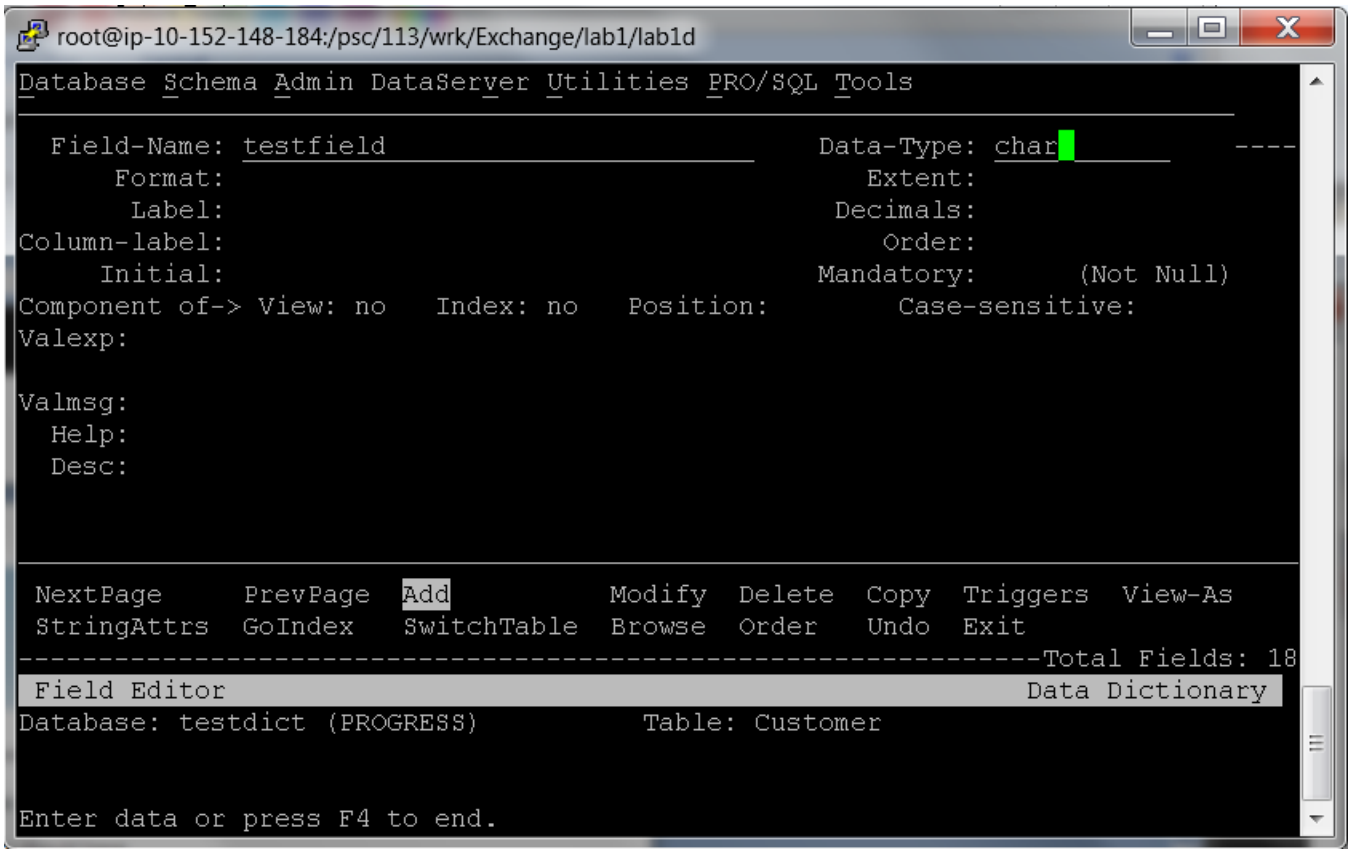


9) Select Add to add a Field



10) Specify testchar as the field name and hit enter

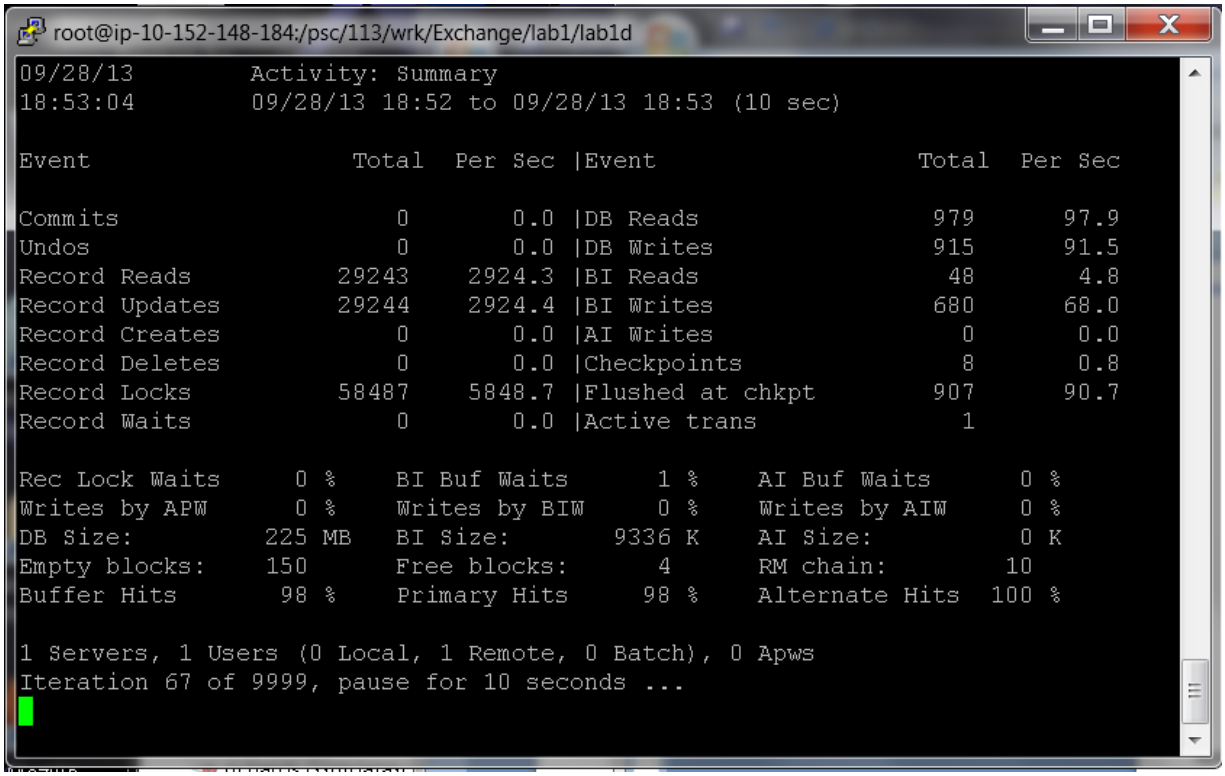
11) Enter character as the field type and hit enter



12) At this point the Data Dictionary should hang.

13) Return to the promon session started in step 3

Notice the tremendous activity occurring. Imagine this were a program used within your company where some new program isn't behaving as expected. Imaging more than one program was recently added and now you don't know what program is the culprit.



14) Enter control-C to stop the automatic iterations

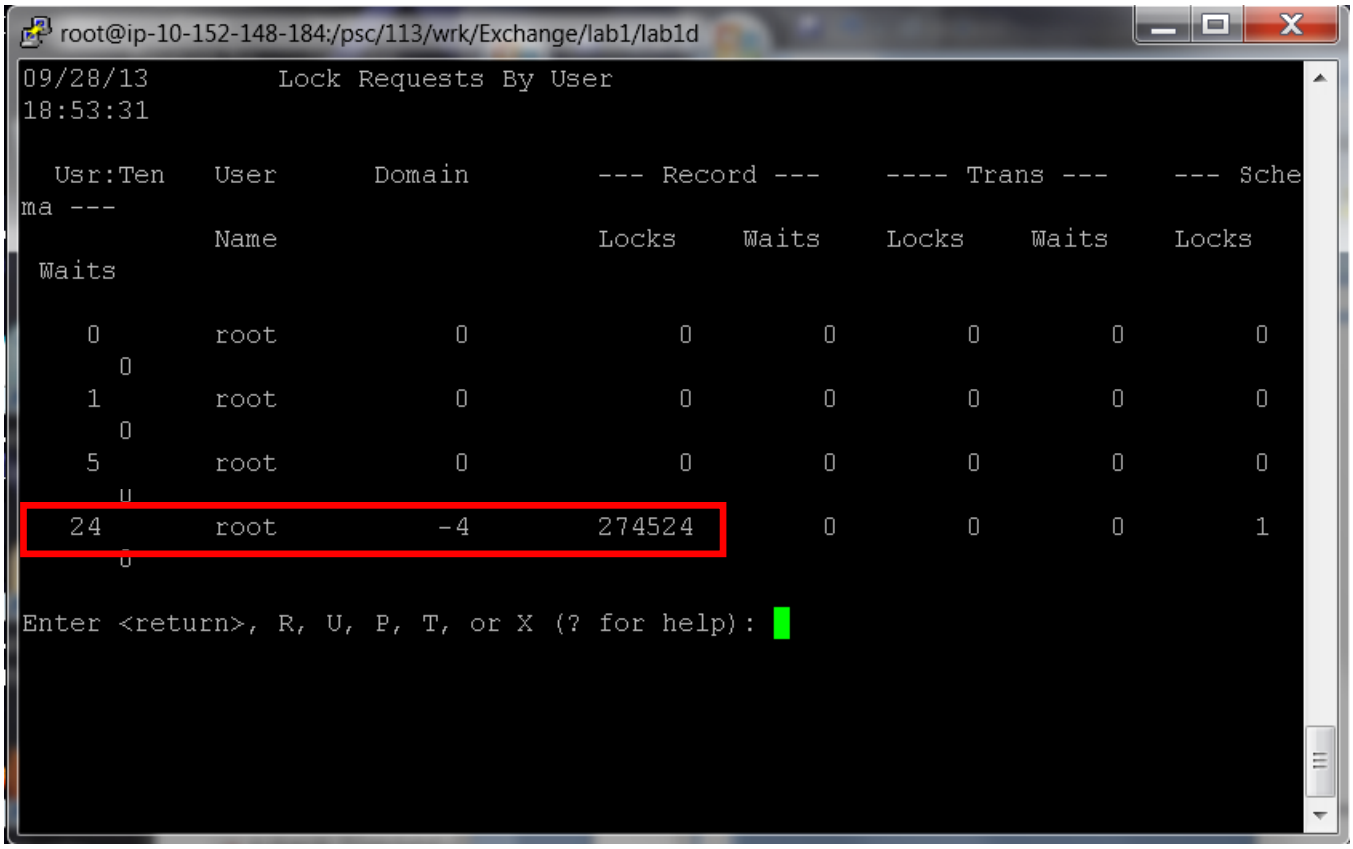
15) Enter T for Top

Since there were many locks being created by the user let's focus on who is performing the most locks.

Enter 3 (3. Other Displays ...)

Enter 3 (3. Lock Requests By User)

Identify the user number with the most locks



a) Enter T for Top
b) Enter 1 (1. Status Displays ...)
c) Enter 18 (18. Client Database-Request Statement Cache ...)
d) Enter 2 (2. Activate For All Users)
e) Enter 1 (1-Single)
f) Select 7 (7. View Database-Request Statement Cache)

Select the user (there will likely be only one unless you have strayed from the script)

The code which is creating the excessive volume of work will be listed.

If you choose to repeat this step for the full stack steps 3 to 7 above can be repeated but a new field name must be chosen each time.

16) In the promon session type the following commands:

a) Enter T for Top
b) Enter 1 (1. Status Displays ...)
c) Enter 18 (18. Client Database-Request Statement Cache ...)
d) Enter 2 (2. Activate For All Users)
e) Enter 2 (2-Stack)
f) Select 7 (7. View Database-Request Statement Cache)

17) To end the client session, when the message "can you find my code name?" is on the screen follow these steps:

a) Press the F4 key on the keyboard
   It may take a few seconds for it to backout the temporary work.
b) The Schema Menu should be highlighted.
c) Press the D key to select the Database menu.
d) Press X to exit.

Lab (2) New performance features

Objective

In lab 2 you will learn the benefits to performance using the new -lruskips and lru2skips parameters. Database administrators will be advised on best practices to review metrics that can identify if lruskips or lruskips2 should be used.

Part (2a) Demonstration of -lruskips (-lru2skips works the same)

Duration

8 minutes

Goals

Part (a) will provide hands-on demonstration of the –lruskips (and by extension the –lru2skips) parameter and how it may benefit the performance of your database.

Instructions

1) open three putty sessions and issue the following commands in each

    ./proenv

    cd lab2/lab2a

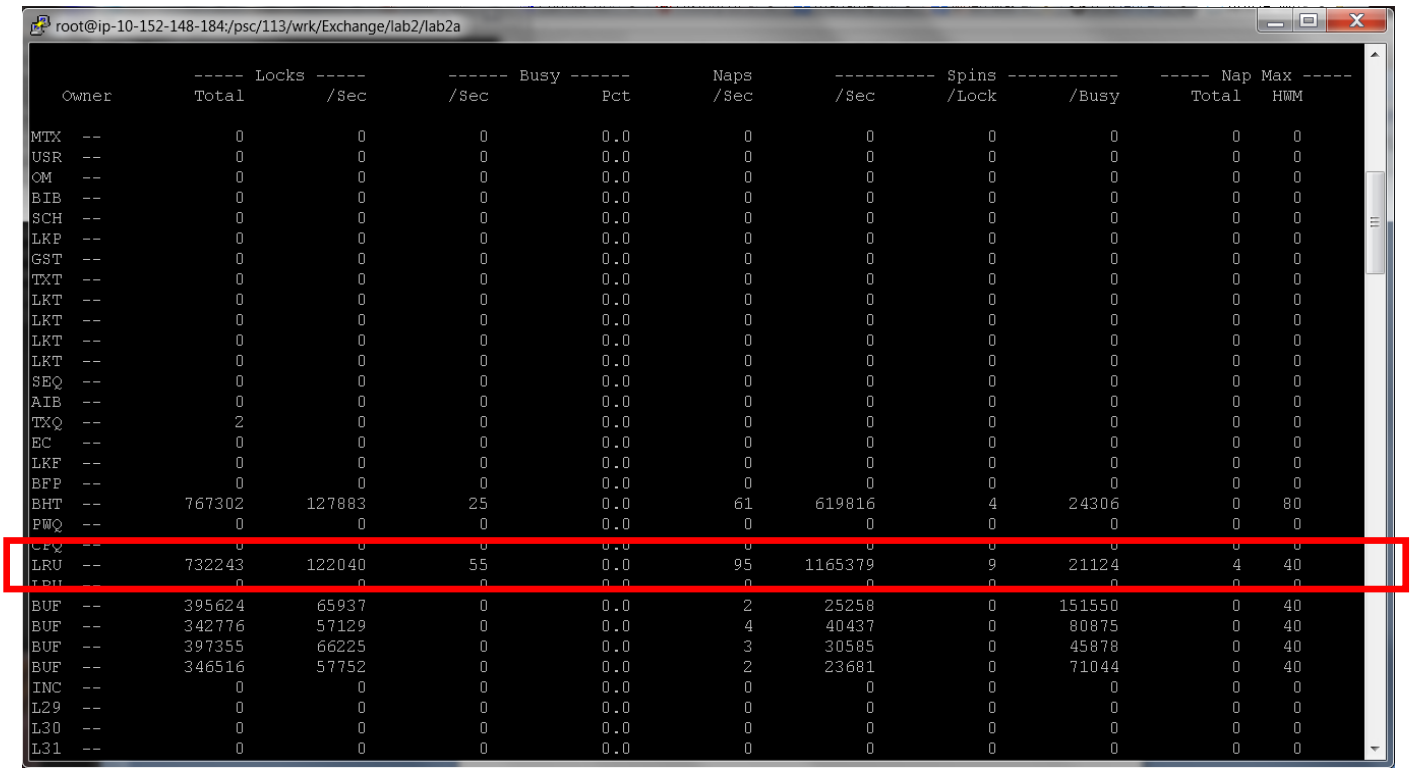
2) In the first putty session issue this command

    ./busywork.sh

3) In the second putty session issue this command

    promon.sh < ./promoninput

Note the High values for LRU (if you don't see it immediately just wait about 10 seconds).

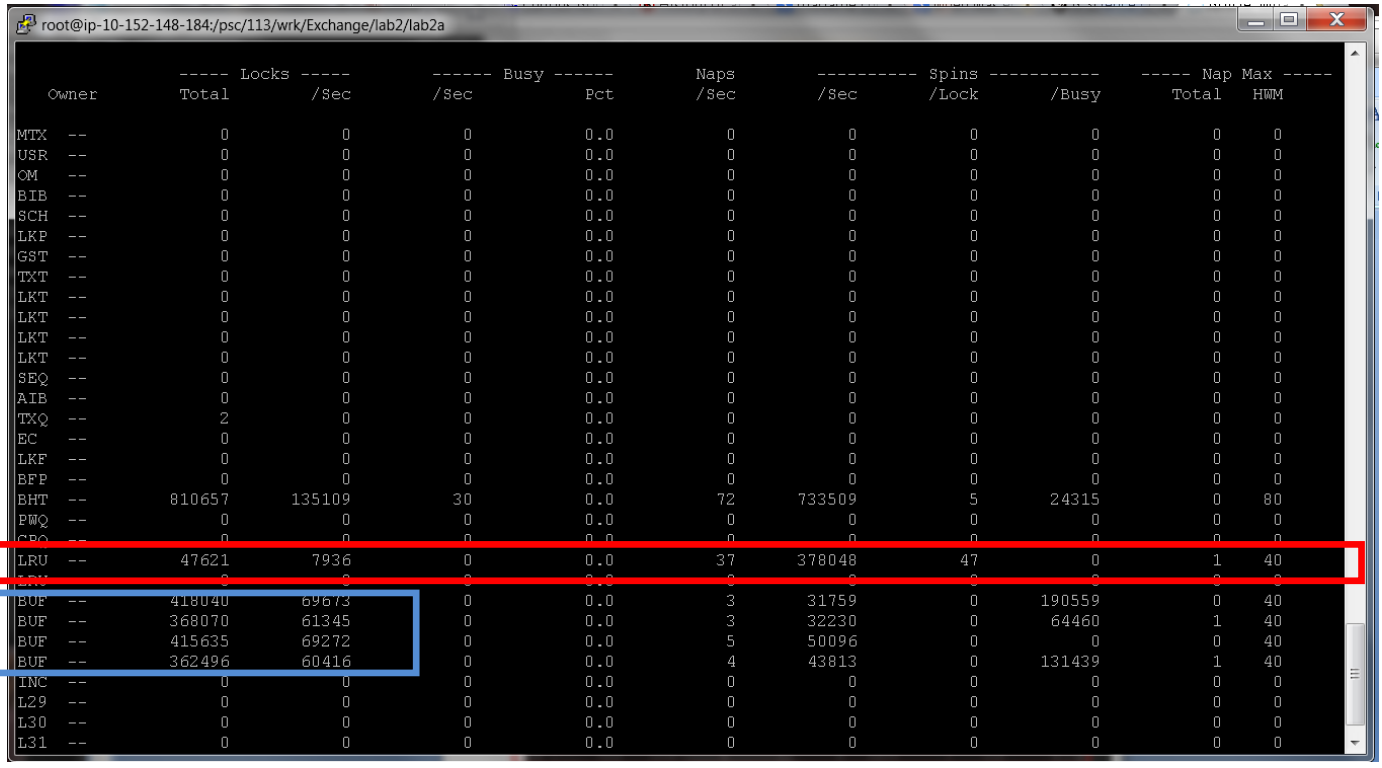


Owner	Locks Total	Locks /Sec	Busy /Sec	Busy Pct	Naps /Sec	Spins /Sec	Spins /Lock	Spins /Busy	Nap Max Total	Nap Max HWM
MTX --	0	0	0	0.0	0	0	0	0	0	0
USR --	0	0	0	0.0	0	0	0	0	0	0
OM --	0	0	0	0.0	0	0	0	0	0	0
BIB --	0	0	0	0.0	0	0	0	0	0	0
SCH --	0	0	0	0.0	0	0	0	0	0	0
LKP --	0	0	0	0.0	0	0	0	0	0	0
GST --	0	0	0	0.0	0	0	0	0	0	0
TXT --	0	0	0	0.0	0	0	0	0	0	0
LKT --	0	0	0	0.0	0	0	0	0	0	0
LKT --	0	0	0	0.0	0	0	0	0	0	0
LKT --	0	0	0	0.0	0	0	0	0	0	0
LKT --	0	0	0	0.0	0	0	0	0	0	0
SEQ --	0	0	0	0.0	0	0	0	0	0	0
AIB --	0	0	0	0.0	0	0	0	0	0	0
TXQ --	2	0	0	0.0	0	0	0	0	0	0
EC --	0	0	0	0.0	0	0	0	0	0	0
LKF --	0	0	0	0.0	0	0	0	0	0	0
BFP --	0	0	0	0.0	0	0	0	0	0	0
BHT --	767302	127883	25	0.0	61	619816	4	24306	0	80
PWQ --	0	0	0	0.0	0	0	0	0	0	0
LRU --	732243	122040	55	0.0	95	1165379	9	21124	4	40
BUF --	395624	65937	0	0.0	2	25258	0	151550	0	40
BUF --	342776	57129	0	0.0	4	40437	0	80875	0	40
BUF --	397355	66225	0	0.0	3	30585	0	45878	0	40
BUF --	346516	57752	0	0.0	2	23681	0	71044	0	40
INC --	0	0	0	0.0	0	0	0	0	0	0
L29 --	0	0	0	0.0	0	0	0	0	0	0
L30 --	0	0	0	0.0	0	0	0	0	0	0
L31 --	0	0	0	0.0	0	0	0	0	0	0

4) In the third putty session issue this command

promon.sh
Enter R&D (R&D. Advanced options)
Enter 4 (4. Administrative Functions ...)
Enter 4 (4. Adjust Latch Options)
Enter 4 (4. Adjust LRU force skips: 0)
Enter 20 (new value for LRU force skips)

Note the decrease in the LRU latching amounts in the second promon screen..



Owner	Locks Total	Locks /Sec	Busy /Sec	Busy Pct	Naps /Sec	Spins /Sec	Spins /Lock	Spins /Busy	Nap Max Total	Nap Max HWM
MTX --	0	0	0	0.0	0	0	0	0	0	0
USR --	0	0	0	0.0	0	0	0	0	0	0
QM --	0	0	0	0.0	0	0	0	0	0	0
BIB --	0	0	0	0.0	0	0	0	0	0	0
SCH --	0	0	0	0.0	0	0	0	0	0	0
LKP --	0	0	0	0.0	0	0	0	0	0	0
GST --	0	0	0	0.0	0	0	0	0	0	0
TXT --	0	0	0	0.0	0	0	0	0	0	0
LKT --	0	0	0	0.0	0	0	0	0	0	0
LKT --	0	0	0	0.0	0	0	0	0	0	0
LKT --	0	0	0	0.0	0	0	0	0	0	0
LKT --	0	0	0	0.0	0	0	0	0	0	0
SEQ --	0	0	0	0.0	0	0	0	0	0	0
AIB --	0	0	0	0.0	0	0	0	0	0	0
TXQ --	2	0	0	0.0	0	0	0	0	0	0
EC --	0	0	0	0.0	0	0	0	0	0	0
LKF --	0	0	0	0.0	0	0	0	0	0	0
BFP --	0	0	0	0.0	0	0	0	0	0	0
BHT --	810657	135109	30	0.0	72	733509	5	24315	0	80
PWQ --	0	0	0	0.0	0	0	0	0	0	0
CPQ --	0	0	0	0.0	0	0	0	0	0	0
LRU --	47621	7936	0	0.0	37	378048	47	0	1	40
LRU	0	0	0	0.0	0	0	0	0	0	0
BUF --	418040	69673	0	0.0	3	31759	0	190559	0	40
BUF --	368070	61345	0	0.0	3	32230	0	64460	1	40
BUF --	415635	69272	0	0.0	5	50096	0	0	0	40
BUF --	362496	60416	0	0.0	4	43813	0	131439	1	40
INC --	0	0	0	0.0	0	0	0	0	0	0
L29 --	0	0	0	0.0	0	0	0	0	0	0
L30 --	0	0	0	0.0	0	0	0	0	0	0
L31 --	0	0	0	0.0	0	0	0	0	0	0

As LRUSKIPS is increased from the default the contention on LRU will shift to the BUF buffer latches which have gone up as the LRU latching has gone down.

10) Play with varying values for LRU force skips in the third putty session and observe the behavior of LRU and BUF.

Part (2b) Demonstration of Things that can effect LRU

Duration

5 Minutes

Goals

Show negative impact of insufficient value for -omsize.

Instruction

1) open two putty sessions and issue the following commands in each

    ./proenv

    cd lab2/lab2b

2) In the first putty session issue this command

    startdb.sh -omsize 10

3) In the second putty session issue this command

    multiuser.sh

In the procedure editor type this command but don't run the command yet.

    for each _file no-lock: end.

4) In the first putty session issue this command

    promon.sh < ./promonauto

    NOTE: You may want to resize the screen so that the columns don't wrap around.

5) In the putty session with mpro issue the GO command

    F1 or CTRL-X

6) In the putty session with promon notice the large number of locks for the OM latch.

7) End the client session with the following commands:

Press the ESC + M key to enter the menu
Press F for File
Press X to exit

8) Let's demonstrate reading from a larger table with an omsize value that is too small

multiuser.sh -p measuring-transmission-time.p

Note the values for OM and LRU in the promon session.

Note the etime duration.

9) Let's start the database back up again in the first putty session issue this command

startdb.sh -omsize 2048

10) In the first putty session issue this command

promon.sh < ./promonauto

NOTE: You may want to resize the screen so that the columns don't wrap around.

11) In the second putty session issue this command

multiuser.sh -p measuring-transmission-time.p

Observe the promon session.

What changes did you observe for the OM latch?

What changes did you see for the LRU latch?

How different was the etime duration?

12) Let's restart the database and alter the value for the client private buffer pool limit with the following command:

startdb.sh -B 100000 -Bpmax 25000

13) Let's run the etime code again with this command:

multiuser.sh -p measuring-transmission-time.p -Bp 1000

While the difference isn't significant for this small test the greater benefit will be for large groups of users. Performing concurrent operations against a very busy buffer pool.

Part (2c) Demonstration of -B2

Duration

15 Minutes

Goals

Show performance benefits of the alternate buffer pool; the method to enable areas or specific tables and indices to use the alternate buffer pool. How to chart benefits from use of the alternate buffer pool. Learn what things can enable the LRU2 latching for the alternate buffer pool and how to disable the LRU2 latch if it has accidently been enabled.

Notes

This database has three copies of the customer table with 500k+ records each
The first customer table is in the cust_data area which is type I
The second customer table is in the cust_data2 area with is Type II
The third customer table is in the cust_data3 area which is Type II and enabled for B2 usage
Each of these tables has its own index area in a corresponding area type (type I index area for type I data area and type II index area for type II data area)

Instruction

1) Start a putty session and issue the following commands

```
./proenv

cd lab2/lab2c
```

2) Start the database with a reasonable amount of buffers for the primary buffer pool:

```
startdb.sh  -B 100000
```

3) Start a client session and read all the customer records:

multiuser.sh -p customer.p

NOTE the elapsed time to read all the customer records from the Type I area.

Press Enter to clear the message.

4) Restart the database and allocate a reasonable amount of buffers for the primary and alternate buffer pools:

startdb.sh -B 100000 -B2 100000

5) Start a client session and read all the customer2 table records in a Type II area:

multiuser.sh -p customer2.p

NOTE the elapsed time to read all the customer records from the Type II area.

6) Start Restart the database and allocate a reasonable amount of buffers for the primary and alternate buffer pools:

startdb.sh -B 100000 -B2 100000

7) Start a client session and read all the customer3 table records in a Type II area which has been enabled to use the alternate buffer pool:

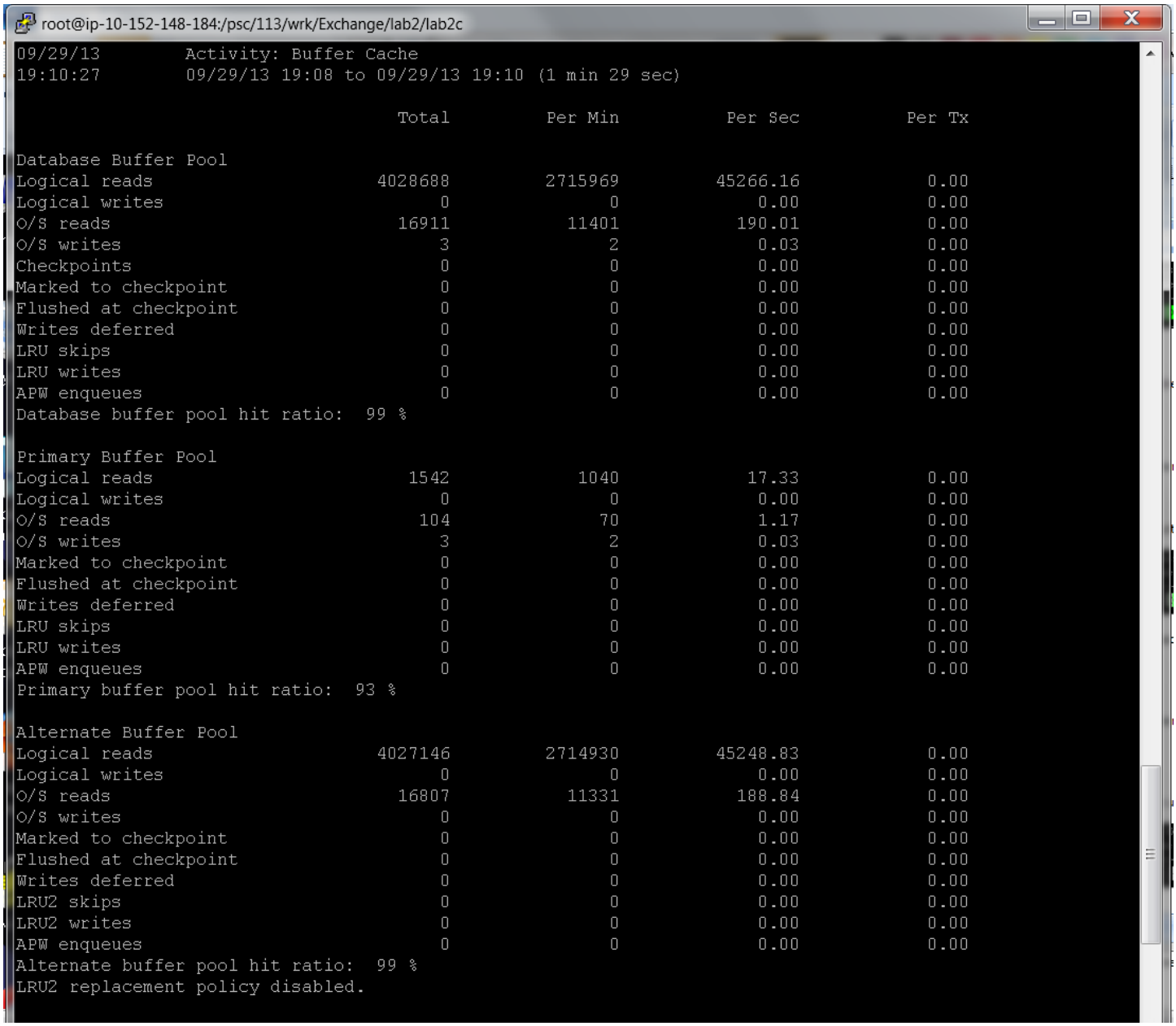
multiuser.sh -p customer3.p

Note the decrease in elapsed time when using the alternate buffer pool.

8) Let's check to see if the LRU2 Replacement policy was enabled by checking promon:

promon <dbname>

Enter R&D	(R&D. Advanced options)
Enter 2	(2. Activity Displays ...)
Enter 3	(3. Buffer Cache)



If the LRU2 Replacement policy has been enabled then the alternate buffer pool has been exhausted which will negatively affect performance.

Consider using proutil <dbname> -C increaseto -B2 <larger B2 size>

This will be demonstrated later in the workshop.

NOTE: In the past probkup would overwhelm the alternate buffer pool due to a bug.

This has been fixed in 10.2B05 and 11.0.

Lab 3 Demonstration of -Nmsg, -prefetchFactor, -prefetchDelay, -prefetchNumRecs.

Objective

Demonstrate methods to improve communication time between remote clients and servers when the application code uses prefetch, no-lock, or scrolling queries.

Considering which options are better for individual client connections and multiple concurrent client connections.

Observing the trade-offs (more / less packets versus delay in time) using the new network parameters.

Duration

15 Minutes

Instruction

1) Open two putty sessions and issue the following commands in each

```
./proenv
cd lab3
```

2) In the first putty session issue this command to start the database listening on port 7077 with a small buffer pool of 10000:

```
startdb.sh  -S 7077 -B 10000
```

3) In the first putty session start a promon session against the database and issue the follow commands in promon:

```
promon.sh

Enter  R&D              (R&D.  Advanced options)
Enter 2          (2. Activity Displays ...)
Enter 2          (2. Servers)
Enter Z to zero the counters
```

4) In the second putty session run this command to connect to the database via TCP and query the customer table and display the elapsed time:

multiuser.sh -S 7077 -H localhost -p measuring-transmission-time.p

This will serve as a baseline for comparison versus the new parameters added later in this lab.

5) A message will be displayed in the client session:

" Just finished populating the database buffer pool."

At this point return to the putty session that contains promon

Enter Z to zero the counters

6) Press the Enter key in the Progress client session to run the code to collect the elapsed time.

Note the etime value now.

7) Hit U in the promon session to collect a sample

Note the messages sent and received

8) Hit X to exit the promon session.

9) Restart the database using the additional parameter -Mm 8192

startdb.sh -S 7077 -B 10000 -Mm 8192

10) In the first putty session start a promon session against the database and issue the follow commands in promon:

promon.sh

Enter R&D	(R&D. Advanced options)
Enter 2	(2. Activity Displays ...)
Enter 2	(2. Servers)

Enter Z to zero the counters

11) Run the etime code with the additional parameter -Mm

multiuser.sh -S 7077 -p measuring-transmission-time.p -Mm 8192

12) A message will be displayed in the client session:

" Just finished populating the database buffer pool."

At this point return to the putty session that contains promon

Enter Z to zero the counters

13) Press the Enter key in the Progress client session to run the code to collect the elapsed time.

Note the etime value now.

14) Hit U in the promon session to collect a sample

Note the messages sent and received

15) Hit X to exit the promon session.

16) Restart the database adding the additional parameter -prefetchDelay

startdb.sh -S 7077 -B 10000 -prefetchDelay -Mm 8192

17) In the first putty session start a promon session against the database and issue the follow commands in promon:

promon.sh
Enter R&D (R&D. Advanced options)
Enter 2 (2. Activity Displays ...)
Enter 2 (2. Servers)
Enter Z to zero the counters

18) Run the etime code with the additional parameter -Mm

multiuser.sh -S 7077 -p measuring-transmission-time.p -Mm 8192

19) A message will be displayed in the client session:

" Just finished populating the database buffer pool."

At this point return to the putty session that contains promon

Enter Z to zero the counters

20) Press the Enter key in the Progress client session to run the code to collect the elapsed time.

Note the etime value now.

21) Hit U in the promon session to collect a sample

Note the messages sent and received

22) Hit X to exit the promon session.

Which went down or up? Is that what you expected.

23) Restart the database again and add -prefetchFactor

startdb.sh -S 7077 -B 10000 -prefetchDelay -prefetchFactor 90 -Mm 8192

24) Run the etime code with the additional parameter -Mm

multiuser.sh -S 7077 -p measuring-transmission-time.p -Mm 8192

25) A message will be displayed in the client session:

" Just finished populating the database buffer pool."

At this point return to the putty session that contains promon

Enter Z to zero the counters

26) Press the Enter key in the Progress client session to run the code to collect the elapsed time.

Note the etime value now.

27) Hit U in the promon session to collect a sample

Note the messages sent and received

28) Hit X to exit the promon session.

Which went down or up? Is that what you expected.

Lab 4 Use of the proutil increaseto feature.

Objective:

- **Lab 4 will simulate common problems related to the database startup parameters (-B, -B2, -L, -aibufs, -bibufs, and -Mxs).**
- **Some caveats to the proutil increaseto function will be shown.**

Part (4a) Demonstration of increaseto -L

Duration

5 Minutes

Instruction

1) Start a putty session

2) Enter the following commands:

```
./proenv
cd lab4/lab4a
```

3) Start the database with a small value for -L

```
startdb.sh -L 500
```

4) Start a client session and run a piece of code to fill the -L:

```
multiuser.sh  -p lock-lots-of-records.p
```

The session will have died because the Lock Table has been exhausted.

```
Lock table overflow, increase -L on server (915)
```

5) Issue these commands within the client session:

Press the F4 key within the client session.
Enter the following in the procedure editor:

```
quit
```

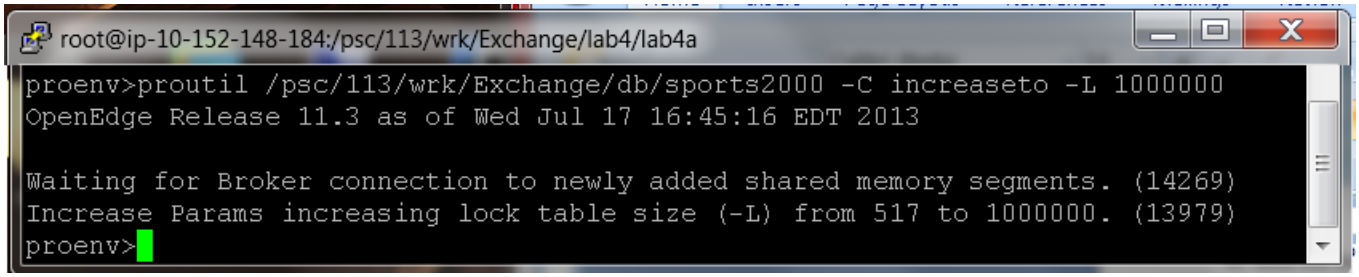
Type the following control key sequence:

```
CTRL + X
```

6) Issue the following command:

```
proutil /psc/113/wrk/Exchange/db/sports2000 -C increaseto -L 1000000
```

This will be the screen results:



7) Start a client session and run the same piece of code:

multiuser.sh -p lock-lots-of-records.p

Note the client did not die because the lock table was not exhausted.

Part (4b) Demonstration of increaseto -B

Duration

8 Minutes

Instruction

1) Open two putty sessions and issue the following commands:

./proenv

cd lab4/lab4b

2) In the first putty session issue the following commands to start the database with a small buffer pool:

startdb.sh -B 1000 -L 1000000

3) Run promon against the database:

promon.sh <./promonauto

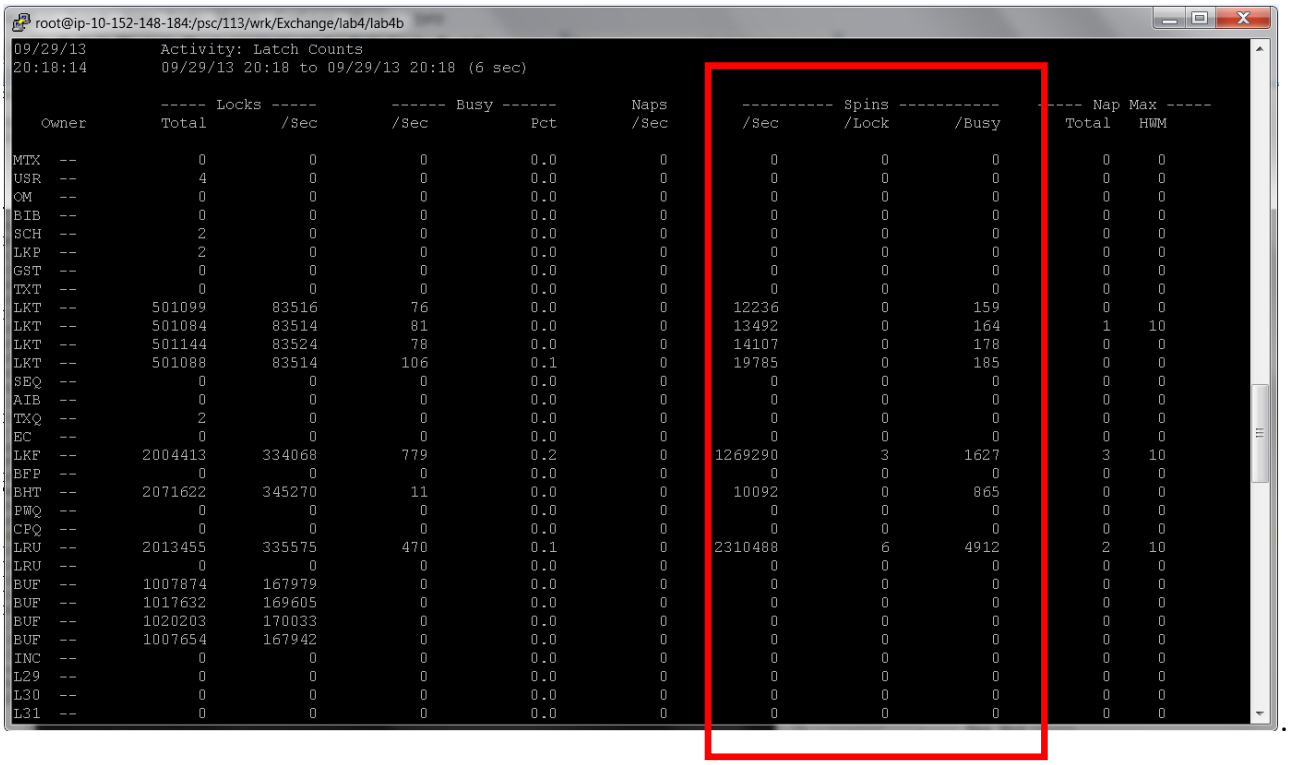
NOTE: You may want to resize the putty session to prevent the column wrapping.

4) In the second putty session run this command:

./twosessions.sh

5) In the putty session running promon:

Notice the high contention



6) In the putty session where the mpro was run exit the mpro session hit Enter to return to the proenv command prompt.

7) In the putty session running promon let's end the promon session even if it isn't finished with its iterations by issuing this control sequence:

CTRL + C

8) In the first putty session issue the following command:

proutil /psc/113/wrk/Exchange/db/sports2000 -C increaseto -B 100000

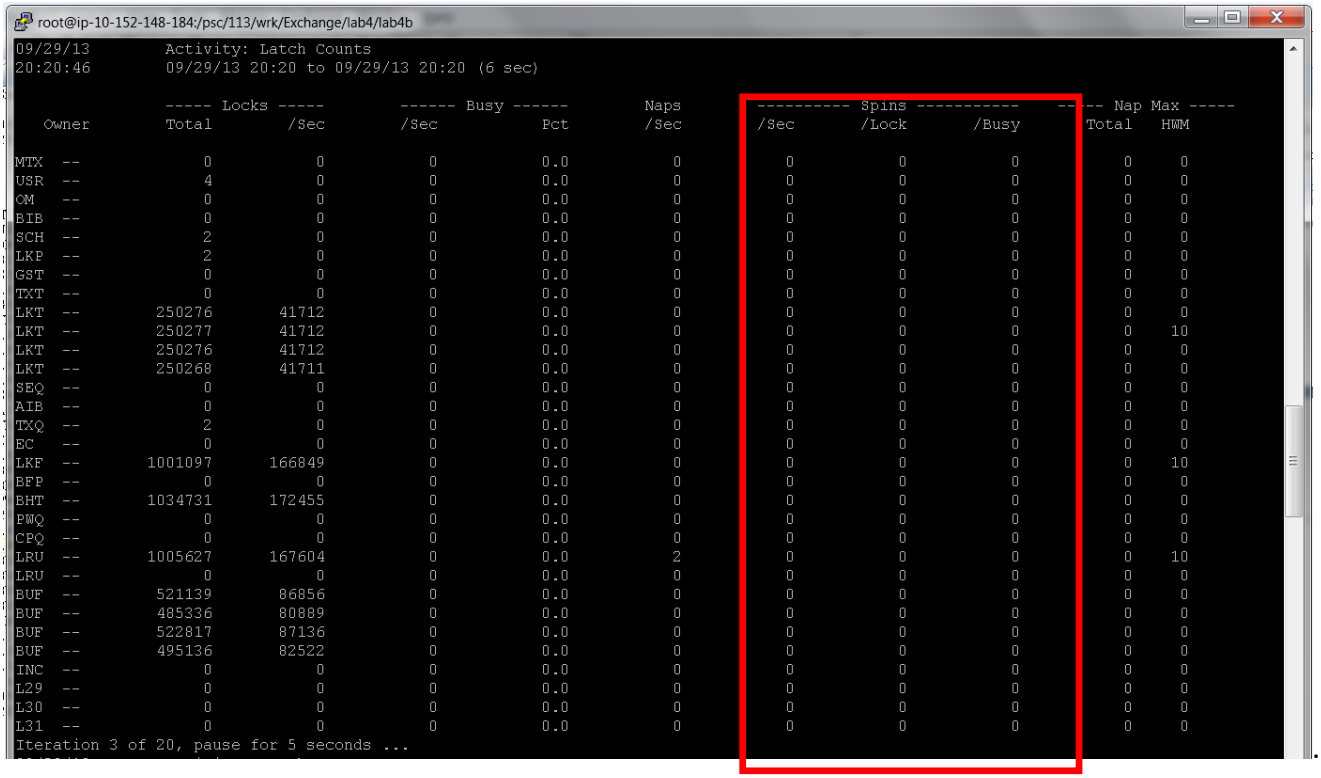
9) In the first putty session start promon against the database

promon.sh <./promonauto

10) In the second putty session run this command:

./twosessions.sh

11) In the putty session where promon is running notice the reduced contention



Caveat to increaseto due to current logged in users.

Duration

5 Minutes

Instruction

1) Open two putty sessions and issue the following commands

./proenv

cd lab4/lab4c

2) In the first putty session start the database with this command to intentionally give very few database buffers

startdb.sh

3) Start promon against the database

promon.sh

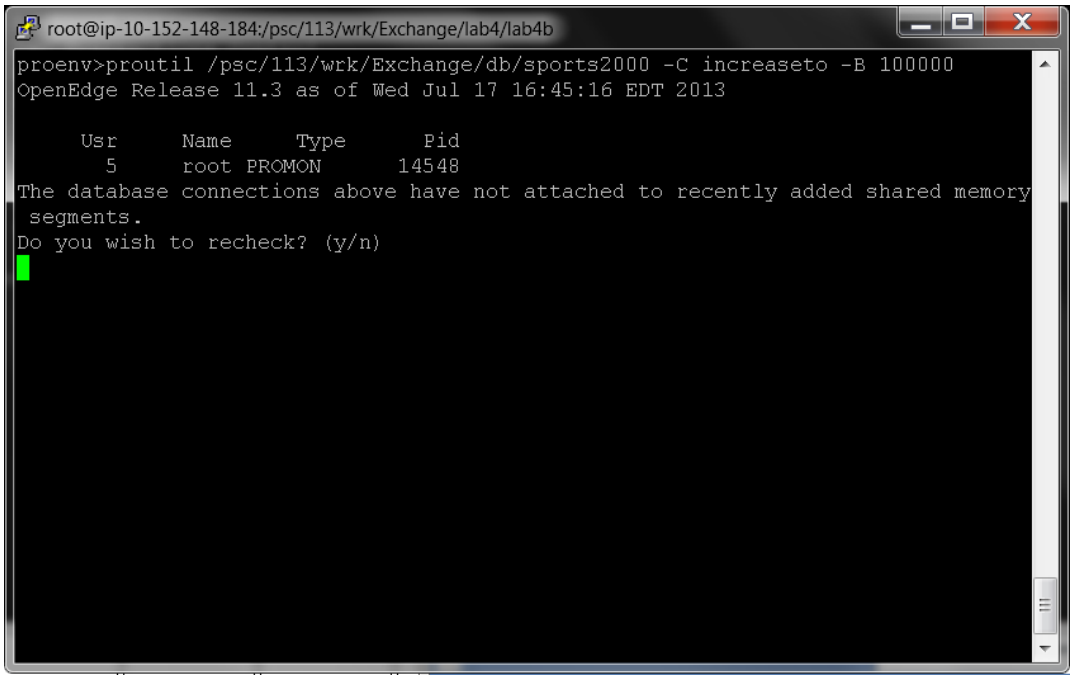
4) In the second putty session issue the following commands:

proutil /psc/113/wrk/Exchange/db/sports2000 -C increase2 -B 1000

Note the message:

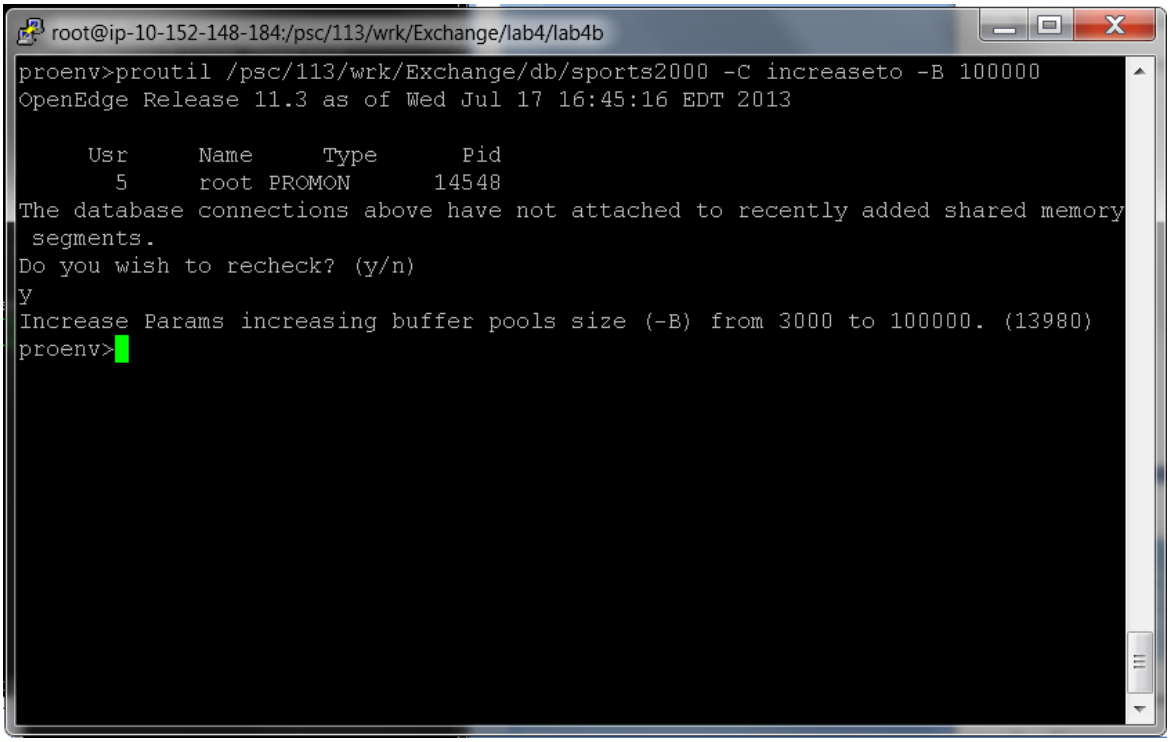
Users already connect may not be able to immediately connect to the newly allocated shared memory.

If not, the proutil function will display those users that must be disconnected and reconnected:



5) In the putty session running promon Enter X to exit promon.

6) In the putty session which is waiting to increase the -B enter Y to recheck.



Part (4c) Demonstration of increaseto -B2 (Disabling LRU2 Policy)

Duration

5 Minutes

Instruction

1) Open two putty sessions and issue the following commands

   ./proenv

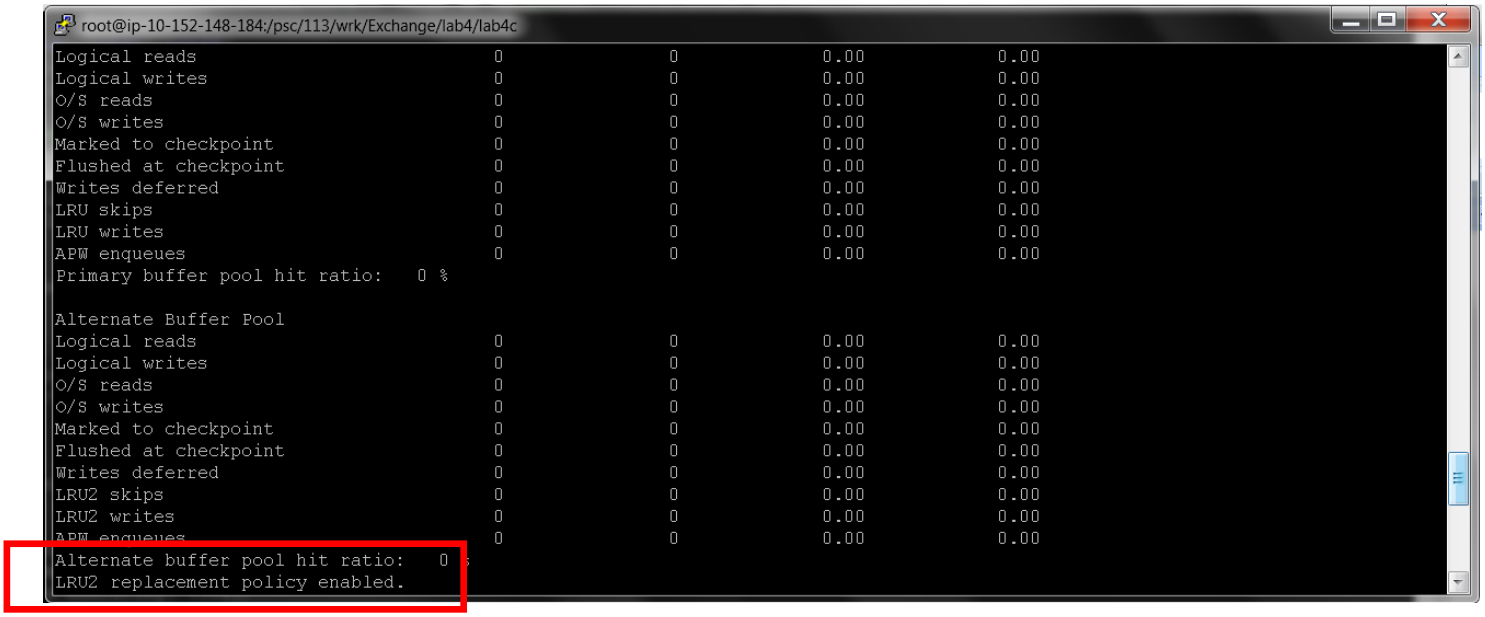
   cd lab4/lab4c

2) Issue the following command in the first putty session
   demonstrate-lru2-enabled.sh
   Hit the return key once more so the program will return to the prompt when it is done.

3) In the second putty session issue this the following commands:

   gatherlru.sh

Notice the LRU2 Replacement Policy is Enabled



4) From the command prompt in the second putty session issue the command to increase the -B2

proutil /psc/113/wrk/Exchange/db/sports2000 -C increaseto -B2 100000

5) In the first putty session run this command again:

gatherlru.sh

Notice the LRU2 Replacement Policy is now Disabled