OpenEdge Database Monitoring

The Coders Are Out To Get You

Tom Bascom, White Star Software

Abstract: It's true. They are. And this talk is all about how to prove it.

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OpenEdge Database Monitoring

The Coders Are Out To Get You!

It’s True, They Are!

Tom Bascom, White Star Software
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A Few Words about the Speaker

- Tom Bascom: Progress user & roaming DBA since 1987
- Partner: White Star Software, LLC
  - Expert consulting services related to all aspects of Progress and OpenEdge.
  - Remote database management service for OpenEdge.
  - Author of: 
  - Simplifying the job of managing and monitoring the world's best business applications.
  - **tom@wss.com**

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The Deadly Sins Of Coders

- Bad transaction scope
- Bad WHERE clauses
- Keywords that they just can’t seem to forget
- It works great in Development!

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Bad Transactions

Poor Transaction Scope

- If you have transactions that last more than 1 second you probably have a problem.
- There are three main categories:
  - Transactions that span UI (long time)
  - “Business Transactions” inappropriately implemented as database transactions (very large –L)
  - Ad-hoc ”data fix” routines with poor transaction scope

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Transaction Spanning UI

- Drives out of control BI growth
- Consumes resources
- Could crash your system, possibly in a difficult to recover manner
- Caused by poor coding practices with regards to buffer and transaction scope

Business Transaction as a DB Transaction

- Often associated with interruptible and easily restartable or reversible business processes
- For example:
  - Purging old data
  - Bulk updates

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Ad-Hoc “Data Fix”

It’s just quick and dirty code…
No need to follow best practices!

```
find controlTable where activity = 1234.
controlTable.inuse = yes.

run myUpdate.p.  /* myUpdate.p updates a few million rows… */
```

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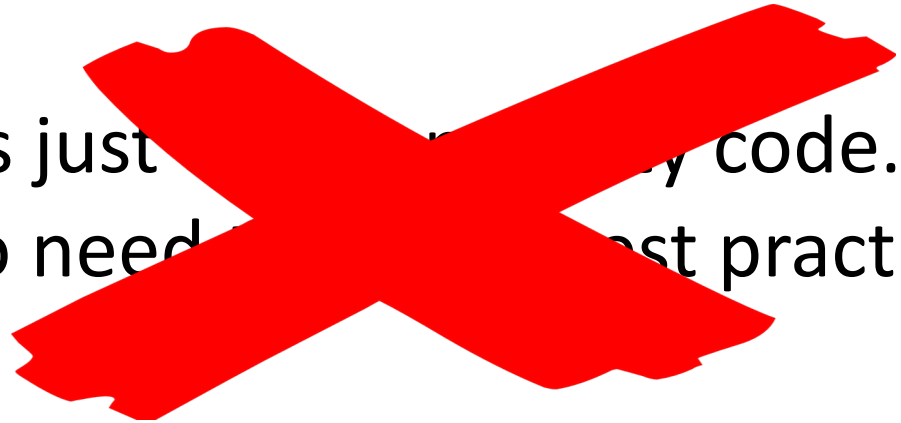
Preventing Ad-Hoc Accidents




```
do for controlTable transaction:
  find controlTable exclusive-lock where activity = 1234.
  controlTable.inuse = yes.
end.

run myUpdate.p.  /* myUpdate.p updates a few million rows… */
```

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Monitoring Bad Transaction Scope

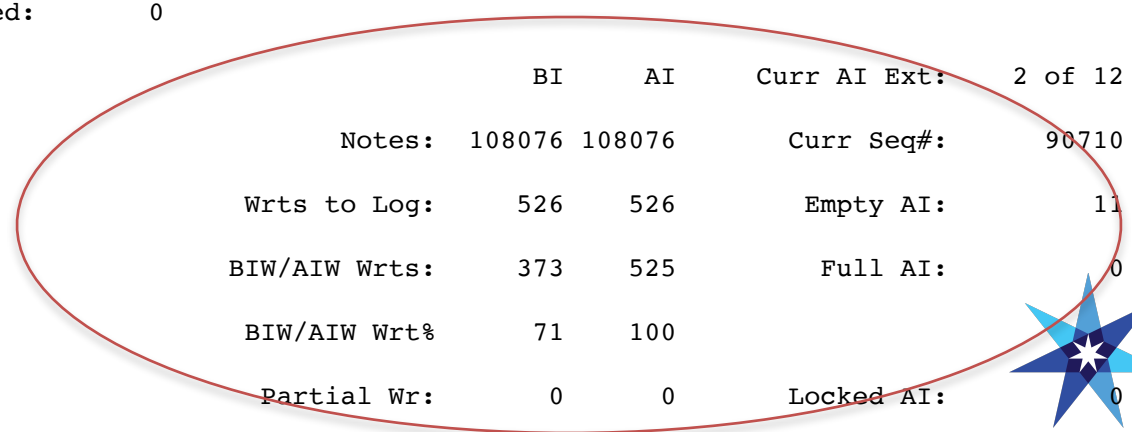
ProTop Command Key: d

```
demo Auto Interval Rate DS 2202 175604 1.160       ProTop Version 3.14159x as of September 22, 2020 11:14
2020/10/26 19:42:15
demo 1134 209 0                                                    demo
protop.wss.com
p
         Hit%       99.72          Commits:       417      Examined:    10991      APW Writes:           516      DB UpTime: 110d 03:15
Connections:     1046
   Log Reads:      693637            Undos:     20381        New RM:    10366       APW Write%           100      Backup Age:      08:45              -n
%       35
  Log Writes:           0                                   From RM:    10366    Bufs Scanned:          3677
Brokers:        5
    OS Reads:        1944     Lock Tbl HWM:   1000014      RM Locked:    10319    APW Scan Wrs:             1      Oldest TRX:   00:18:41      SQL
Servers:        2
   OS Writes:         516     Curr # Locks:      1804      From Free:        0      APW Q Wrts:               0    Curr BIClstr:     420810      SQL
Clients:        2
 LogRd/LogWr:        0.00         Lock Tbl%     0.18%      Front2Bk:      624    Chkpt Q Wrts:             515     Old BIClstr:     420793      4gl
Servers:       34
 LogRd/RecRd:        3.03         Rec Lk/s:     51781                            Flushed Bufs:               0    Num BIClstrs:         17      4gl
RemCnx:        2
   Rec Reads:      229207     Lk Dura (ms):      3.49       Mod Bufs:     2509      Chkpt Len:        00:01:50      BI MB Used:       1088      App
Server:       64
   Idx Reads:      199973                                   Evicted:        0                                                                 Web
Speed:        0
 Rec Creates:       10366                                                                    BI      AI     Curr AI Ext:     2 of 12
Local:      885
 Idx Creates:         800          BogoMIPS:      5.03                              Notes:  108076  108076     Curr Seq#:      90710
Batch:       47
 Rec Updates:         151   Random IO (ms):      0.12                          Wrts to Log:     526     526      Empty AI:         11     BIW/AIW/
WDOG:    1 1 1
 Rec Deletes:         132    Sync IO (sec):      1.81                          BIW/AIW Wrts:     373     525      Full AI:          0          AI
Mgmt:        1
 Idx Deletes:         612          (MB/sec):     53.04                          BIW/AIW Wrt%      71     100
APWs:        2
 Idx Blk Spl:           0     User Exp SHM:     90000                           Partial Wr:       0       0      Locked AI:        0      RPLA/
RPLS:      0 1
```

Monitoring Bad Transaction Scope

ProTop Command Key: x

```
demo Auto Interval Rate DS 2202 175604 1.160       ProTop Version 3.14159x as of September 22, 2020 11:14
2020/10/26 19:42:15
demo 1134 209 0                                                    demo
protop.wss.com
p
         Hit%       99.72         Commits:       417      Examined:   10991      APW Writes:            516      DB UpTime: 110d 03:15
Connections:     1046
   Log Reads:      693637           Undos:     20381        New RM:   10366       APW Write%            100      Backup Age:       08:45              -n
%       35
  Log Writes:           0                                  From RM:   10366    Bufs Scanned:           3677
Brokers:        5
    OS Reads:        1944    Lock Tbl HWM:   1000014     RM Locked:   10319    APW Scan Wrs:              1      Oldest TRX:    00:18:41      SQL
Servers:        2
   OS Writes:         516    Curr # Locks:     1804     From Free:       0      APW Q Wrts:              0    Curr BIClstr:      420810      SQL
Clients:        2
 LogRd/LogWr:        0.00        Lock Tbl%     0.18%     Front2Bk:     624    Chkpt Q Wrts:            515    Old BIClstr:      420793      4gl
Servers:       34
 LogRd/RecRd:        3.03        Rec Lk/s:    51781                          Flushed Bufs:              0    Num BIClstrs:          17       4gl
RemCnx:        2
   Rec Reads:      229207    Lk Dura (ms):     3.49      Mod Bufs:    2509      Chkpt Len:       00:01:50      BI MB Used:        1088      App
Server:       64
   Idx Reads:      199973                                Evicted:       0                                                                 Web
Speed:        0
 Rec Creates:       10366                                                                  BI      AI     Curr AI Ext:       2 of 12
Local:      885
 Idx Creates:         800        BogoMIPS:     5.03                          Notes:   108076  108076      Curr Seq#:         90710
Batch:       47
 Rec Updates:         151  Random IO (ms):     0.12                       Wrts to Log:     526     526       Empty AI:            11     BIW/AIW/
WDOG:    1 1 1
 Rec Deletes:         132   Sync IO (sec):     1.81                       BIW/AIW Wrts:    373     525        Full AI:             0          AI
Mgmt:        1
 Idx Deletes:         612        (MB/sec):    53.04                       BIW/AIW Wrt%      71     100
APWs:        2
 Idx Blk Spl:           0    User Exp SHM:    90000                        Partial Wr:       0       0      Locked AI:             0     RPLA/
RPLS:      0 1
```



Bad WHERE Clauses

WHERE clause – Golden Rule

- Equality matches on **all** leading components of an index!

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- Equality matches on **all** leading components of an index!
- The company is always the same, why should I include it?

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- Equality matches on **all** leading components of an index!
- The company is always the same, why should I include it?

```
etime( yes ).
find order where orderNum = 36.
display etime.

etime( yes ).
find order where company = 0 and orderNum = 36.
display etime.
```

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WHERE clause – Golden Rule

- Equality matches on **all** leading components of an index!
- The company is always the same, why should I include it?

```
etime( yes ).
find order where orderNum = 36.
display etime.

etime( yes ).
find order where company = 0 and orderNum = 36.
display etime.
```

```
707
```

```
0
```

Recognizing Bad WHERE Clauses at run time

ProTop Command Key: d

```
demo Auto Interval Rate DS 81 6001 0.381            ProTop Version 3.14159x as of October 06, 2020 10:27
2020/10/28 11:54:38
demo 1 25465 105                                                   /db/demo
protop.wss.com
  p
         Hit%        98.33       Commits:         0       Examined:        0       APW Writes:            0       DB UpTime:      00:11
Connections:        3
   Log Reads:      2231033        Undos:         0         New RM:        0        APW Write%            0      Backup Age:    Never!             -n
%     14
  Log Writes:            0                                From RM:        0     Bufs Scanned:            0
Brokers:         1
    OS Reads:        37194   Lock Tbl HWM:       27       RM Locked:        0     APW Scan Wrs:            0      Oldest TRX:  00:00:00     SQL
Servers:         0
   OS Writes:            0   Curr # Locks:        1       From Free:        0       APW Q Wrts:            0     Curr BIClstr:         0     SQL
Clients:         0
 LogRd/LogWr:         0.00       Lock Tbl%     0.01%       Front2Bk:        0     Chkpt Q Wrts:            0      Old BIClstr:         0     4gl
Servers:         0
 LogRd/RecRd:         2.01       Rec Lk/s:       57                           Flushed Bufs:            0     Num BIClstrs:         0      4gl
RemCnx:         0
   Rec Reads:      1110408   Lk Dura (ms):     1.90        Mod Bufs:        0        Chkpt Len:                   BI MB Used:         0      App
Server:         0
   Idx Reads:      1110440                                 Evicted:        0                                                              Web
Speed:         0
 Rec Creates:            0                                                                          BI      AI     Curr AI Ext:  Disabled
Local:         2
 Idx Creates:            0       BogoMIPS:     3.72                                  Notes:          0       0        Curr Seq#:         0
Batch:         0
 Rec Updates:            0  Random IO (ms):     0.01                            Wrts to Log:          0       0        Empty AI:         0    BIW/AIW/
WDOG:      0  0  0
 Rec Deletes:            0   Sync IO (sec):     0.00                          BIW/AIW Wrts:          0       0         Full AI:         0        AI
Mgmt:          0
 Idx Deletes:            0        (MB/sec):     0.00                          BIW/AIW Wrt%          0       0
APWs:          0
 Idx Blk Spl:            0   User Exp SHM:   233373                            Partial Wr:          0       0       Locked AI:         0     RPLA/
```

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Recognizing Bad WHERE Clauses at run time

ProTop Command Keys: t i u

```
demo Auto Interval Rate DS 81 6001 0.381            ProTop Version 3.14159x as of October 06, 2020 10:27
2020/10/28 11:54:38
demo 1 25465 105                                                           /db/demo
protop.wss.com
. . .
┌──────────────────────────────────────────────────────────────────────── Table Activity
────────────────────────────────────────────────────────────────────────┐
│    Tbl# Area# BX Table Name                         RM Chain      #Records   Frag% Scat       Churn  AvgRow     Create       Read v     Update     Delete
OS Read │
│
─────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────
─────  │
│ >   14     7 B1 Order                                     5        727285   0.00%    1        1.53      93          0    1110439          0          0
34702 │
│      1     7 B1 Benefits                                  4            21   0.00%    1        0.00      40          0          0          0          0
0 │
│      2     7 B1 BillTo                                    4             2   0.00%    1        0.00     111          0          0          0          0
0 │
┌──────────────────────────────────────────────────────────────────────── Index Activity
────────────────────────────────────────────────────────────────────────┐
│    Idx# Area# BX Index Name                                     Blocks    Util Lvls   Idx Root   Note     Create       Read v      Split     Delete
BlkDl │
│
─────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────
─────  │
│ >   41     8 B1 Order.OrderNum                                   1655  98.30%    3      69760     PU          0    1109656          0          0
0 │
│      8     8 B1 Benefits.EmpNo                                      1   4.80%    1       2176     PU          0          0          0          0
0 │
│      9     8 B1 BillTo.custnumbillto                                1   0.70%    1       4224     PU          0          0          0          0
0 │
┌─────────────────────────────────────────────────────────────────────── User IO Activity
───────────────────────────────────────────────────────────────────────┐
│    Usr# Name                      PID       Flags     Blk Ac v     OS Rd   OS Wr     Hit% Rec Lck  Lk HWM  CSC Age Line# Program Name
```

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Keywords to forget!

- CAN-DO()
  - CAN-DO() in a WHERE clause forces client side selection and sorting
- USE-INDEX
  - Overrides the compiler's index selection
  - Prevents the use of multiple indexes to resolve a query
- MATCHES
  - When used in a WHERE, forces a table scan

It Works Great in Development!

ProTop Features

ProTop Command Key: ?

```
 d = Performance Dashboard          c = Configuration Viewer          o = OS Info (if avail)

 t = Table Activity                 w = Latches and Resources         Q = SQL activity
 i = Index Activity                 k = Checkpoints                   D = Disk Free Space
 l = LOB Activity                   b = Blocked Sessions              / = Sequences
 u = User IO Activity               r = OE Replication Agents         N = Network Traffic
 x = Active Transactions            f = File IO                       W = Who is Connected?
 L = Login Brokers                  s = Server Activity               m = Multi-Tenant Info
 a = Storage Areas                  A = "Classic" App Servers         e = Application Specific
^b = Buffer Pools                   B = BigB Guesstimator            ^a = After-Imaging Info

 U = User Information Viewer        # = Set Usr#                      P = Set Process Id
 H = Health Check                   * = Client Statement Cache       _ = Clear Client Statement Cache
^l = Progress "showcfg" info


 0 = Color Picker                   6 = Set Table Name                8 = Monitor Users of a Table
 ! = Generate DBAnalys Output       7 = Set Index Name                9 = Monitor Users of an Index
 R = DB Parameters Report           S = Client/Server Parameters      T = Show Table and Index Ranges

 2 = Pro2 Activity                  j = PASOE Health Scanner          C = CDC Processing Queue

^p = programmer mode               ^u = SQL update stats script     ^t = show session temp-tables
^d = dump & load scripts           ^r = dbanalys review & reports    Y = show session user*stat
^f = FAQ about oddball stuff        v = view reports                 y = run profiler on this session

 ; = Set Refresh Interval           ^ = Modify Sort Columns          & = Show ProTop Properties

     % = Switch between Raw and Rate Sampling        $ = Switch between Auto and On-Demand Sampling
                          <space> = Refresh Sample (or un-pause)
                                  h, ? = Help
                                    q = Quit

Forum: https://community.wss.com/                  Online Help: https://wss.com/protop/help
```

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User Drill Down

ProTop Command Key: #

```
demo Auto Interval Rate DS 81 6001 0.381            ProTop Version 3.14159x as of October 06, 2020 10:27
2020/10/28 11:54:38
demo 1 25465 105                                                                  /db/demo
protop.wss.com

#                                                                  ┌──────────────────────────────────── DB Connection Number
──────────────────────────────────────┐
         Hit%        100.00          Commits:         0      Examined:|
|3
   Log Reads:          2836            Undos:         0        New RM:|  Enter the DB Connection Number for the session of interest.  This is the "Usr#"
column   |4
  Log Writes:             0                                   From RM:|  found on many ProTop screens, in the DB .lg file, and in many Progress error
messages.  |1
    OS Reads:             0     Lock Tbl HWM:        27     RM Locked:|
|0
   OS Writes:             0     Curr # Locks:         0     From Free:|  Usr#     2
|0
 LogRd/LogWr:          0.00         Lock Tbl%     0.00%      Front2Bk:|
|0
 LogRd/RecRd:          2.14         Rec Lk/s:         0               |  Client statement cache type: 1      0 = Off
|0
   Rec Reads:          1325     Lk Dura (ms):      0.00      Mod Bufs:|                                      1 = Single (Top of Stack)
|0
   Idx Reads:          1325                                  Evicted:|                                      2 = Full Call Stack
|0
 Rec Creates:             0                                          |
|2
 Idx Creates:             0         BogoMIPS:      6.33               |      Most of the time you want "1".  You typically do not need the full stack
|0
 Rec Updates:             0   Random IO (ms):      0.01               |      unless you are planning to look at the detailed User Info screen (the "U"
|0
 Rec Deletes:             0    Sync IO (sec):      0.00               |      command).  The full stack option obviously takes more memory, uses more
|0
 Idx Deletes:             0         (MB/sec):      0.00               |      space in the client/server networking communications and is more likely
```

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User Drill Down and programmerMode

ProTop Command Key: ^p

```
demo OnDemand Interval Summary DS 81 5296 0.017      ProTop Version 3.14159x as of October 06, 2020 10:27                    2020/10/28
12:59:27
demo 1 1 1 programmerMode                                                  /db/demo
protop.wss.com
  T#?U^p
   Login Name: tom         Login Time:Wed Oct 28 11:46:44 2020                 -Bp Bufs:          0            BI Reads:          0       Logical Rd:
7305877
         Usr#:          2  Device/IP: /dev/pts/2                              -Bp Used:          0           BI Writes:          0       Logical Wr:
0
   Connect Id:          3  Full Name:                                                                        AI Reads:          0       Disk Reads:
  121910
          PID:      23288      Phone:                                           Server:          0           AI Writes:          0              Hit%
      98
          TID:      23288     E-Mail:                                         Serv PID:          0                                          Num TRX:
0
                                                                              Serv TID:          0                                       Curr Locks:
0
 Session Info: ABL SELF S4                                                                                                                 Lock HWM:
2
     TRX Info: --None--
┌─────────────────────────────────────────────────────────────────── Session Table Activity
───────────────────────────────────────────────────────────────────────┐
│    Tbl# Area# Table Name                                RM Chain      #Records       Frag% Scat      Churn  AvgRow     Create        Read v     Update     Delete
OS Read │
│
──────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────
────  │
│ >    14     7 Order                                           5        727285       0.00%    1        5.00      93          0      3636425          0          0
     ? │
│       1     7 Benefits                                        4            21       0.00%    1        0.00      40          0            0          0          0
     ? │
│       2     7 BillTo                                          4             2       0.00%    1        0.00     111          0            0          0          0
     ? │
┌─────────────────────────────────────────────────────────────────── Session Index Activity
```

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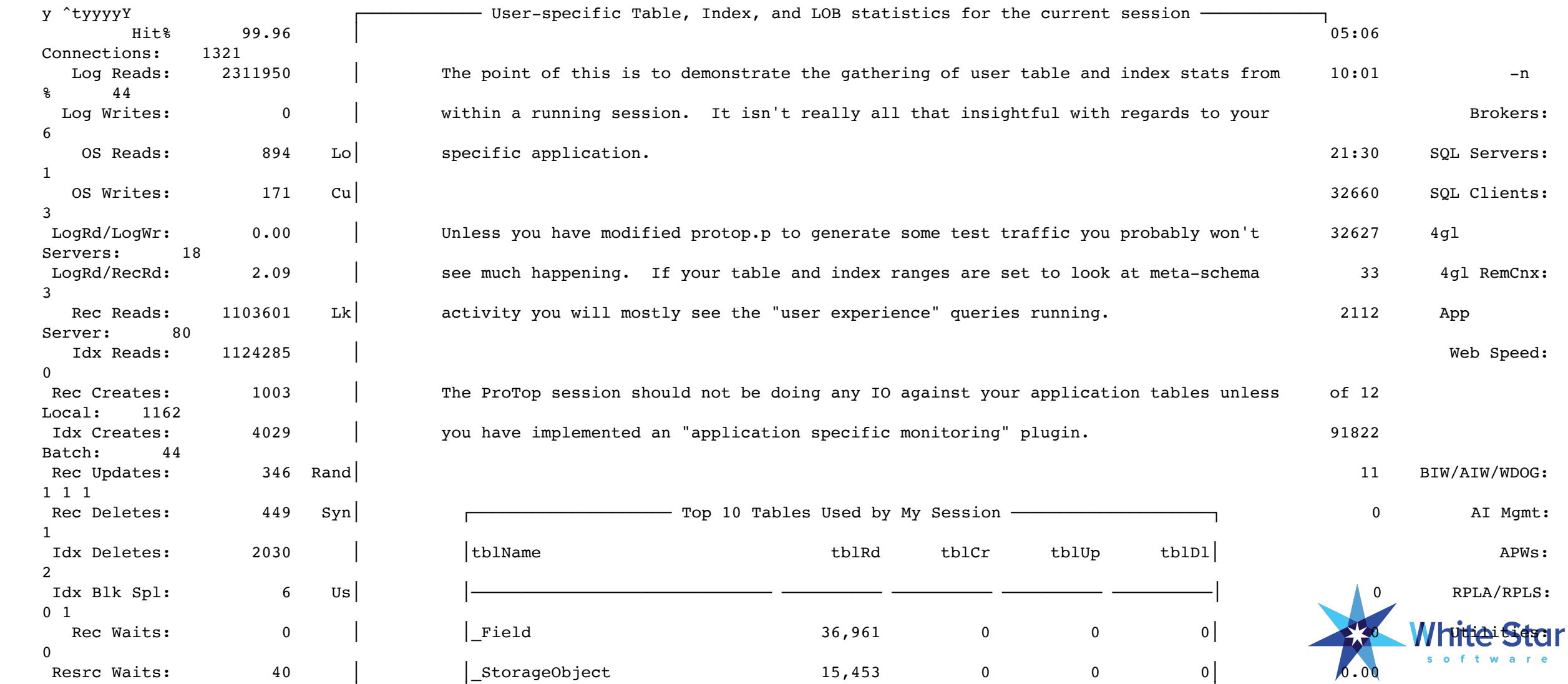
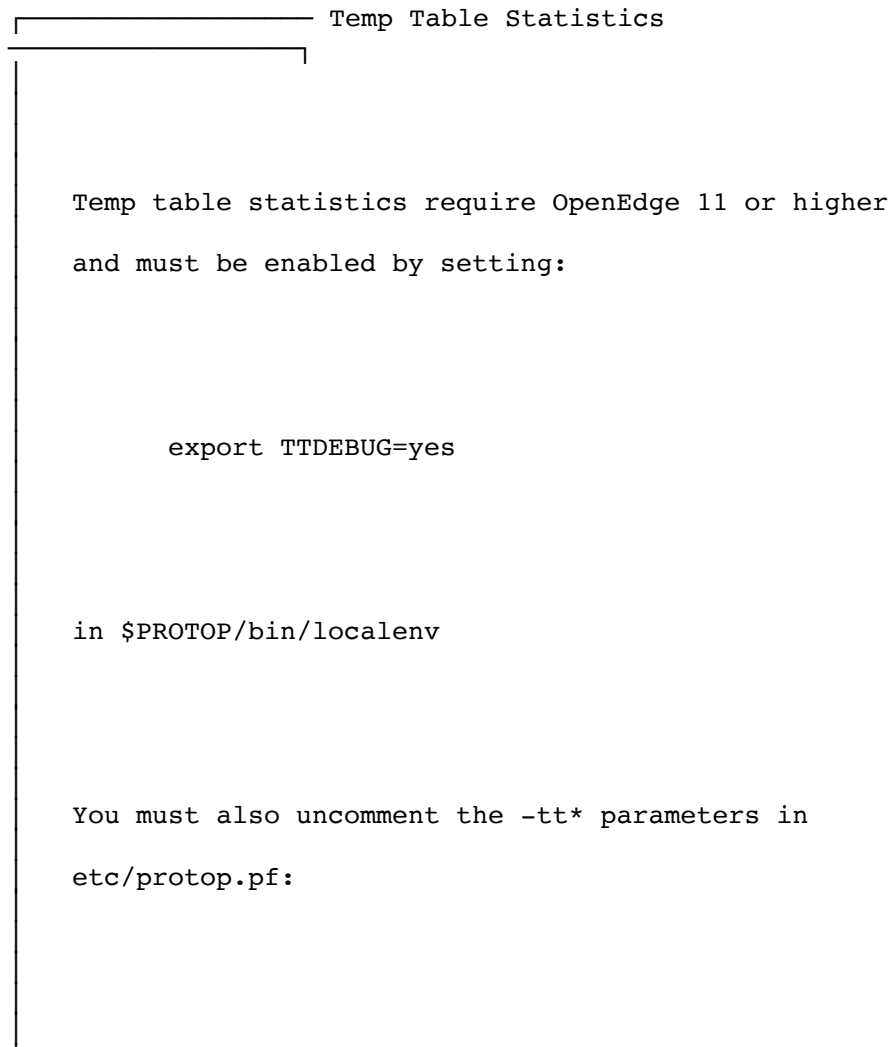
User-specific Table & Index Information

ProTop Command Key: Y



Temp Table Usage

ProTop Command Key: ^t



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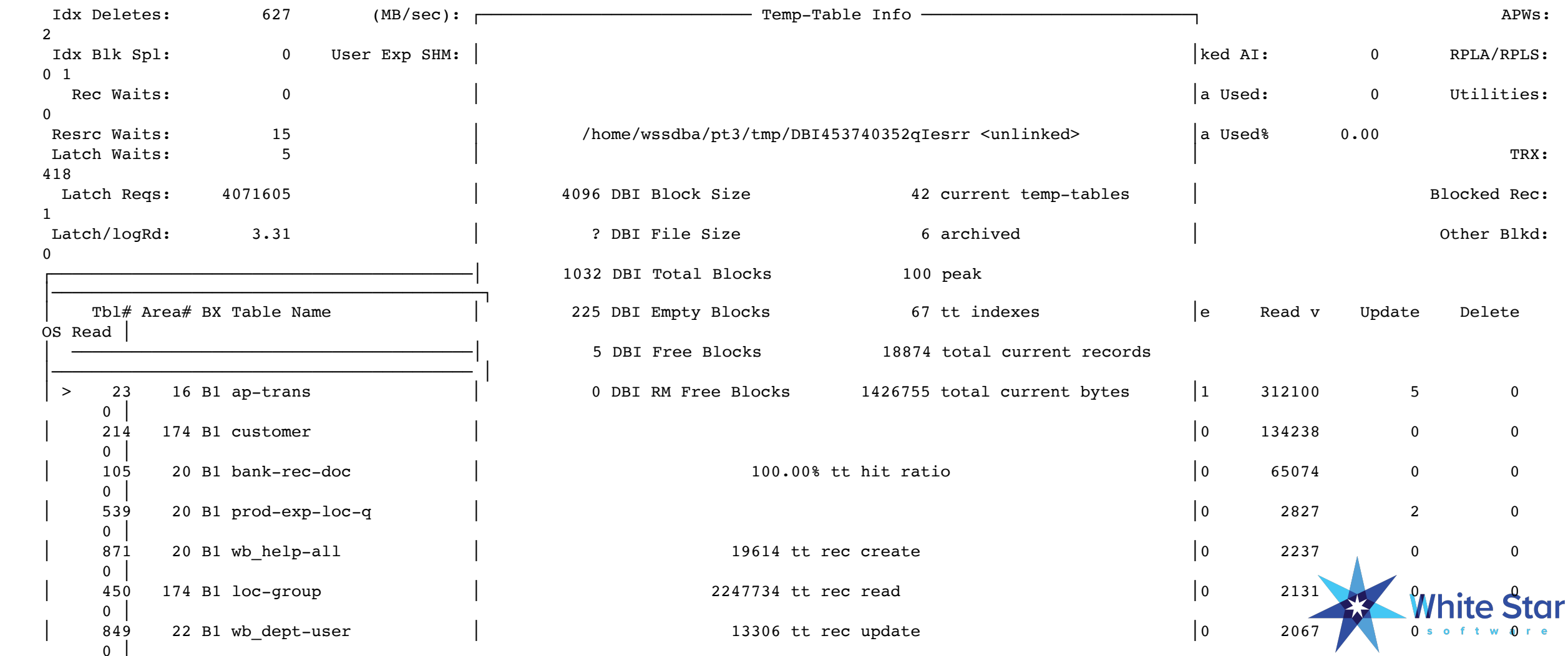
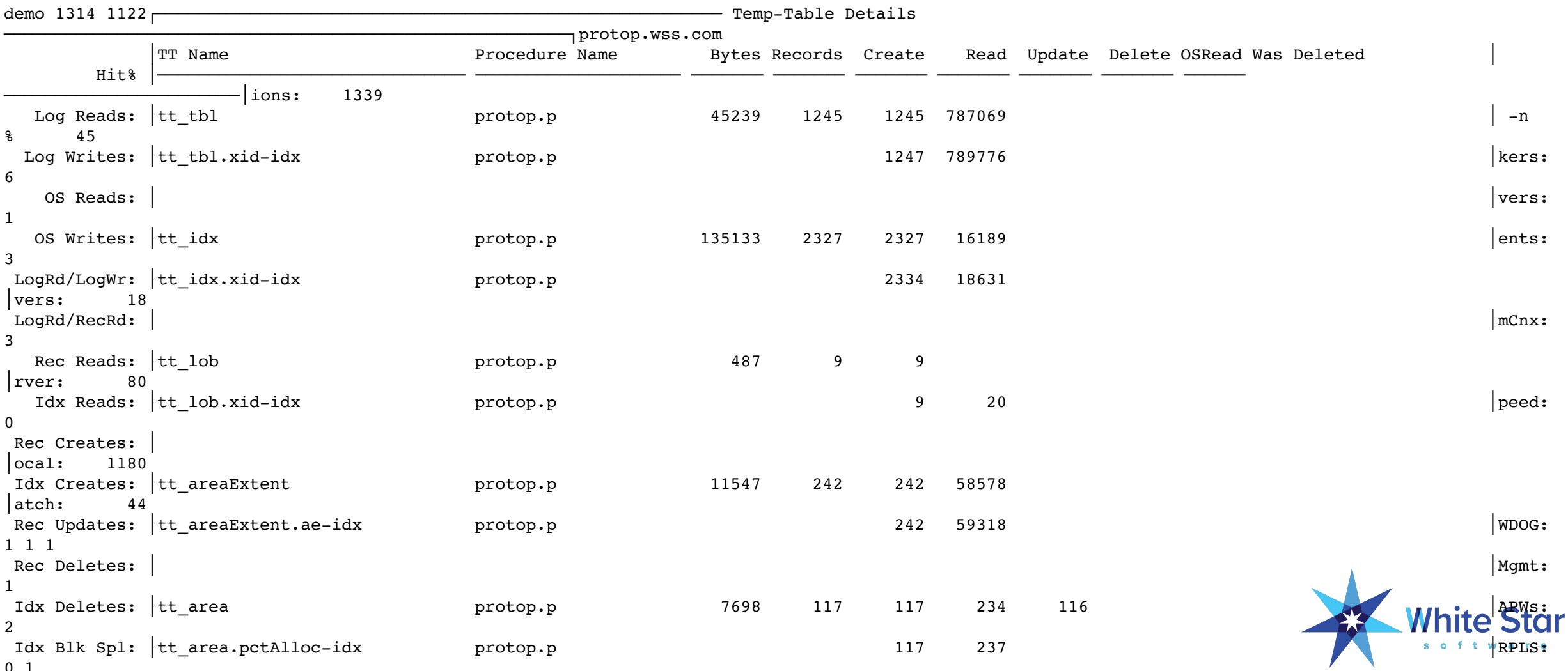
Temp Table Usage

ProTop Command Key: ^t



Temp Table Usage

ProTop Command Key: ^t



Profiler Sample Code

ProTop Command Key: y

```
 Idx Blk Spl:            0    User Exp SHM:┌──────────────────────── Are You Sure? ────────────────────────┐ed AI:           0       RPLA/RPLS:
0 1
   Rec Waits:            0                 │                                                              │ Used:           0       Utilities:
0
 Resrc Waits:           35                 │                                                              │ Used%        0.00
 Latch Waits:            6                 │   The Profiler capability is used to track down performance issues │                          TRX:
418
  Latch Reqs:      6413397                 │   within the ProTop client.  It is very unusual for an end-user to │                  Blocked Rec:
0
 Latch/logRd:         3.32                 │   need to run this for that purpose.                         │                   Other Blkd:
0
┌──────────────────────────────────────────┘                                                              │
│┌─────────────────────────────────────────┐                                                              │
│    Tbl# Area# BX Table Name              │                                                              │     Read v    Update    Delete
OS Read │
│  ┌──────────────────────────────────────┘   Aside from debugging ProTop this code is also a useful example of
│┌─────────────────────────────────────┘ │
│ >     23     16 B1 ap-trans            │   embedding the profiler within an application.  The source can be │     274526         0         0
      0 │
│      539     20 B1 prod-exp-loc-q      │   found in lib/zprof*.p                                      │     154059         5         0
      0 │
│      930     20 B1 wm-pick             │                                                              │     148645         0         0
      0 │
│      652     18 B1 so-pick             │                                                              │      62154         2         0
      0 │
│      214    174 B1 customer            │   It is fine to run this code in order to get a feel for how useful │      52461         0         0
      0 │
│      528     18 B1 prod-exp            │   embedded profiling can be (IMHO it is *VERY* useful).      │      48018         0         0
      0 │
│      790     20 B1 s_crm-valid-queue   │                                                              │      21530         0         0
      0 │
│       61    122 B1 ar-trans            │                                                              │      12179         4         0
39 │
│       68    118 B1 ar-trans-d          │   But be aware that profiling can very quickly create very large │       8101         2         0
```

Profiler Output

ProTop Command Key: y

Profiler: Top 20 Results

Description: ProTop3 Execution Profile [00:00:15]

Session Total Execution Time   00:00:02

Line 0 = initialization, line -1 = cleanup

Top 20 Lines: Total Execution Time

Program/Class	Line	Time	Avg Time	Calls	Internal Procedure/Method
dc/dashboard.p	3812	0.902008	0.000000	2000002	mon-update
dc/dashboard.p	0	0.554537	0.277269	2	mon-update
ssg/sausage00.p	1937	0.164200	0.000004	46774	scanDataSet
ssg/sausage00.p	0	0.154750	0.077375	2	scanDataSet
ssg/sausage00.p	1974	0.132913	0.000003	43213	scanDataSet
dc/idxact.p	877	0.132201	0.000029	4546	upd-tt_index
dc/uio.p	0	0.126270	0.063135	2	mon-update
dc/dashboard.p	3813	0.120680	0.000000	2000000	mon-update
ssg/sausage00.p	1973	0.095414	0.000002	43517	scanDataSet

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Conclusion

Summary

- How to recognize bad transactions
- How to recognize bad where clauses
- Some keywords to banish
- Tools to show your coders the way to righteous coding and happy users!

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protop

wss.com/download

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Detect and correct issues with your Progress OpenEdge environments before they affect your critical business processes. Learn more about ProTop downloading.

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12.1	Download	Download
12.0	Download	Download
11.7	Download	Download
11.6	Download	Download
11.5	Download	Download
11.4	Download	Download
11.3	Download	Download
11.2	Download	Download
10.2B	Download	Download
10.2B08 32-Bit	Download	Download
Source Code*	Download	Download

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Thank You!

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Questions?

See you in the chat window or e-mail tom@wss.com!

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