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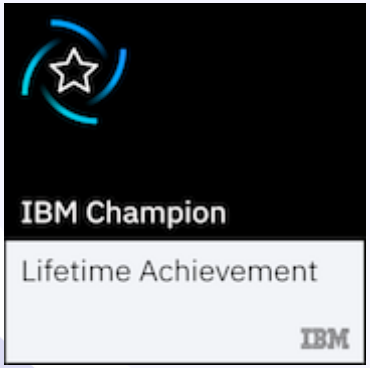
Session Title: Managing and Optimizing the IBM Informix Server using the Sysmaster Database

Lester Knutsen

Retired DBA,

Advanced DataTools Corporation

Lester Knutsen
Retired DBA



Lester Knutsen is a retired DBA. Lester was Founder and President of Advanced DataTools Corporation and has built and managed Informix database systems since 1983. Lester is an Informix IBM Lifetime Champion. Lester was one of the founders of the Washington Area Informix User Group and the International Informix Users Group.

lester@advancedatatools.com
www.advancedatatools.com
703-256-0267

How to use the Sysmaster Database to measure the health and performance of your IBM Informix Server.

Agenda

- What is the Sysmaster Database?
- How do we measure the basic CPU and IO levels of the Server?
- What indexes are needed?
- How can we fit more tables into memory?
- How can we reduce the Buffer churn rate?
- How do we monitor Memory usage?
- How do we monitor Database Statistics?
- Extra Scripts

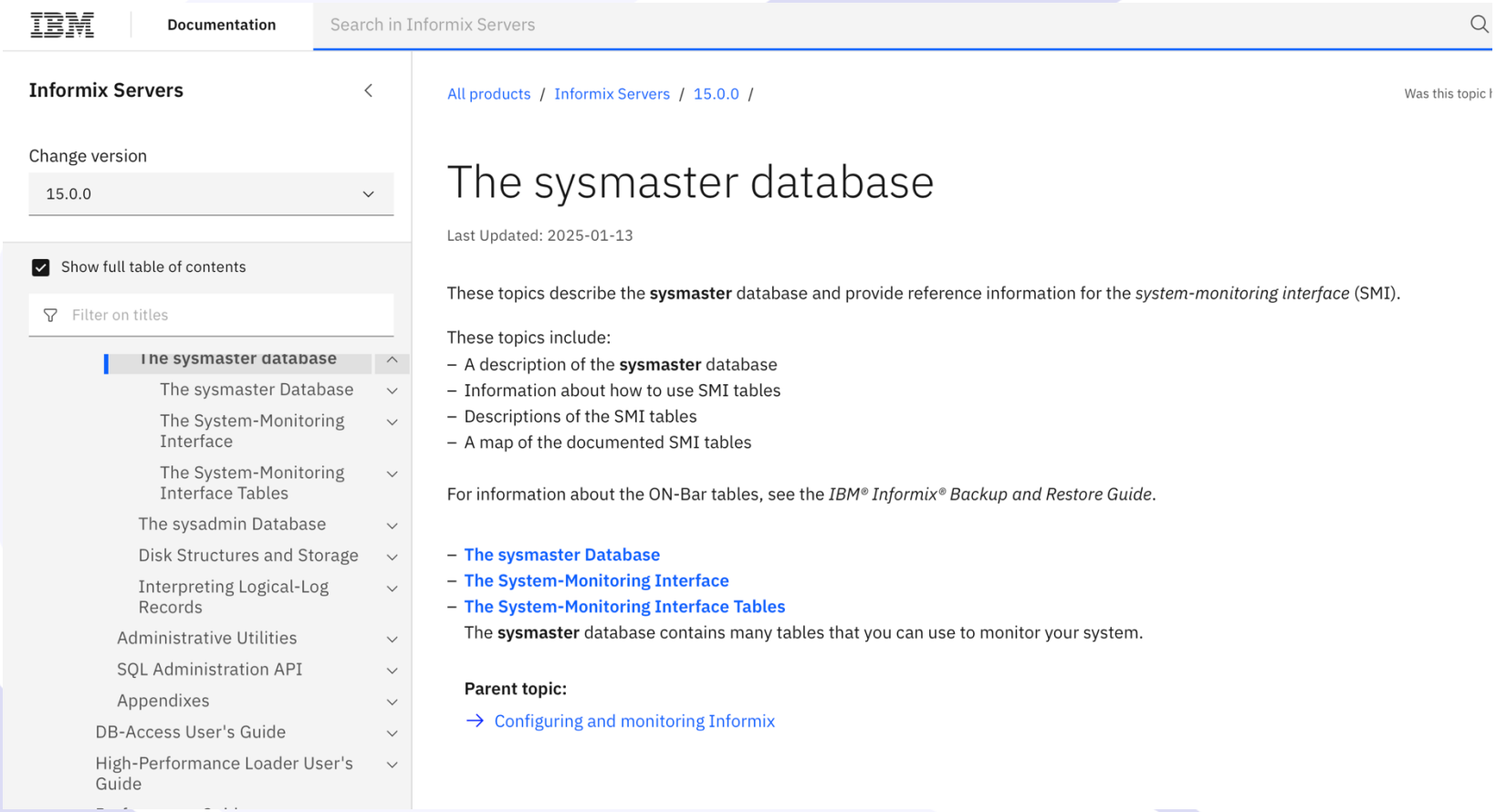
What is the Sysmaster Database?

A database that peeks into
the shared memory structures
of an INFORMIX-Dynamic Server

Script to create the Sysmaster Database:
$INFORMIXDIR/etc/sysmaster.sql

Sysmaster Documentation

https://www.ibm.com/docs/en/informix-servers/15.0.0?topic=informix-sysmaster-database

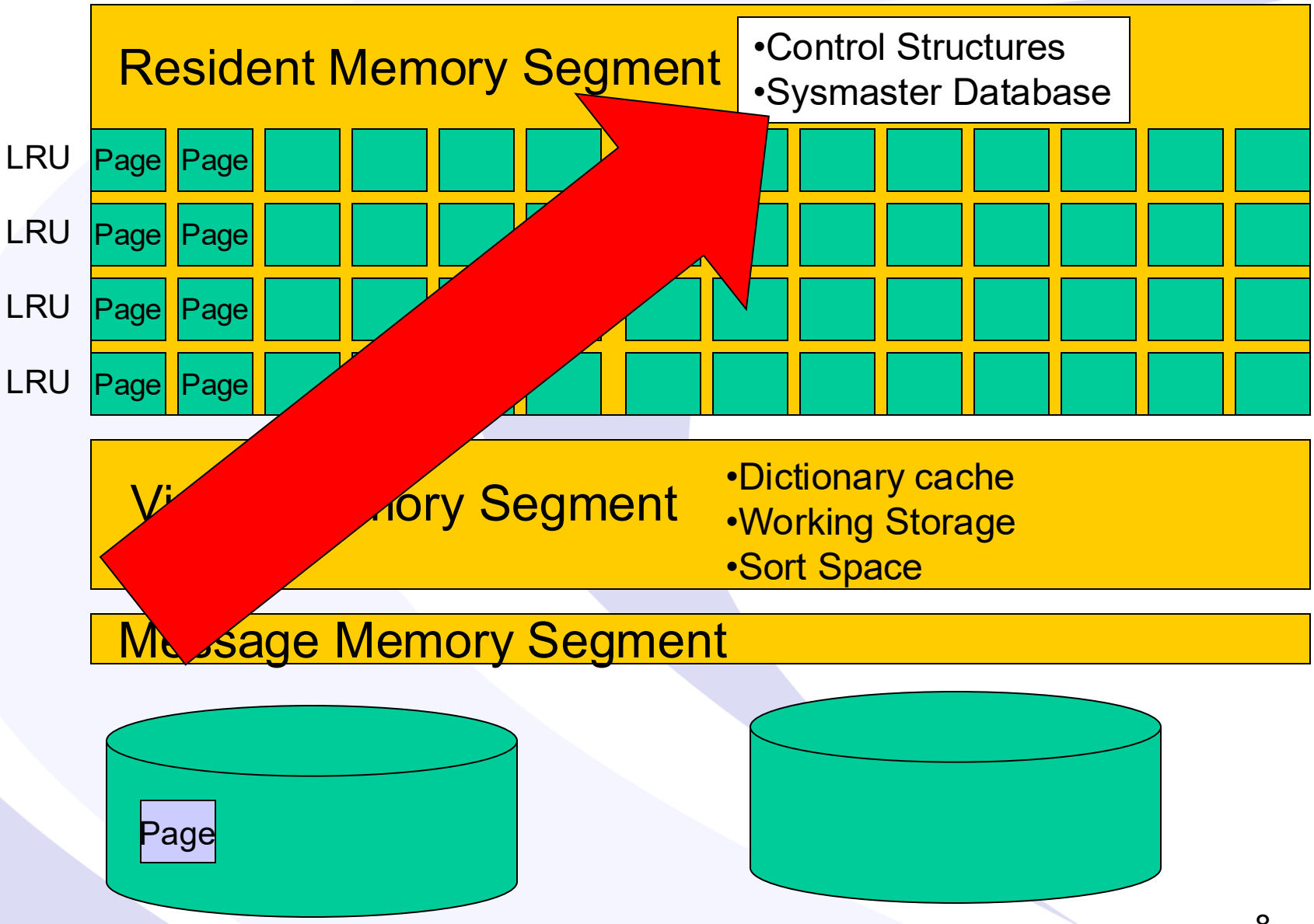


Advanced DataTools

Script to Create the Sysmaster Database $INFORMIXDIR/etc/sysmaster.sql

```
{*********************************************************************}
{*                                                                   *}
{*  Licensed Materials - Property of IBM and/or HCL                  *}
{*                                                                   *}
{*  IBM Informix Dynamic Server                                       *}
{*  Copyright IBM Corporation 2001, 2013                             *}
{*  (c) Copyright HCL Technologies Ltd. 2017, 2024.  All Rights Reserved.   *}
{*                                                                   *}
{*********************************************************************}
{                                                                     }
{   Title:       sysmaster.sql                                        }
{   Description: create sysmaster database and SMI tables             }
{                                                                     }
{  NOTE: Ensure that any changes in the schema of the "sysmaster" database   }
{        OR changes in the corresponding shared memory structure  defns      }
{        are reflected *appropriately* in ALL the files below:                }
{               rsam/sysmaster.sql.IUS,                               }
{               rsam/rsmem.h,                                         }
{               rsam/rspseudo.h and                                   }
{               rsam/rspseudo.c                                       }
{                                                                     }
{*********************************************************************}

{ Create Pseudo Tables }

set lock mode to wait;

create database sysmaster with log;

database sysmaster exclusive;
set environment delimident off;

{ databases }
    create table informix.sysdbspartn
        (
        partnum         integer,        { table id for systables        }
        created         integer,        { date created                  }
        owner           char(32),       { user name of creator          }
        name            char(128),      { database name                 }
        flags           smallint        { flags indicating logging      }
        );
```

Informix Control Structures in Memory are the Sysmaster Database



Same Data as Onstat
onstat -p

```
IBM Informix Dynamic Server Version 14.10.FC10 -- On-Line -- Up 5 days 17:47:53 -- 3743588 Kbytes
2024-07-22 11:08:58

Profile
dskreads   pagreads   bufreads   %cached dskwrits   pagwrits   bufwrits   %cached
19317116   1139646955 4085576579 99.58   265242536  273592030  2986321451 91.12

isamtot    open       start      read       write      rewrite    delete     commit     rollbk
5096252946 852816     654133     246676456  2226728322 33723456   134957     355623     1364

gp_read    gp_write   gp_rewrt   gp_del     gp_alloc   gp_free    gp_curs
0          0          0          0          0          0          0

ovlock     ovuserthread ovbuff     usercpu  syscpu   numckpts   flushes
0          0              853764     28464.27 5942.33  972        1229

bufwaits   lokwaits   lockreqs   deadlks    dltouts    ckpwaits   compress   seqscans
79409      556174     628305395  95         0          414        780826     19969

ixda-RA    idx-RA     da-RA      logrec-RA  RA-pgsused lchwaits   logpgs-RA
2339516    16104      6212898    0          4717540    20979443   1153

informix@tiger6:~ train1 >
```

Sysmaster
select * from sysprofile

```
DISPLAY:  Next  Restart  Exit
Display next page of results.

----------------------- sysmaster@train1 ------- Press CTRL-W for Help --------

name                            value

dskreads                     19317116
bufreads                   4085574774
dskwrites                   265242536
bufwrites                  2986321451
isamtot                    5096253119
isopens                        852834
isstarts                       654157
isreads                    246676550
iswrites                   2226728322
isrewrites                  33723456
isdeletes                     134957
iscommits                     355623
isrollbacks                     1364
ovlock                             0
ovuser                             0
ovtrans                            0
latchwts                    20979444
buffwts                        79409
lockreqs                   628305566
lockwts                       556174
ckptwts                          414
deadlks                           95
lktouts                            0
numckpts                         972
plgpagewrites               10028330
plgwrites                     158089
llgrecs                    145636378
llgpagewrites               30408339
llgwrites                    1080984
pagreads                   1139646955
```

Sysmaster Database Contains:

- Server information
- Dbspace & chunk information
- Database & table information
- User session information
- Currently running SQL

Performance of Queries on Sysmaster Database

The data is in shared memory but:

- Views used by tables require disk access and may be slow
- Complex views are used to hide complex data
- Some tables are large (million locks)
- Unbuffered logging of temp tables

Differences from Other Databases

- Do not update Sysmaster tables, as this may corrupt the server
- Cannot use dbschema on pseudo tables
- Cannot drop pseudo tables or the Sysmaster Database
- Triggers on Sysmaster tables never execute

Isolation Level is Dirty Read

- Data is dynamic and can change as you retrieve it (Dirty Read)
- Dynamic nature may return inconsistent results
- However, reading from the Sysmaster Database uses Unbuffered logging, and temp tables are logged

Sysmaster Database May Change

- Some undocumented tables and columns may change in future versions
- Scripts in this presentation using undocumented features may not work on all versions of Informix
- New scripts have been run on versions 12.10,14.10, and 15.0

Disclaimer

- All scripts are experimental
- Use at your own risk
- Still under test and development
- Tested on 15.0, 14.10.FC3-10, and 12.10.FC15
- May need to be updated in future releases of Informix

Sysmaster Presentations and Scripts

Download all 58 scripts at:

https://advancedatatools.com/Downloads/Sysmaster.zip

OR

See Past Presentations and Download all 58 scripts at:

https://advancedatatools.com/tech-info/tech-sysmaster/

Sysmaster Scripts

```
informix@tiger6:~/Sysmaster2025 train15 > ls
AUS_last_run.sql        database_list.sql       logs_status.sql           server_performance.sql  table_extents.sql
AWSiops.sql             database_size.sql       logs_transaction.sql      server_readahead.sql    table_info_all.sql
checkpoint_history.sql  DB_index_usage.sql      logs_usage.sql            server_sort_ratios.sql  table_info_freerows.sql
checkpoint_last.sql     DB_loop_run.sh          README.txt                server_sqlhosts.sql     table_io_statistics.sql
checkpoint_sumary.sql   dbspace_blob_free.sql   server_btr_ratio.sql      server_statics.sql      table_performance.sql
chunk_free_list.sql     dbspace_free.sql        server_buff_cach_ratio.sql server_uptime.sql      table_waste_space.sql
chunk_io_history.sql    dbspace_io.sql          server_buff_cach_sum.sql  session_list.sql        table_with_seqscans.sql
chunk_io.sql            DB_update_stats_info.sql server_cpu_time.sql      session_lockwait.sql    vp_profile.sql
chunk_io_stat.sql       dbwho.sh                server_licensehistory.sql session_statistics.sql vp_statistics.sql
chunk_io_sum.sql        dbwho.sql               server_machineinfo.sql    session_wait_list.sql
chunk_io_times.sql      logs_not_backup.sql     server_memsegments.sql    SQL_cost_explain.sql
chunk_layout.sql        logs_position.sql       server_onconfig.sql       table_disk_layout.sql
chunk_status.sql        logs_statistics.sql     server_performance_all.sql table_extent_plan.sql
```

Example: What Percent of Dbspace is Free?

```
--------------------------------------------------------------------------------
-- Module: @(#)dbspace_free.sql 2.5     Date: 2013/04/10
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
-- Discription: Displays free space in all dbspaces like Unix "df -k " command
--      Tested with Informix 11.70 and Informix 12.10
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
-- Update: 8/17/2025 - Tested on Informix 15.0.1
--------------------------------------------------------------------------------

database sysmaster;

select    name[1,8] dbspace,        -- name truncated to fit on one line
          sum(chksize) Pages_size, -- sum of all chuncks size pages
          sum(chksize) - sum(nfree) Pages_used,
          sum(nfree) Pages_free,    -- sum of all chunks free pages
          round ((sum(nfree)) / (sum(chksize)) * 100, 2) percent_free
from      sysdbspaces d, syschunks c
where     d.dbsnum = c.dbsnum
group by 1
order by 1;
```

Example: Dbspace_free.sql

```
SQL:   New  Run  Modify  Use-editor  Output  Choose  Save  Info  Drop  Exit
Run the current SQL statements.

---------------------- sysmaster@train1 ------- Press CTRL-W for Help --------

dbspace         pages_size       pages_used       pages_free     percent_free

datab3db          20000000         10029006          9970994            49.85
datadbs            2000000          1707306           292694            14.63
logdbs             1000000           800053           199947            19.99
rootdbs            1000000           264176           735824            73.58
tmpdbs             1000000               53           999947            99.99
```

How do we measure the basic CPU and IO levels of the Server?

How do you measure the time since the Server Statistics have been reset?

Required for Performance Ratios

Important undocumented table – Sysshmvals

sh_mode	int,	turbo mode number
sh_boottime	int,	boot time of day
sh_pfclrtime	int,	time profilers were last clr
sh_curtime	int,	current mt_time
sh_bootstamp	int,	boot time stamp
sh_stamp	int,	current time stamp
sh_mainlooptcb	int,	address of main thread
sh_sysflags	int,	system operating flags
sh_maxchunks	int,	size of chunk table
sh_maxdbspaces	int,	size of dbspace table
sh_maxuserthreads	int,	max # of user structures
sh_maxtrans	int,	max # of trans structures
sh_maxlocks	int,	# of locks total
sh_maxlogs	int,	size of log table
sh_nbuffs	int,	# of buffers total
sh_pagesize	int,	buffer size in bytes
sh_nlrus	int,	# of lru queues
sh_maxdirty	float,	LRU max % dirty pages
sh_mindirty	float,	LRU min % dirty pages
sh_ncleaners	int,	# of cleaning/flushing procs
sh_longtx	int,	# the long transaction flag

sh_optstgbsnum	int,	subsystem Blobspace
sh_cpflag	int,	TRUE => doing checkpoint
sh_rapages	int,	# pages to read ahead
sh_rathreshold	int,	# to start next read ahead
sh_lastlogfreed	int,	last log (id) written to tape
sh_rmdlktout	int,	max timeout when distributed
sh_narchivers	int,	number of active archives
sh_maxpdqpriority	int,	max pdqpriority
sh_fuzcpflag	int,	fuzzy checkpoint flag
sh_needcpsyn	int,	hard checkpoint
sh_nfuzzy	int,	# buffers marked fuzzy
sh_nfuzzypre	int,	# buffers fuzzy in last ckpt
sh_oldestlsnuq	int,	lsn of oldest update not
sh_oldestlsnpos	int,	flushed to disk
sh_builddpt	int,	builing DPT necessary
sh_ndptentries	int,	# entries in DPT
sh_dptsize	int,	size of DPT
sh_curmaxcons	int,	max #connections in this run
sh_ovlmaxcons	int	max #connections to server

Sysshmvals
select * from sysshmvals

```
SQL:  New  Run  Modify  Use-editor  Output  Choose  Save  Info  Drop  Exit
Run the current SQL statements.

----------------------- sysmaster@train1 -------- Press CTRL-W for Help ---------


sh_mode             5
sh_boottime         1721164864
sh_pfclrtime        1721164864
sh_curtime          1721661884
sh_bootstamp        0
sh_stamp            -1015320195
sh_mainlooptcb      1263831040
sh_sysflags         4099
sh_maxchunks        32766
sh_maxdbspaces      2047
sh_maxuserthreads   131072
sh_maxtrans         131072
sh_maxlocks         640000
sh_maxlogs          80
sh_nbuffs           1500000
sh_pagesize         2048
sh_nlrus            16
sh_maxdirty         10.04838755775
sh_mindirty         8.373656298127
sh_ncleaners        8
sh_longtx           0
sh_cpflag           0
sh_rapages          0
sh_rathreshold      0
sh_lastlogfreed     3047
sh_rmdlktout        60
sh_narchivers       0
sh_maxpdqpriority   0
sh_curmaxcons       101
sh_ovlmaxcons       101



 1 row(s) retrieved.
```

When Were the Statistics Cleared?

```
--------------------------------------------------------------------------
-- Module: @(#)Server_server_uptime.sql 2.0     Date: 2013/04/10
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
-- Discription: Displays how long the Informix Server has been up and when the
--              last time stats (onstat -z) were cleared.
--      Tested with Informix 11.70 and Informix 12.10
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
-- Update: 8/17/2025 - Tested on Informix 15.0.1
--------------------------------------------------------------------------

database sysmaster;

select
        current current_time,
        DBINFO ('utc_to_datetime', sh_boottime ) boot_time,
        DBINFO ('utc_to_datetime',sh_pfclrtime)  stats_reset_time,
        current - DBINFO ('utc_to_datetime',sh_pfclrtime) interval_since_stats_reset,
        ( sh_curtime - sh_pfclrtime) units second secounds_since_stats_reset,
        (ROUND (( sh_curtime - sh_pfclrtime)/60) )  minutes_since_stats_reset
from sysshmvals;
```

When Were the Statistics Cleared?

```
SQL:   New  Run  Modify  Use-editor  Output  Choose
Run the current SQL statements.

---------------------- sysmaster@train15 ------ Pre


current_time          2025-09-05 14:23:43.000
boot_time             2025-09-04 12:05:25
stats_reset_time      2025-09-04 12:05:25
interval_since_st+              1 02:18:18.000
secounds_since_st+          94698
minutes_since_sta+  1578
```

Scientific Method for Database Tuning

- **What is the Scientific Method?**
  - Ask a question - Define the Problem
  - Perform research - Observe and Measure
  - Construct a Hypothesis - Plan a Test
  - Test Your Hypothesis - Do an Experiment
  - Analyze Your Data - Draw a Conclusion
  - Communicate Results - Document Results

- **Repeat, Repeat, Repeat**

Benchmark Worksheet to Measure Performance

Run #	Changes	Total Time	CPU % (usercpu + syscpu)	Disk I/O (pagreads + pagwrits)	Buffer I/O (bufreads + bufwrits)	Memory Used	Comments
1	**BASELINE**	17m49.455s	651.43	6494677	30566862	687428	buffers=250000
2	BUFFERPOOL=125000	8m37.551s	322.88	1402911	22158499	2933444	buffers=1250000
3	SHMVIRTSIZE 200000	8m36.411s	327.43	1402927	22168298	2982836	One SHMVIRT Segment
4	LOCKS 640000	5m20.191s	123.7	1402942	22180898	3067708	Resident Segment inceased
5	RESIDENT -1	5m11.777s	107.3	680186	19748667	3070500	
6	VPCLASS cpu,num=4,noag	5m5.403s	108.79	1403024	22205882	3070500	
7	VP_MEMORY_CACHE_KB	5m6.878s	108.57	1403389	22223989	3070500	
8	PHYSBUFF 512 LOGBUFF	3m20.977s	78.13	673413	21319488	3072548	
9	DIRECT_IO 1	3m27.670s	77.58	665103	19944711	3072548	
10	PLOG and LOG	4m11.27s	86.68	1795234	22266939	3072548	
11	SAME	4m13.798s	88.15	1133695	20665709	3236388	
12	SAME no Server restart	3m38.265s	172.32	3439465	42449726	3236388	
13	SQL changes - run1	2m16.111s	27.96	2321957	7626794	3236388	
14	SQL changes - run2	3m17.596s	94.72	2172403	13550781	3236388	
15	SQL changes - run3	0m21.523s	9	486110	3738464	3236388	

Key Metrics for Tuning

```
real    590m16.824s
user    0m0.040s
sys     0m0.008s

IBM Informix Dynam  erver V  on 14.10.FC3 -- On-Line --  9:55:  - 4408904 Kbytes

Profile
dskreads   pagreads   bufreads   %cached dskwrits   pagwrits   bufwrits   %cached
135662     137436     122173960754 100.00  3158796    4171669    8263397    61.77

isamtot    open       start      read       write      rewrite    delete     commit     rollbk
26538791   59495      154488     7272863    150 243    19 4195    641        7458       0

gp_read    gp_write   gp_rewrt   gp_del     allo       _free      gp_curs
0          0          0          0          0          0          0

ovlock     ovuserthread ovbuff     usercpu  syscpu   numckpts   flushes
0          0            0          35903.43 52.30    121        124

bufwaits   lokwaits   lockreqs   deadlks    dltouts    ckpwaits   compress   seqscans
163        0          61080286217 0          0          6          34362      101419

ixda-RA    idx-RA     da-RA      logrec-RA  RA-pgsused lchwaits
900        144        108919     2          109062     12056
```

Displays Selected Server Performance Ratios

```
------------------------------------------------------------------------------
-- Module: @(#)server_performance.sql   1.0     Date: 2021/09/01
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
-- Discription: Displays key server profile/perfomance ratios
--      Tested with Informix 12.10 and Informix 14.10
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
-- Update: 8/17/2025 - Tested on Informix 15.0.1
------------------------------------------------------------------------------

database sysmaster;

select
        "Statics Uptime in Minutes:  " metric,
        (ROUND (( sh_curtime - sh_pfclrtime)/60))  value -- hours_since_stats_reset
from sysshmvals

-- CPU Time
union all
select
        "Total CPU Time:" metric,
        (sum(usecs_user) + sum(usecs_sys) ) total_cpu
from sysvplst
union all
select  "Total Disk IO - Page RW" meteric,
        ( select sum ( value ) from sysprofile where name in ( "dskreads", "dskwrites"))  total_disk_IO
from sysdual

union all
select  "Total Buffer IO - Buffer RW" meteric,
        ( select sum ( value ) from sysprofile where name in ( "bufreads", "bufwrites"))  total_buff_IO
from sysdual

-- Memory
union all
select "Total Memory" metric,
        sum( seg_size ) total_size
from sysseglst

;
```

Server Performance Ratios Example

```
SQL:  New  Run  Modify  Use-editor  Output  Choose  Save  Info  Drop  Exit
Run the current SQL statements.

---------------------- sysmaster@train15 ------ Press CTRL-W for Help --------

metric                                    value

Statics Uptime in Minutes:    8.00000000000000
Total CPU Time:               11.7100000000000
Total Disk IO - Page RW       85566.0000000000
Total Buffer IO - Buffer RW   3256657.00000000
Total Memory                  205074432.000000
```

What Indexes are Needed?

- What indexes are used?
- What indexes are not used?
- What additional indexes are needed to speed up performance?

Look for:

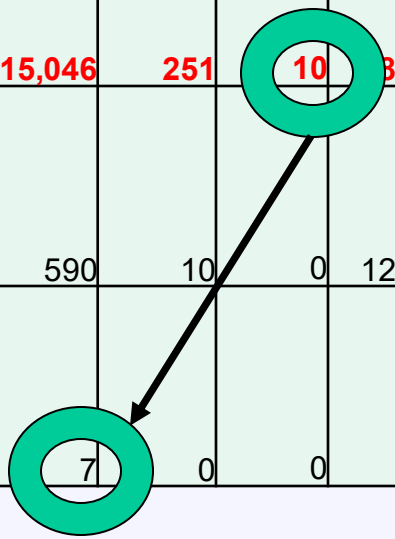
- Unnecessary sequential scans
- Excessive disk reads
- Avoid duplicate Indexes

Example of Poor Index Performance

- Same SQL Query (poorly written)
- Server – Default Configuration
- Server – Moderate Tuning (More Memory BUFFERS)
- Server – Default Configuration – Fixed one missing Index

Example of Poor Index Performance

Server Configuration	Index	Minutes	Hours	Days	Pages Read	Pages Write	BTR	CPU	Mem
Default Configuration	Missing Index	15,046	251	10	33,378,880,757	18,579,020	4,779	597,001	264,884
Moderate Tuning	Missing Index	590	10	0	122,173,960,754	8,263,397	1	35,956	4,408,904
Default Configuration	Added Index	7	0	0	71,578,783	13,517,654		664	256,692



Show Tables with Most Sequential Scans

```
------------------------------------------------------------------------
-- Module: @(#)table_with_seqscans.sql  2.3     Date: 2020/01/01
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
-- Description: Find tables with sequential scans
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
-- Update: 8/17/2025 - Tested on Informix 15.0.1
------------------------------------------------------------------------

database sysmaster;

select  first 100
        dbsname database,
        tabname table,
        partnum partnumber,
        ti_npdata   table_size_pages,
        sum(seqscans) total_scans,
        (ti_npdata * (sum(seqscans))) total_pages_scaned
from    sysptprof, systabinfo
where   sysptprof.partnum = systabinfo.ti_partnum
and seqscans > 0
and tabname not in ( select tabname from systables where tabid < 100 )
and dbsname not in ( "sysmaster", "sysadmin" , "sysuser", "sysutils" )
group   by 1, 2, 3, 4
order   by 6 desc
```

Show Tables with Most Sequential Scans

```
database              benchmark1
table                 benchmark
partnumber            3145797
table_size_pages      418980
total_scans           6
total_pages_scaned    2513880

database              benchmark1
table                 zip
partnumber            3145802
table_size_pages      711
total_scans           2021
total_pages_scaned    1436931

database              benchmark2
table                 bills
partnumber            3145874
table_size_pages      605280
total_scans           1
total_pages_scaned    605280
```

Scripts Monitoring Index Performance and Usage

- DB_index_usage.sql
- DB_loop_run.sh

Index Performance and Usage

- When was my index last used?
  - Oncheck –pt database:table
- What is the ratio of index reads to writes?
- The more reads, the more efficiently an index is used..

We will Use Data from 3 Sources

- Sysmaster database
- System Tables in each database

- Important to join between Sysmaster and Systables database using table partno to avoid duplicate data

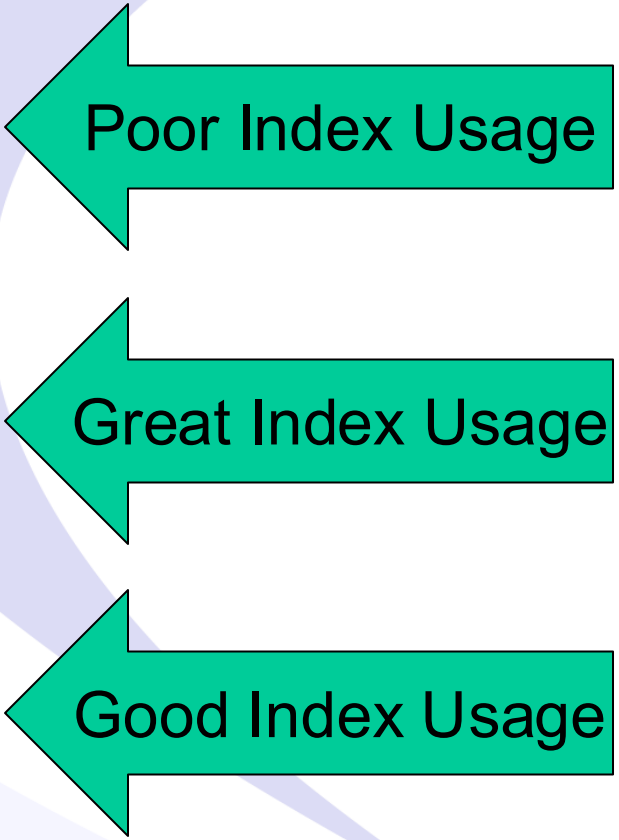
How to Monitor Index Usage

Compare reads and writes on an index by partition …fewer reads indicates the index may not be needed unless it is a constraint

```
-- ###############################################################################
-- ## Module: @(#)DB_index_usage.sql      2.0     Date: 08/25/2019
-- ## Author: Lester Knutsen  Email: lester@advancedatatools.com
-- ##         Advanced DataTools Corporation
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
-- Update: 8/17/2025 - Tested on Informix 15.0.1
-- ###############################################################################

-- Execute this query in a user database
-- Connect to the database you want the info from - Not Sysmaster

-- unload to index_usage.uld
select
        t.tabname,
        i.indexname,
        bufreads,
        bufwrites,
        case
                when bufwrites = 0 then bufreads
                when bufreads = 0 then 0
                else ( bufreads /bufwrites )
        end ratio
from    systables t, sysfragments i,  outer sysmaster:sysptprof p
where   t.tabid = i.tabid
and     i.fragtype = "I"
and     i.partn = p.partnum
and     t.tabid > 99;
```

How to Monitor Index Usage

```
tabname     state
indexname   idx_state_1
bufreads    15
bufwrites   11
ratio       1.36363636363636

tabname     zip
indexname   idx_zip_1
bufreads    630617
bufwrites   931
ratio       677.354457572503

tabname     benchmark
indexname   idx_benchmark_1
bufreads    214154
bufwrites   4614
ratio       46.4139575205895
```



DB_loop_run.sh - Script to create a list of databases and loop through a script for each database

```
#################################################################################
## Module: @(#)DB_loop_run.sh     2.1   08/17/2025
## Author: Lester Knutsen  Email: lester@advancedatatools.com
##         Advanced DataTools Corporation
##  Description: Runs the same script for all database on the server
#################################################################################

DD=`date +'%Y%m%d%H%M%S'`
LOG=Logfile$DD.log

## Create a log file to capute stdio and stderr
echo "Log file: $LOG"
echo "Script to run: $1"
{
echo $INFORMIXSERVER

dbaccess sysmaster - <<EOF 2>&1
-- create a list of database names that can be used in a loop
unload to database_list.x delimiter " "
select  trim(name)
        from sysdatabases
        where name not in ( "sysmaster", "sysadmin", "sysuser", "sysutils" )
EOF

for db in `cat database_list.x`
do
echo "Results for: $db"
dbaccess $db $1 2>&1
done

rm database_list.x

} 2>&1 | tee $LOG
```

How can we fit more tables into memory?

Show Tables with Wasted Space - table_waste_space.sql

```
--------------------------------------------------------------------------------
-- Module: @(#)Table_waste_space.sql    1.0     Date: 2022/01/01
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
-- Description: Calculate Wasted space used by table
-- Update: 8/17/2025 - Tested on Informix 15.0.1
--------------------------------------------------------------------------------

database sysmaster;

-- unload to tablewaste.uld
select
        systabnames.dbsname      database,
        systabnames.tabname      tabname,
        ( dbinfo('dbspace', ti_partnum )) dbspace,
        systabnames.partnum,
        ti_rowsize   row_size,
        ti_pagesize  page_size,
        ti_npused       pages_used,
        ti_npdata       pages_data,
        (ti_nptotal - ti_npused ) pages_free,
        ti_nrows        num_rows,
        case
                when ( (ti_pagesize +4)  -28)  <  ti_rowsize   then "Row larger then pagesize"
                else "Row smaller then pagesize"
        end rowfit,
        case
                when ti_rowsize > 0 then
                        trunc ((ti_pagesize -28) / ( ti_rowsize +4))
                else 0
        end rows_per_page,
        case
                when ti_rowsize > 0 then
                        ( trunc ((ti_pagesize -28) / ( ti_rowsize +4)) * ( ti_rowsize +4))
                else 0
        end kb_used_per_page,
        case
                when ti_rowsize > 0 then
                        ((ti_pagesize -28) - ( trunc ((ti_pagesize -28) / ( ti_rowsize +4)) * ( ti_rowsize +4)))
                else 0
        end kb_waste_per_page,
        case
                when ti_rowsize > 0 then
                        (((ti_pagesize -28) - ( trunc ((ti_pagesize -28) / ( ti_rowsize +4)) * ( ti_rowsize +4)))* ti_npdata )
                else 0
        end kb_waste_per_table
from systabnames, systabinfo, outer sysptprof
where   systabinfo.ti_partnum = systabnames.partnum
and     systabinfo.ti_partnum = sysptprof.partnum
and     systabnames.dbsname not in ( "sysmaster", "sysuser", "sysutils", "sysadmin" )
and     systabnames.tabname not in ( select tabname from systables where tabid <=99 )
and     ti_npdata > 0 -- remove partitions with no data pages
order by kb_waste_per_table desc;
```

Show Tables with Wasted Space - table_waste_space.sql

```
database             benchmark3
tabname              customer
dbspace              datab3dbs
partnum              5242979
row_size             684
page_size            2048
pages_used           2000519
pages_data           2000022
pages_free           3387
num_rows             6000000
rowfit               Row smaller then pagesize
rows_per_page        2
kb_used_per_page     1376
kb_waste_per_page    644
kb_waste_per_table   1288014168

database             benchmark1
tabname              benchmark
dbspace              datadbs
partnum              3145797
row_size             3534
page_size            2048
pages_used           838168
pages_data           418980
pages_free           79183
num_rows             418980
rowfit               Row larger then pagesize
rows_per_page        0
kb_used_per_page     0
kb_waste_per_page    2020
kb_waste_per_table   846339600
```

Show Tables with Free Row Space: table_info_freerows.sql

```
-- Module: @(#)table_info_freerows.sql  1.0     Date: 2015/03/20
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
-- Description:
--      Tested with Informix 11.70 and Informix 12.10
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
-- Update: 8/17/2025 - Tested on Informix 15.0.1

database sysmaster;

select
        dbsname      database,
        tabname      tabname,
        ( dbinfo('dbspace', ti_partnum )) dbspace,
        partnum,
        ti_rowsize   row_size,
        ti_ncols     num_columns,
        ti_nkeys     num_indexes,
        ti_nextns    num_extents,
        ti_pagesize  page_size,
        ti_nptotal   pages_total,
        ti_npused       pages_used,
        ti_npdata       pages_data,
        (ti_nptotal - ti_npused ) pages_free,
        ti_nrows        num_rows,
        case
                when ( ti_pagesize -24)  <  ti_rowsize   then "Row larger then pagesize"
                else "Row smaller the pagesize"
        end rowfit,
        case
                when ti_rowsize > 0 then
                        trunc ((ti_pagesize -24) / ti_rowsize )
                else 0
        end rows_per_page,
        case
                when ti_rowsize > 0 then
                        ( ( trunc ((ti_pagesize -24) / ti_rowsize ) ) * (ti_nptotal - ti_npused ) )
                else 0
        end free_rows,
        DBINFO ('utc_to_datetime', ti_created ) create_date
from systabnames, systabinfo
where ti_partnum = partnum
and     systabnames.dbsname not in ( "sysmaster", "sysuser", "sysutils", "sysadmin", "system" )
and     systabnames.tabname not in ( select tabname from systables where tabid <=99 )
and     systabnames.tabname != "TBLSpace"
and     ti_npdata > 0
order by free_rows;
```

Show Tables with Free Row Space: table_info_freerows.sql

```
database        benchmark4
tabname         bmsql_new_order
dbspace         datab4dbs
partnum         6291530
row_size        12
num_columns     0
num_indexes     0
num_extents     28
page_size       2048
pages_total     7168
pages_used      7168
pages_data      2178
pages_free      0
num_rows        172078
rowfit          Row smaller the pagesize
rows_per_page   168
free_rows       0
create_date     2022-05-25 11:21:48
```

Table Performance Scripts

- table_extent_plan.sql
- table_info_all.sql
- table_info_freerows.sql
- table_io_statistics.sql
- table_performance.sql
- table_waste_space.sql
- table_with_seqscans.sql

Table Information - table_info_all.sql

- Everything you want to know about your tables
- Load results into an Excel Worksheet
- Updated to exclude System tables and Indexes

Questions about Tables

- What tables fit on a page?
- What tables have free space before a new extent?
- How big are the tables?
- What tables have the most lock activity?
- What tables have the most I/O activity?
- What tables have sequential scans?
- What is the buffer read % by table?
- What tables could be partitioned?

Join Between Four Base Tables

- Systabnames – Basic Table Information
- Systabinfo – Undocumented
- Sysptprof – Performance Information

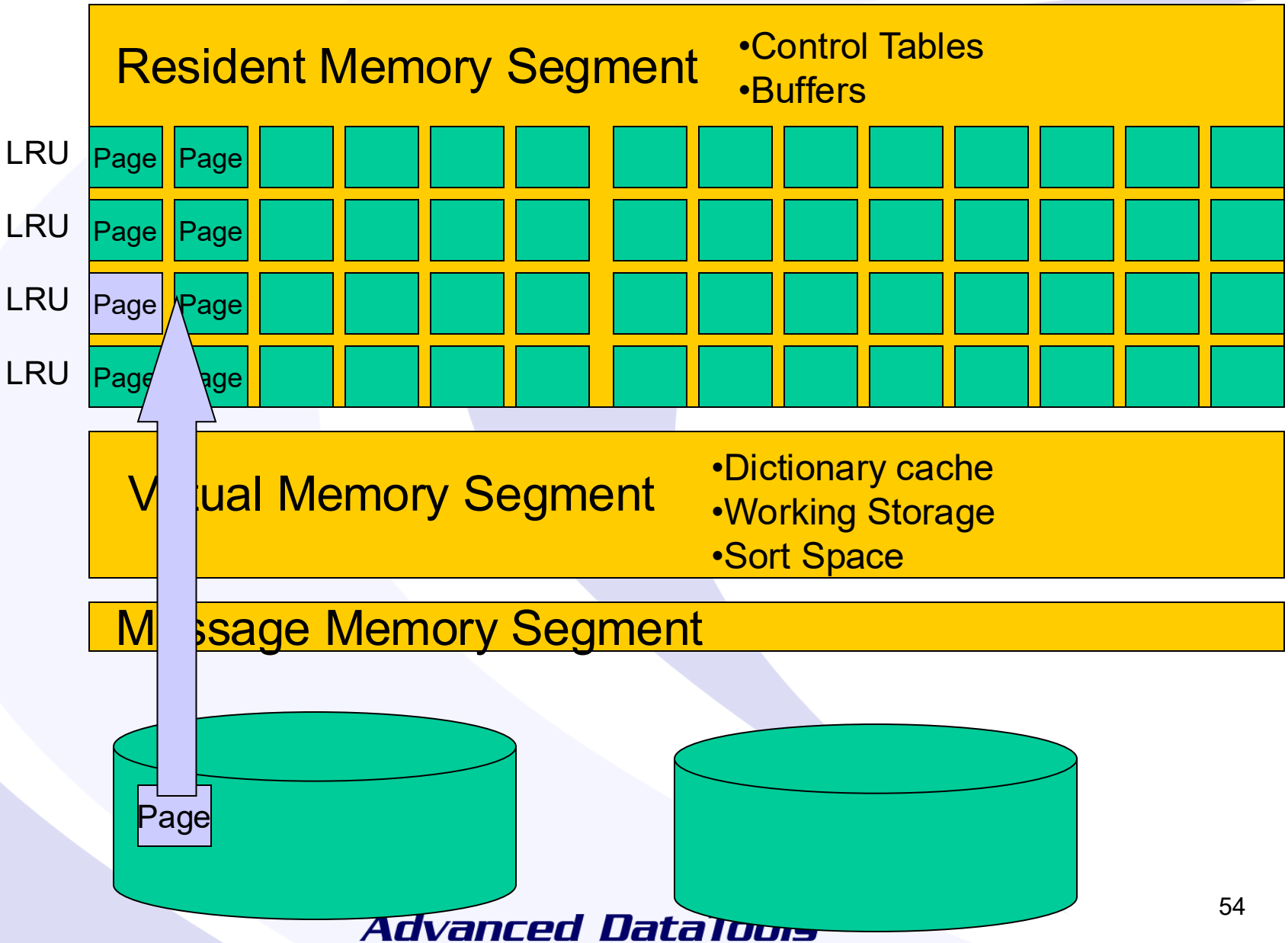
Table_info_all.sql

```
--------------------------------------------------------------------------------
-- Module: @(#)table_info_all.sql       1.0     Date: 2016/04/01
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
-- Description: New Table Information Script - Unload the output to a file
--              and the load the results into a worksheet for analysis
--      Tested with Informix 11.70 and Informix 12.10, 14.10
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
-- Update: 8/17/2025 - Tested on Informix 15.0.1
--------------------------------------------------------------------------------

database sysmaster;

-- unload to tableinfo.uld
select
        systabnames.dbsname      database,
        systabnames.tabname      tabname,
        ( dbinfo('dbspace', ti_partnum )) dbspace,
        systabnames.partnum,
        ti_rowsize   row_size,
        ti_ncols     num_columns,
        ti_nkeys     num_indexes,
        ti_nextns    num_extents,
        ti_pagesize  page_size,
        ti_nptotal   pages_total,
        ti_npused       pages_used,
        ti_npdata       pages_data,
        (ti_nptotal - ti_npused ) pages_free,
        ti_nrows        num_rows,
        case
                when ( (ti_pagesize +4)  -24)  <  ti_rowsize   then "Row larger then pagesize"
                else "Row smaller the pagesize"
        end rowfit,
        case
                when ti_rowsize > 0 then
                        trunc ((ti_pagesize -24) / ti_rowsize )
                else 0
        end rows_per_page,
        case
                when ti_rowsize > 0 then
                        ( ( trunc ((ti_pagesize -24) / ti_rowsize ) ) * (ti_nptotal - ti_npused ) )
                else 0
        end free_rows,
        DBINFO ('utc_to_datetime', ti_created ) create_date,
        lockreqs,
        lockwts
```

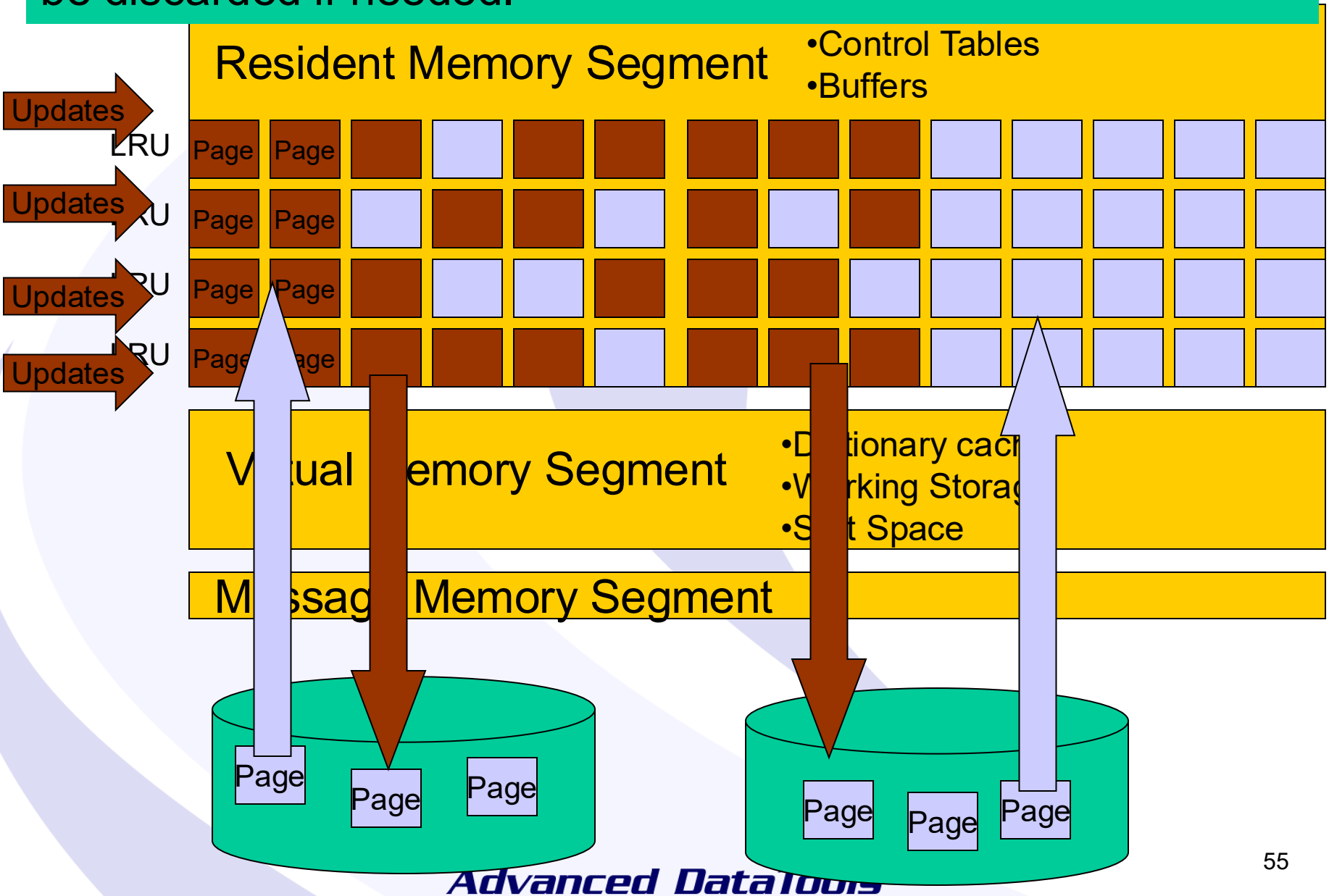
How can we reduce the Buffer churn rate?

- How much memory is available on the machine?
- How much is used by the Operating System and other applications?
- How much will be assigned to Informix?
- ***DO NOT allow the machine to Swap memory to disk as this will SLOW everything down***

Page Gets Read into Memory by a Select



When a buffer is written to disk, it is marked as clean and may be discarded if needed.



BUFFERPOOL Best Practices

- Biggest performance gain is to have enough Buffers to hold as many pages as possible in Memory
- ***More Buffers = the better and faster your database will perform***
- Goal is to put all the active data into Memory
- Goal is to prevent high Memory Buffers Turnover (Art Kagel's rule – less than 8 times per hour)

Monitoring BUFFERPOOL Turnover

```
--------------------------------------------------------------------------------
-- Module: @(#)Server_btr_ratio.sql     2.0     Date: 2013/04/10
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
-- Discription: Display Buffer Turnovers per hour
--              Based on Art Kagels performance tuning tip on monitoring
--              how much buffer churn your server has.
--              Goal is BTR of less then 7 times per hour
--      Tested with Informix 11.70 and Informix 12.10
--  The Error - 1202: An attempt was made to divide by zero. happens when
--  the server has been up less then one hour
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
-- Update: 8/17/2025 - Tested on Informix 15.0.1
--------------------------------------------------------------------------------

select
        bufsize,
        pagreads,
        bufwrites,
        nbuffs,
        ((( pagreads + bufwrites ) /nbuffs )
                / ( select (ROUND ((( sh_curtime - sh_pfclrtime)/60)/60) )
                        from sysshmvals )
        ) BTR
from sysbufpool;
```

How do we monitor Memory usage?

Show Memory Usage by Segment

```
--------------------------------------------------------------------------------
-- Module: @(#)Server_memsegments.sql   1.0     Date: 2015/03/20
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
-- Update: 8/17/2025 - Tested on Informix 15.0.1
--------------------------------------------------------------------------------

database sysmaster;

-- Summary by Memory Segments Class
select
        -- seg_class,
        case
                when seg_class = 1 then "Resident"
                when seg_class = 2 then "Virtual"
                when seg_class = 3 then "Message"
                when seg_class = 4 then "Buffer"
                else "Unknown"
        end class,
        count(*) number ,
        sum( seg_size ) total_size,
        sum( seg_blkused )      total_blkused,
        sum( seg_blkfree )      total_blkfree
from sysseglst
group by 1;

-- Detail by Memory Segment
select
        -- seg_class,
        case
                when seg_class = 1 then "Resident"
                when seg_class = 2 then "Virtual"
                when seg_class = 3 then "Message"
                when seg_class = 4 then "Buffer"
                else "Unknown"
        end class,
        seg_size,
        seg_blkused,
        seg_blkfree
from sysseglst;
```

Show Memory Usage by Segment

class	number	total_size	total_blkused	total_blkfree
Message	1	561152	136	1
Resident	1	92274688	22419	109
Buffer	2	3577741312	873472	0
Virtual	7	255131648	24620	37668

class	seg_size	seg_blkused	seg_blkfree
Resident	92274688	22419	109
Virtual	204800000	23768	26232
Buffer	3409969152	832512	0
Message	561152	136	1
Buffer	167772160	40960	0
Virtual	8388608	37	2011
Virtual	8388608	46	2002
Virtual	8388608	118	1930
Virtual	8388608	495	1553
Virtual	8388608	107	1941
Virtual	8388608	25	2023

How do we monitor Database Statistics?

Monitoring AUS and Update Statistics

- AUS_last_run.sql
- DB_update_stats_info.sql

Update Statistics Status

- When did Automatic Update Status last run?
- When did Update Status last run for all databases and tables?

Aus_last_run.sql

```
---------------------- benchmark3@train1 ------ Press CTRL-W for Hel

db                     table                  level when

benchmark1             state                  l     2019-09-24 01:01:16
benchmark1             state                  H     2019-09-24 01:01:16
benchmark1             benchmark              l     2019-09-24 01:01:16
benchmark1             benchmark              H     2019-09-24 01:01:16
benchmark2             state                  l     2019-09-24 01:01:21
benchmark2             state                  H     2019-09-24 01:01:21
benchmark2             customer               l     2019-09-24 01:01:21
benchmark2             customer               H     2019-09-24 01:01:21
benchmark2             product                l     2019-09-24 01:01:21
benchmark2             product                H     2019-09-24 01:01:21
benchmark2             bills                  l     2019-09-24 01:01:21
benchmark2             bills                  H     2019-09-24 01:01:21
```

DB_update_stats_info.sql

```
tabname       customer
low_update    2019-09-21 01:11:02.00000
column        customer_number
upddate       09/21/2019
mode          H
updtime       2019-09-21 01:11:02.00000
updduration     0:00:00.02175
maxseqno      9

tabname       product
low_update    2019-09-21 01:11:02.00000
column        product_number
upddate       09/21/2019
mode          H
updtime       2019-09-21 01:11:02.00000
updduration     0:00:00.00001
maxseqno      1

tabname       state
low_update    2019-09-21 01:11:02.00000
column        state
upddate       09/21/2019
mode          H
updtime       2019-09-21 01:11:02.00000
updduration     0:00:00.00002
maxseqno      2
```

Extra Scripts

AWS Calculations for IOPS and Throughput

```
--------------------------------------------------------------------------------
-- Module: @(#)AWSIOPS.sql      version: 2.5     Date: 10/1/2021
-- Author: Lester Knutsen  Contact: lester@advancedatatools.com
-- Copyright: Advanced DataTools Corporation - 2021
-- Description:  Use AWS Calculations for IOPS and Throughput
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
--------------------------------------------------------------------------------

{ ==
AWS IOPS Calculations
Disk reads/sec + disk writes/sec = IOPS
Disk read bytes/sec + disk write bytes/sec = Throughput
}

database sysmaster;
select
        "Statics Uptime in Seconds:  " metric,
        (ROUND (( sh_curtime - sh_pfclrtime)))  value -- hours_since_stats_reset
from sysshmvals
union all
select  "Average Disk IOPS - Page RW per Second" meteric,
        (( select sum ( value ) from sysprofile where name in ( "dskreads", "dskwrites"))
        / ( select (ROUND (( sh_curtime - sh_pfclrtime)))  from sysshmvals )) value

from sysdual
union all
select  "Average Disk Throughput - Bytes per Second" meteric,
        ((( select sum ( value ) from sysprofile where name in ( "dskreads", "dskwrites"))
        * ( select sh_pagesize from sysshmvals ))
        / ( select (ROUND (( sh_curtime - sh_pfclrtime)))  from sysshmvals )) value

from sysdual;
```

Checkpoints and Logs Performance

- checkpoint_sumary.sql
- logs_not_backup.sql
- logs_usage.sql

Checkpoint Performance Summary

```
--------------------------------------------------------------------------------
-- Module: @(#)checkpoint_sumary.sql    1.0     Date: 2019/09/01
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
-- Description:
--      Tested with Informix 12.10 and Informix 14.10
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
--------------------------------------------------------------------------------

database sysmaster;

-- unload to checkpoint_sumary.uld
select
        type,
        count(*) num_checkpoints,
        max ( dbinfo( "utc_to_datetime", clock_time)) last_checkpoint,   -- Clock time of the checkpoint
        max ( crit_time ) max_sec_crit_time, -- Fractional seconds spent in critical sections
        sum ( crit_time ) sum_sec_crit_time, -- Fractional seconds spent in critical sections
        max ( flush_time ) max_sec_flush_time, -- Fractional seconds spent flushing dirty pages during the checkpoint
        sum ( flush_time ) sum_sec_flush_time, -- Fractional seconds spent flushing dirty pages during the checkpoint
        max ( cp_time ) max_checkpoint_time, -- Duration of the checkpoint in fractional seconds
        sum ( cp_time ) sum_checkpoint_time, -- Duration of the checkpoint in fractional seconds
        max ( n_dirty_buffs ) max_dirty_buffs, -- Number of dirty buffers at the beginning of the checkpoint
        sum ( n_dirty_buffs ) sum_dirty_buffs, -- Number of dirty buffers at the beginning of the checkpoint
        max ( n_crit_waits ) max_crit_waits, -- Number of processes that had to wait for the checkpoint
        sum ( n_crit_waits ) sum_crit_waits, -- Number of processes that had to wait for the checkpoint
        max ( tot_crit_wait ) max_crit_sec, -- Total time all processes waited for the checkpoint - fractional seconds
        sum ( tot_crit_wait ) sum_crit_sec, -- Total time all processes waited for the checkpoint - fractional seconds
        max ( block_time ) max_block_time, -- Longest any process had to wait for the checkpoint - fractional seconds
        sum ( block_time ) sum_block_time -- Longest any process had to wait for the checkpoint - fractional seconds
from syscheckpoint
group by 1
order by 1 ;
```

Checkpoint_summary.sql

```
---------------------- sysmaster@train1 ----

type                 Blocking
num_checkpoints      8
last_checkpoint      2019-09-24 21:07:41
max_sec_crit_time    1.725911e-05
sum_sec_crit_time    7.05932528e-05
max_sec_flush_time   0.001612641024
sum_sec_flush_time   0.00474524459
max_checkpoint_ti+   0.004824562211
sum_checkpoint_ti+   0.014854903223
max_dirty_buffs      52
sum_dirty_buffs      141
max_crit_waits       1
sum_crit_waits       3
max_crit_sec         0.003520003761
sum_crit_sec         0.00634974786
max_block_time       0.00
sum_block_time       0.00
```

```
---------------------- sysmaster@train1 -------

type                 Non-Blocking
num_checkpoints      20
last_checkpoint      2019-09-24 20:32:15
max_sec_crit_time    3.04870461e-05
sum_sec_crit_time    0.000438870645
max_sec_flush_time   63.46445248515
sum_sec_flush_time   92.86006797244
max_checkpoint_ti+   63.48626005307
sum_checkpoint_ti+   93.01298011093
max_dirty_buffs      251943
sum_dirty_buffs      436956
max_crit_waits       1
sum_crit_waits       3
max_crit_sec         36.72768298873
sum_crit_sec         36.74681120340
max_block_time       36.72765214286
sum_block_time       46.15479190084
```

Logical Log Performance

- For HDR Planning – How much data will be going to the Secondary Servers?
- What is my Log turnover rate?
- Do I have enough Logs?
- Are the Logs too small or too big?
- Goal – Enough Logs for 4 days
- Goal – Turnover 12 to 24 Logs per hour

Logical Log Performance

```
--------------------------------------------------------------------------------
-- Module: @(#)logs_usage.sql   2.0     Date: 2019/09/01
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
--  Description:        Calculates how many logs and log pages used in the past 8 days.
--      Tested with Informix 12.10 and Informix 14.10
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
--------------------------------------------------------------------------------

database sysmaster;

-- unload to log_usage.uld
select  "Logs for last 7 days",
        count(*) logs_used,
        sum( size ) log_pages_used,
        dbinfo('utc_to_datetime', min( filltime) ) start_time,
        dbinfo('utc_to_datetime', max( filltime) ) end_time,
        (dbinfo('utc_to_datetime', max( filltime) ) - dbinfo('utc_to_datetime', min( filltime) )) total_time,
        (( max( filltime)) -  ( min( filltime) )) total_secs,
        ((( max( filltime)) -  ( min( filltime) )) /60 ) total_minutes,
        ((((  max( filltime)) -  ( min( filltime) )) /60 ) /60 ) total_hours,
        ( count(*) / ((((  max( filltime)) -  ( min( filltime) )) /60 ) /60 )) logs_per_hour,
        ( sum(size) / ((((  max( filltime)) -  ( min( filltime) )) /60 ) /60 )) pages_per_hour
from syslogfil
where filltime > 0
and ( dbinfo('utc_to_datetime', ( filltime) ) > ( current -  7 units day ));
```

Logical Log Not Backed up

```
--------------------------------------------------------------------------------
-- Module: @(#)logs_not_backup.sql    1.0     Date: 2019/09/01
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
-- Description:
--      Tested with Informix 12.10 and Informix 14.10
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
--------------------------------------------------------------------------------

database sysmaster;

-- select * from syslogs;
-- This query should normally only return the current log (is_current = 1)
-- and possibly the log with the previous uniqid to the current one if you
-- happen to catch it just as it filled and didn't get backed up yet.
-- If more than those last two uniqids are returned, then something is amiss.


-- unload to logs_not_backup.uld
select uniqid, is_current, is_used, is_backed_up, is_new
from syslogs
where is_used = 1
  and is_new = 0
  and is_temp = 0
  and is_pre_dropped = 0
  and is_backed_up != 1
order by uniqid;
```

Dbspace and Chunks Performance Scripts

- dbspace_free.sql
- chunk_io.sql
- dbspace_io.sql

DBspace and Chunks Performance

- Started with a script to measure dbspace free
- Added Summary of underlying Chunk IO
- Added Ratios
  - Real read ahead
  - Pages per read/write operation
  - Pages read per minute
  - Pages write per minute
  - Percent of Total IO
- Data from syschktab and sysdbstab

Dbspaceio.sql

```
current_time          2023-01-31 12:18:05.000
stats_reset_time      2023-01-23 11:55:19
minutes_since_sta+    11543
dbspace               tmp3dbs
pagesize              2048
num_chunks            1
size_sys_pages        1000000
free_pages            999947
size_kb               2000000
free_kb               1999894
pagereads             1133
pagewrites            3010
num_reads             96
num_writes            557
usecs_readtime        822.9473712101
usecs_writetime       6147.077034593
pages_per_read        11.8020833333333
pages_per_writes      5.40394973070018
pages_read_per_mi+    0.09815472580785
pages_write_per_m+    0.26076409945421
read_percent          0.00
write_percent         0.00
```

Session Performance and Monitoring Scripts

- session_lockwait.sql
- session_statistics.sql
- session_wait_list.sql

Displays User Session Profile info

- session_statistics.sql

```
username    informix
sid         42
lockreqs    6132777
bufreads    164089089
bufwrites   303812

username    informix
sid         43
lockreqs    6939395
bufreads    126226004
bufwrites   517732

username    informix
sid         886
lockreqs    10567488
bufreads    5249040
bufwrites   278452
```

Displays only Locks with Other Users Waiting

- session_lockwait.sql

```
dbsname    benchmark3
tabname    warehouse
type       X
ownersid   952
ownername  informix
waitsid    901
waitname   informix

dbsname    benchmark3
tabname     105_25
type       X
ownersid   925
ownername  informix
waitsid    944
waitname   informix

dbsname    benchmark3
tabname    district
type       X
ownersid   863
ownername  informix
waitsid    881
waitname   informix
```

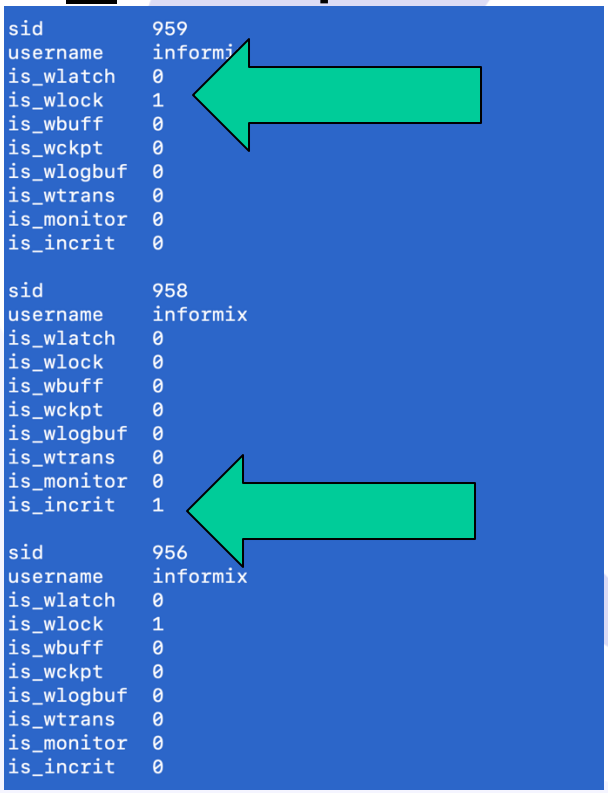
Displays User Session Waits and Status

- session_wait_list.sql

```
--------------------------------------------------------------------------------
-- Module: @(#)session_wait_list.sql    2.3     Date: 2013/04/10
-- Author: Lester Knutsen  Email: lester@advancedatatools.com
--         Advanced DataTools Corporation
-- Discription: Displays session status
--      Tested with Informix 11.70 and Informix 12.10
-- Update: 1/20/2023 - Tested on Informix 14.10.FC9
--------------------------------------------------------------------------------

database sysmaster;

select
        sid,
        username,
        is_wlatch,
        is_wlock,
        is_wbuff,
        is_wckpt,
        is_wlogbuf,
        is_wtrans,
        is_monitor,
        is_incrit
from    syssessions
where   (  is_wlatch != 0 )
or      (  is_wlock != 0 )
or      (  is_wbuff  != 0 )
or      (  is_wckpt  != 0 )
or      (  is_wlogbuf  != 0 )
or      (  is_wtrans  != 0 )
or      (  is_monitor  != 0 )
or      (  is_incrit  != 0 )
order by username
```

Displays User Session Waits and Status

- session_wait_list.sql

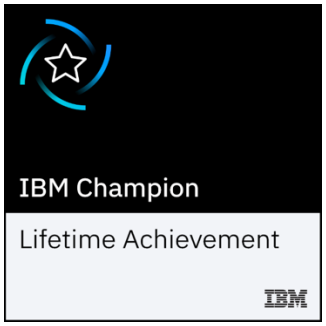


```
sid         959
username    informi
is_wlatch   0
is_wlock    1
is_wbuff    0
is_wckpt    0
is_wlogbuf  0
is_wtrans   0
is_monitor  0
is_incrit   0

sid         958
username    informix
is_wlatch   0
is_wlock    0
is_wbuff    0
is_wckpt    0
is_wlogbuf  0
is_wtrans   0
is_monitor  0
is_incrit   1

sid         956
username    informix
is_wlatch   0
is_wlock    1
is_wbuff    0
is_wckpt    0
is_wlogbuf  0
is_wtrans   0
is_monitor  0
is_incrit   0
```

Questions?

Please ask your questions in the chat!

Thank You!



lester@advancedatatools.com

https://www.advancedatatools.com