# Informix Best Practices Configuration, ONCONFIG, Part II

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by

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**Advanced DataTools**

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# Overview

- ONCONFIG Recommendations and Best Practices

- Basic Settings

- Auto Tune

- CPU Settings in ONCONFIG

- Memory Settings in ONCONFIG

- Disk Settings in ONCONFIG

- Network Settings

- User Settings

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# Informix ONCONFIG File Recommendations and Best Practices

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# Basic Informix ONCONFIG Setup and Configuration

| | |
|---|---|
| ROOTPATH | /PATH/rootdbs |
| ROOTSIZE | 400000 |
| MSGPATH | /PATH/trainX_online.log |
| CONSOLE | /PATH/trainX_console.log |
| TAPEDEV | /dev/null |
| LTAPEDEV | /dev/null |
| SERVERNUM | <Your Server number goes here> |
| DBSERVERNAME | <Informix Server Name> |
| DBSERVERALIASES | <Informix Server Alias Name> |
| NETTYPE | ipcshm,1,50,CPU |
| NETTYPE | soctcp,1,50,NET |

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# Basic Informix ONCONFIG Setup and Configuration

- ROOTPATH – full path location to your rootdbs
    - ROOTPATH /informixchunks/train1/rootdbs
- ROOTSIZE – Size of your rootdbs in KB
    - ROOTSIZE 2000000
- File must be owned by Informix and belong to the Informix group
- File Permissions must be read/write by user and group Informix only

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# Basic Informix ONCONFIG Setup and Configuration

- MSGPATH – Full path to the location of the Informx Message log file
  - MSGPATH $INFORMIXDIR/train1_online.log
- CONSOLE – Full path to the location of the Informx Console log file
  - CONSOLE $INFORMIXDIR/train1_console.log

# Basic Informix ONCONFIG Setup and Configuration

- ## Set Ontape Backups to a directory
  - TAPEDEV /home/informix/backups/servername/archive
  - LTAPEDEV /home/informix/backups/servername/logs

- ## Directory must be owned by Informix and belong to the Informix group

- ## Permissions must be read/write by user and group Informix only

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# Basic Informix ONCONFIG Setup and Configuration

- SERVERNUM – Must be a unique number for each instance on a machine

- DBSERVERNAME – the Server Name
  - The connections INFORMIXSERVER

- DBSERVERALIAS – the Server Alias Name for other (Network Connections)
  - The connections INFORMIXSERVER

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# Basic Informix ONCONFIG Setup and Configuration

- NETTYPE – The Network settings for your Server

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# Disk Space Configuration

- Root DBspace

- Physical Log DBspace

- Logical Logs Dbspace

- Temp Dbspace

- Data Dbspace

- Index DBspace

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# ONCONFIG Setting

- The following is a review on critical ONCONFIG Settings

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# Rootdbs

```
######################################################################
# Root Dbspace Configuration Parameters
######################################################################
# ROOTNAME     - The root dbspace name to contain reserved pages and
#                internal tracking tables.
# ROOTPATH     - The path for the device containing the root dbspace
# ROOTOFFSET   - The offset, in KB, of the root dbspace into the
#                device. The offset is required for some raw devices.
# ROOTSIZE     - The size of the root dbspace, in KB.  The value of
#                200000 allows for a default user space of about
#                100 MB and the default system space requirements.
# MIRROR       - Enable (1) or disable (0) mirroring
# MIRRORPATH   - The path for the device containing the mirrored
#                root dbspace
# MIRROROFFSET - The offset, in KB, into the mirrored device
#
# Warning: Always verify ROOTPATH before performing
#          disk initialization (oninit -i or -iy) to
#          avoid disk corruption of another instance
######################################################################

ROOTNAME rootdbs
ROOTPATH /Users/informix/informixchunks/benchmark6/rootdbs
ROOTOFFSET 0
ROOTSIZE 4000000
MIRROR 0
MIRRORPATH
MIRROROFFSET 0
```

# Physical and Logical Logs

```
###########################################################################
# Physical Log Configuration Parameters
###########################################################################
# PHYSFILE            - The size, in KB, of the physical log on disk.
#                       If RTO_SERVER_RESTART is enabled, the
#                       suggested formula for the size of PHSYFILE
#                       (up to about 1 GB) is:
#                           PHYSFILE = Size of BUFFERS * 1.1
# PLOG_OVERFLOW_PATH - The directory for extra physical log files
#                       if the physical log overflows during recovery
#                       or long transaction rollback
# PHYSBUFF            - The size of the physical log buffer, in KB
###########################################################################

PHYSFILE          5000000
PLOG_OVERFLOW_PATH  $INFORMIXDIR/tmp
PHYSBUFF 128


###########################################################################
# Logical Log Configuration Parameters
###########################################################################
# LOGFILES     - The number of logical log files
# LOGSIZE      - The size of each logical log, in KB
# DYNAMIC_LOGS - The type of dynamic log allocation.
#                Acceptable values are:
#                2 Automatic. The server adds a new logical log to the
#                  root dbspace when necessary.
#                1 Manual. The server notifies the DBA to add new logical
#                  logs when necessary.
```

# Long Transactions

```
# Long Transaction Configuration Parameters
######################################################################
# If The server cannot roll back a long transaction, the server hangs
# until more disk space is available.
#
# LTXHWM       - The percentage of the logical logs that can be
#                filled before a transaction is determined to be a
#                long transaction and is rolled back
# LTXEHWM      - The percentage of the logical logs that have been
#                filled before the server suspends all other
#                transactions so that the long transaction being
#                rolled back has exclusive use of the logs
#
# When dynamic logging is on, you can set higher values for
# LTXHWM and LTXEHWM because the server can add new logical logs
# during long transaction rollback. Set lower values to limit the
# number of new logical logs added.
#
# If dynamic logging is off, set LTXHWM and LTXEHWM to
# lower values, such as 50 and 60 or lower, to prevent long
# transaction rollback from hanging the server due to lack of
# logical log space.
#
# When using Enterprise Replication, set LTXEHWM to at least 30%
# higher than LTXHWM to minimize log overruns.
######################################################################

LTXHWM 50
LTXEHWM 60
```

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# Temp DBSpace



```
################################################################
# Temporary dbspace and sbspace Configuration Parameters
################################################################
# DBSPACETEMP  - The list of dbspaces used to store temporary
#                tables and other objects. Specify a colon
#                separated list of dbspaces that exist when the
#                server is started. If no dbspaces are specified,
#                or if all specified dbspaces  are not valid,
#                temporary files are created in the /tmp directory
#                instead.
# SBSPACETEMP  - The list of sbspaces used to store temporary
#                tables for smart large objects. If no sbspace
#                is specified, temporary files are created in
#                a standard sbspace.
################################################################

DBSPACETEMP       tmp1dbs:tmp2dbs:tmp3dbs:tmp4dbs
SBSPACETEMP

################################################################
# Dbspace and sbspace Configuration Parameters
################################################################
# SBSPACENAME   - The default sbspace name where smart large objects
#                 are stored if no sbspace is specified during
#                 smart large object creation. Some DataBlade
#                 modules store smart large objects in this
#                 location.
# SYSSBSPACENAME - The default sbspace for system statistics
#                  collection. Otherwise, the server stores statistics
```

# System Configration – Server Names

```
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##########################################################################
# System Configuration Parameters
##########################################################################
# SERVERNUM       - The unique ID for the the server instance. Acceptable
#                   values are 0 through 255, inclusive.
# DBSERVERNAME    - The name of the default database server
# DBSERVERALIASES - The list of up to 32 alternative dbservernames,
#                   separated by commas
# FULL_DISK_INIT  - Specifies if oninit -i can run:
#                   0 allows full disk initialization only if no
#                     instance is detected at the rootchunk location.
#                     For oninit -ie allows full disk initialization
#                     only if no existing encryption key database or
#                     stashfile are found.
#                   1 required if an existing instance is detected at
#                     the rootchunk location.  For oninit -ie,
#                     required if an existing encryption key database
#                     or stashfile is found.
##########################################################################

SERVERNUM 1
DBSERVERNAME   benchmark6
DBSERVERALIASES benchmark6tcp
FULL_DISK_INIT 0

##########################################################################
# Network Configuration Parameters
##########################################################################
```

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# Nettype Settings

```
################################################################################
# NETTYPE                      - The configuration of poll threads
#                                for a specific protocol. The
#                                format is:
#                                NETTYPE <protocol>,<# poll threads>
#                                ,<number of connections/thread>
#                                ,(NET|CPU)
#                                You can include multiple NETTYPE
#                                entries for multiple protocols.
# LISTEN_TIMEOUT                - The number of seconds that the server
#                                waits for a connection
# MAX_INCOMPLETE_CONNECTIONS - The maximum number of incomplete
#                                connections before the server logs a Denial
#                                of Service (DoS) error
# FASTPOLL                     - Enables (1) or disables (0) fast
#                                polling of your network, if your
#                                operating system supports it.
# NUMFDSERVERS                 - The maximum number of poll threads to handle
#                                network connections migrating between VPs
# NS_CACHE                     - The number of seconds for the server name service
 cache
#                                (host, service, user, group) expiration time.
#                                0 to disable cache.
################################################################################

NETTYPE ipcshm,1,50,CPU
NETTYPE soctcp,4,300,NET
LISTEN_TIMEOUT 60
MAX_INCOMPLETE_CONNECTIONS 1024
```

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# Oninit Processes Controlled by NETTYPE

- ## ONCONFIG NETTYPE Setting
  - SHM - Performs shared memory communications
  - TLI - Performs TLI network communications
  - SOC - Performs socket network communications

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# NETTYPE Configuration

- NETTYPE <protocol>,<number of oninit process>, <number of connections per oninit>, <Type of Oninit – CPU or NET>

- Examples:
  - NETTYPE ipcshm,1,50,CPU
  - NETTYPE soctcp,4,250,NET

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# NETTYPE Configuration Best Practices

- Configure Shared Memory Connection to run on NETTYPE type CPU and Network Connections to run on NETTYPE NET.

- Configure 200-300 Connections per Oninit process.

- Example:
  - NETTYPE ipcshm,1,50,CPU – Shared Memory with 50 connections
  - NETTYPE soctcp,4,250,NET – Network with 1000 connections

# CPU Settings

```
##################################################################
# CPU-Related Configuration Parameters
##################################################################
# MULTIPROCESSOR      - Specifies whether the computer has multiple
#                       CPUs. Acceptable values are: 0 (single
#                       processor), 1 (multiple processors or
#                       multi-core chips)
# VPCLASS cpu         - Configures the CPU VPs. The format is:
#                       VPCLASS cpu, num=<number of CPU VPs>,
#                       [,max=<maximum number for class>]
#                       [,aff=<single CPU number> | <start cpu>-<end cpu> |
#                       ( <start cpu>-<end cpu>/<skip amount> ) ]
#                       [,noage]
#                       for example:
#                       num=4,aff=(1-10/3) means assign 4 CPU VPs to processors
#                       1,4,7,10
# VP_MEMORY_CACHE_KB  - Specifies the amount of private memory
#                       blocks of your CPU VP, in KB, that the
#                       database server can access and whether
#                       the memory changes dynamically (default).
#                       Format is: <size>[,DYNAMIC|STATIC]
#                       Acceptable values for <size> are:
#                       0 (disable)
#                       800 through 40% of the value of SHMTOTAL
# SINGLE_CPU_VP       - Optimizes performance if the server runs with
#                       only one CPU VP. Acceptable values are:
#                       0 multiple CPU VPs
#                       Any nonzero value (optimize for one CPU VP)
##################################################################
```

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# CPU Settings

```
#                    multi-core chips)
# VPCLASS cpu         - Configures the CPU VPs. The format is:
#                      VPCLASS cpu, num=<number of CPU VPs>,
#                      [,max=<maximum number for class>]
#                      [,aff=<single CPU number> | <start cpu>-<end cpu> |
#                      ( <start cpu>-<end cpu>/<skip amount> ) ]
#                      [,noage]
#                      for example:
#                      num=4,aff=(1-10/3) means assign 4 CPU VPs to processors
#                      1,4,7,10
# VP_MEMORY_CACHE_KB  - Specifies the amount of private memory
#                      blocks of your CPU VP, in KB, that the
#                      database server can access and whether
#                      the memory changes dynamically (default).
#                      Format is: <size>[,DYNAMIC|STATIC]
#                      Acceptable values for <size> are:
#                      0 (disable)
#                      800 through 40% of the value of SHMTOTAL
# SINGLE_CPU_VP       - Optimizes performance if the server runs with
#                      only one CPU VP. Acceptable values are:
#                      0 multiple CPU VPs
#                      Any nonzero value (optimize for one CPU VP)
###################################################################

MULTIPROCESSOR 1
VPCLASS cpu,num=8,noage
VP_MEMORY_CACHE_KB 8095
SINGLE_CPU_VP 0
```

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# CPU Terms

- Example: 2 Sockets with 5 Cores and 2 Hyper-Threads per Core = 10 Cores and 20 Virtual Cores

- Can run 10 processes at the same time
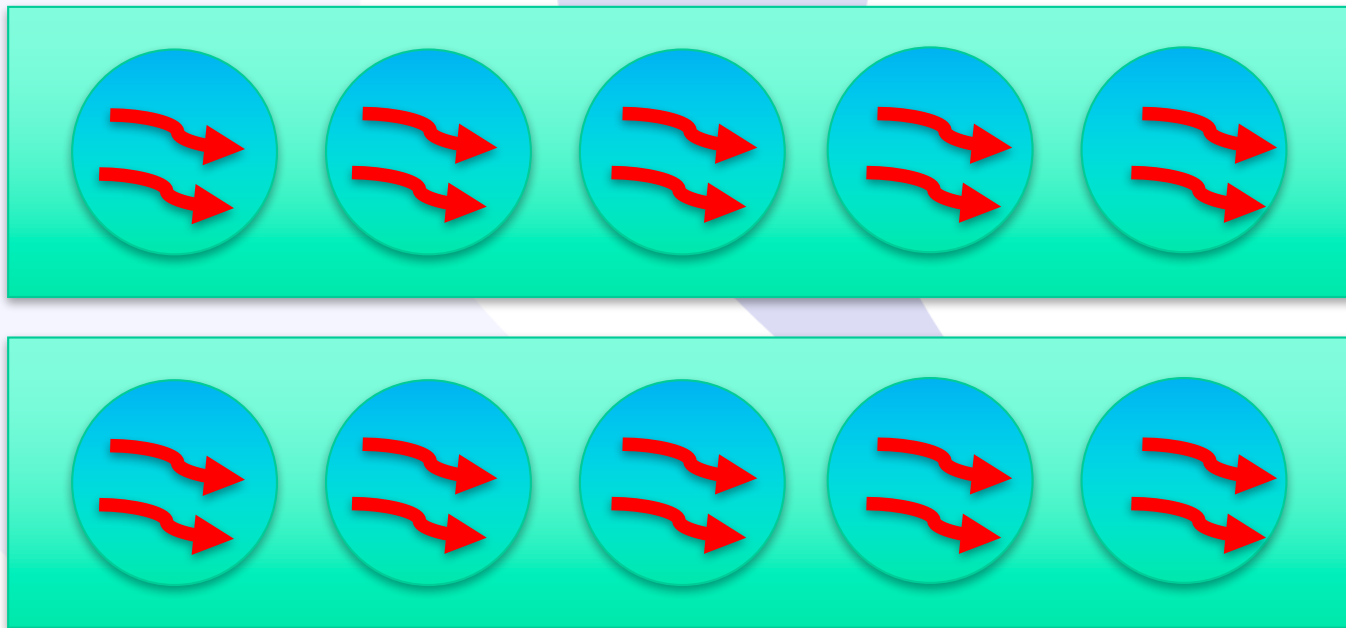
# Informix CPU Best Practices

- How many Cores will be allocated for Informix? What else is running on the machine?

- Traditional best practice is number of physical CPU Cores minus 1

- Current CPU Cores are fast enough to handle 2-3 oninits per Core or 1 oninit per 500-1000 MHz

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# Informix Architecture



SQL Clients · SQL Clients · SQL Clients · SQL Clients · SQL Clients

Oninit → Oninit ← Oninit

Oninit

Oninit

Informix Shared Memory

Oninit

Disk Drives
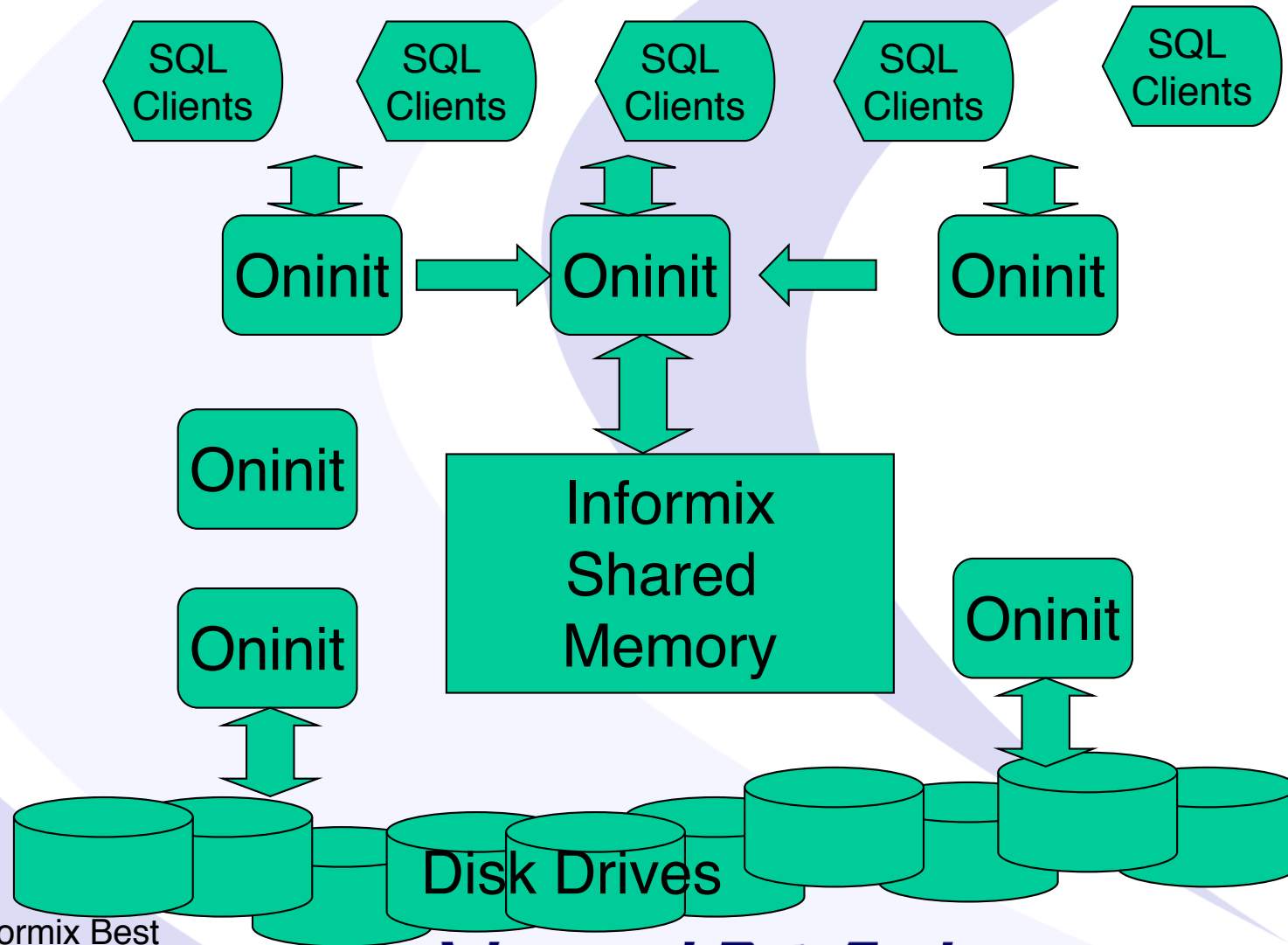
# Oninit Process

```
informix@train6:~ train6 > ps -ef | grep oninit
informix 22472       1  9 14:03 ?          00:00:03 oninit -v
root       22473 22472  0 14:03 ?          00:00:00 oninit -v
root       22474 22473  0 14:03 ?          00:00:00 oninit -v
root       22475 22473  0 14:03 ?          00:00:00 oninit -v
root       22476 22473  0 14:03 ?          00:00:00 oninit -v
root       22477 22473  0 14:03 ?          00:00:00 oninit -v
root       22478 22473  0 14:03 ?          00:00:00 oninit -v
root       22479 22473  0 14:03 ?          00:00:00 oninit -v
```

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# Oninit Process
# onstat –g sch

```
informix@train6:~ train6 > onstat -g sch

IBM Informix Dynamic Server Version 12.10.FC6 -- On-Line -- Up 00:02:12 -- 766404 Kbytes
VP Scheduler Statistics:
 vp    pid      class      semops    busy waits   spins/wait   bsy lspins
 1     22472    cpu        141       0            0            0
 2     22473    adm        0         0            0            0
 3     22474    lio        4115      0            0            0
 4     22475    pio        30        0            0            0
 5     22476    aio        7453      0            0            0
 6     22477    msc        5         0            0            0
 7     22478    fifo       2         0            0            0
 8     22479    soc        2         0            0            0
 9     22480    aio        2890      0            0            0
 10    22481    aio        187       0            0            0
 11    22482    aio        113       0            0            0
 12    22483    aio        55        0            0            0
 13    22484    aio        58        0            0            0
 14    22485    aio        41        0            0            0
 15    22486    aio        32        0            0            0
 16    22487    aio        29        0            0            0
 17    22489    aio        22        0            0            0
```

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# Oninit Process Classes

- CPU - Executes all user and session threads and some system threads

- PIO - Handles physical log file when cooked disk space is used

- LIO - Handles logical log file when cooked disk space is used

- AIO - Handles disk I/O

- SHM - Performs shared memory communications

- TLI - Performs TLI network communications

- SOC - Performs socket network communications

- FIFO - Performs FIFO operations

- OPT - Handles optical disk I/O

- ADM - Executes administrative threads

- ADT - Executes auditing threads

- MSC - Handles request for system calls

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# Oninit Process Automatically Started

- Started Automatically
    - PIO - Handles physical log file when cooked disk space is used
    - LIO - Handles logical log file when cooked disk space is used
    - FIFO - Performs FIFO operations
    - ADM - Executes administrative threads
    - MSC - Handles request for system calls

- Started when Auditing is on
    - ADT - Executes auditing threads

- Started when UDRs are called
    - Java
    - User Defined Functions

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# Oninit Process Controlled by VPCLASS

- ## ONCONFIG VPCLASS Setting
    - CPU - Executes all user and session threads and some system threads
    - AIO - Handles disk I/O

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# VPCLASS Options

The VPCLASS parameter allows you to:

- Designate a class of virtual processors (VPs)
- Create a user-defined VP, and specify the following information for it:
  - The number of virtual processors that the database server should start initially - optional
  - The maximum number of virtual processors allowed for this class - optional
  - The assignment of virtual processors to CPUs if processor affinity is available - optional
  - The disabling of priority aging by the operating system if the operating system implements priority aging - optional

Syntax:
- VPCLASS classname, options

# CPU Oninit Configuration

- VPCLASS CPU – Configure the number of Oninit CPU VPs to start for Informix
  - VPCLASS cpu,num=<number> [,max=<max number cpu>] [,aff=<single CPU number> | <start cpu>-<end cpu> | ( <start cpu>-<end cpu>/<skip amount> ) ] ] [,noage]
- Examples for 8 Core machine:
  - VPCLASS cpu,num=4,noage
  - VPCLASS cpu,num=8,noage
  - VPCLASS cpu,num=8,aff=0,noage
  - VPCLASS cpu,num=8,aff=1-4,noage

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# CPU Affinity

- Example:
  - VPCLASS cpu,num=4,aff=0-3,noage

Message in the Online Log:

15:33:12  Affinitied VP 8 to phys proc 1

15:33:12  Affinitied VP 9 to phys proc 2

15:33:12  Affinitied VP 10 to phys proc 3

15:33:12  Affinitied VP 1 to phys proc 0

# Additional CPU Best Practices

- Set MULTIPROCESSOR to 1 (Almost all machines today are multiprocessor)

- Set SINGLE_CPU_VP to 0 (Allows you to run more Oninits of CPU class as needed)

- Set NOAGE if your OS supports it

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# Additional CPU Best Practices

- Set VP_MEMORY_CACHE_KB <size in KB for private cache for each CPU VP>

- Format is: <size>[,DYNAMIC|STATIC] Acceptable values for <size> are: 0 (disable) or 800 through 40% of the value of SHMTOTAL

- Example:
  - VP_MEMORY_CACHE_KB 4096

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# Auto Tuning

```
# AUTO_TUNE    – The value of this parameter serves as the default value for
#                the following AUTO_* parameters:
#                AUTO_AIOVPS
#                AUTO_CKPTS
#                AUTO_REPREPARE
#                AUTO_STAT_MODE
#                AUTO_READAHEAD
#                AUTO_LRU_TUNING
#
# Any of the above parameters that are not present in your config file
# will default to the value of AUTO_TUNE, which can be set to either 0 or 1.
# If an AUTO_* parameter is set in your config file, the given value overrides
# that of AUTO_TUNE. Information on individual AUTO_* parameters is below.
#
# AUTO_LRU_TUNING – Enables (1) or disables (0) automatic LRU tuning, which
#                   adjusts flushing thresholds for individual buffer pools
#                   if the server discovers they are sub-optimal
# AUTO_AIOVPS    – Enables (1) or disables (0) automatic management
#                   of AIO VPs
# AUTO_CKPTS     – Enables (1) or disables (0) monitoring of
#                   critical resource to trigger checkpoints
#                   more frequently if there is a chance that
#                   transaction blocking might occur.
# AUTO_REPREPARE – Enables (1) or disables (0) automatically
#                   re-optimizing stored procedures and re-preparing
#                   prepared statements when tables that are referenced
#                   by them change. Minimizes the occurrence of the
#                   -710 error.
# AUTO_STAT_MODE  – Enables (1) or disables (0) update statistics
```

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# Auto Tuning

```
# 
# RA_PAGES & RA_THRESHOLD have been replaced with AUTO_READAHEAD.
#
# AUTO_READAHEAD mode[,readahead_cnt]
#     mode              0 = Disable     (Not recommended)
#                       1 = Passive     (Default)
#                       2 = Aggressive  (Not recommended)
#     readahead_cnt     Optional        Range 4-4096
#                       readahead_cnt allows for tuning the # of
#                       pages that automatic readahead will request
#                       to be read ahead. When not set, the default
#                       is 128 pages.
#
#     Notes:
#     The threshold for starting the next readahead request, which
#     used to be known as RA_THRESHOLD, is always set to 1/2 of the
#     readahead_cnt. RA_THRESHOLD is deprecated and no longer used.
#
# If RA_PAGES & AUTO_READAHEAD are not present in the ONCONFIG file,
# AUTO_READAHEAD will default to the value of AUTO_TUNE.
#
# If RA_PAGES is present in the ONCONFIG file and AUTO_READAHEAD is
# not, the server will set AUTO_READAHEAD to AUTO_TUNE,RA_PAGES
#
####################################################################

AUTO_TUNE 1


####################################################################
```

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# Auto Tuning

```
#                     pages that automatic readahead will request
#                     to be read ahead. When not set, the default
#                     is 128 pages.
#
#    Notes:
#    The threshold for starting the next readahead request, which
#    used to be known as RA_THRESHOLD, is always set to 1/2 of the
#    readahead_cnt. RA_THRESHOLD is deprecated and no longer used.
#
# If RA_PAGES & AUTO_READAHEAD are not present in the ONCONFIG file,
# AUTO_READAHEAD will default to the value of AUTO_TUNE.
#
# If RA_PAGES is present in the ONCONFIG file and AUTO_READAHEAD is
# not, the server will set AUTO_READAHEAD to AUTO_TUNE,RA_PAGES
#
####################################################################

AUTO_TUNE 0
AUTO_AIOVPS      0
AUTO_CKPTS      0
AUTO_REPREPARE  0
AUTO_STAT_MODE  0
AUTO_READAHEAD  0
AUTO_LRU_TUNING 0


####################################################################
# AIO and Cleaner-Related Configuration Parameters
####################################################################
# VPCLASS aio  - Configures the AIO VPs. The format is:
```

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# Disk I/O

```
# AIO and Cleaner-Related Configuration Parameters
####################################################################
# VPCLASS aio   - Configures the AIO VPs. The format is:
#                 VPCLASS aio,num=<#>[,max=<#>][,aff=<#>][,noage]
#                 Example:
#                 VPCLASS aio,num=1
# CLEANERS      - The number of page cleaner threads
# DIRECT_IO     - Specifies whether direct I/O is used for cooked
#                 files used for dbspace chunks.
#                 Acceptable values are:
#                 0 Disable
#                 1 Enable direct I/O
#                 2 Enable concurrent I/O
####################################################################

CLEANERS 8
DIRECT_IO 0

####################################################################
# Lock-Related Configuration Parameters
####################################################################
# LOCKS             - The initial number of locks when the server starts.
#                     Dynamic locking can add extra locks if needed.
# DEF_TABLE_LOCKMODE - The default table lock mode for new tables.
#                     Acceptable values are ROW and PAGE (default).
####################################################################

LOCKS 200000
DEF_TABLE_LOCKMODE page
```

# AIO Oninit Best Practices

- ## Default is
  - AUTO_AIOVPS 1 – enable automatically adding AIO VPs as needed
  - This can lead to **too many** AIO VPs writing to the same disk system

- ## Recommended
  - AUTO_AIOVPS 0
  - VPCLASS aio,num=<number of oninits you need to write to disk>

# AIO Oninit Best Practices

- ## How many AIO Class Oninits do you need? Test, Test, Test…

  - With KAIO on – only need 2 AIO oninits

  - With KAIO off (default), it depends on how many processes can write to a disk at the same time.

  - Never need more than twice the number of active chunks.

  - Most disks can handle up to 8 AIO oninit processes.

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# AIO Oninit Best Practice Examples

- 1 Disk and 24 Chunks

  – VPCLASS aio,num=8

- 6 Disks and 24 Chunks (12 active)

  – VPCLASS aio,num=24

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# Locks

```
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# AIO and Cleaner-Related Configuration Parameters
####################################################################
# VPCLASS aio  - Configures the AIO VPs. The format is:
#               VPCLASS aio,num=<#>[,max=<#>][,aff=<#>][,noage]
#               Example:
#               VPCLASS aio,num=1
# CLEANERS     - The number of page cleaner threads
# DIRECT_IO    - Specifies whether direct I/O is used for cooked
#               files used for dbspace chunks.
#               Acceptable values are:
#               0 Disable
#               1 Enable direct I/O
#               2 Enable concurrent I/O
####################################################################

CLEANERS 8
DIRECT_IO 0

####################################################################
# Lock-Related Configuration Parameters
####################################################################
# LOCKS             - The initial number of locks when the server starts.
#                     Dynamic locking can add extra locks if needed.
# DEF_TABLE_LOCKMODE - The default table lock mode for new tables.
#                     Acceptable values are ROW and PAGE (default).
####################################################################

LOCKS 200000
DEF_TABLE_LOCKMODE page
```

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# LOCKS Memory Settings

- LOCKS – The number of LOCKS when Informix Starts. This determines the amount of Memory initially set for LOCKS. Can be dynamically added when needed.

- Dynamically adding LOCKS can cause a performance degradation.

**Advanced DataTools**

# LOCKS Memory Settings

- To monitor, look at the last line of:

  – onstat –k

```
IBM Informix Dynamic Server Version 12.10.FC6 -- On-Line -- Up 02:34:23 -- 165016 Kbytes

Locks
address         wtlist          owner           lklist          type      tblsnum rowid
44199028        0               44cd4668        0                  S      100002    204
4423f068        0               44cd4f28        0                  S      100002    204
442e50a8        0               44cd57e8        0                  S      100002    204
442e5130        0               44cd57e8        442e50a8        HDR+S      100002    201
4438b0e8        0               44cd60a8        0               HDR+S      100002    204
 5 active, 80000 total, 16384 hash buckets, 2 lock table overflows
```

  – This shows 2 lock table overflows.
  – This system requires 80,000 locks.

**Advanced DataTools**

# LOCK Best Practices

- LOCK Table Overflows will slow performance and should be avoided.

- LOCK Table Overflows are a major contributor to SHMVIRT Memory additions.

- Set your LOCK setting to a value that is the largest number required.

**Advanced DataTools**

# Memory Settings

```
####################################################################
# Shared Memory Configuration Parameters
####################################################################
# RESIDENT          - Controls whether shared memory is resident.
#                     Acceptable values are:
#                     0 off (default)
#                     1 lock the resident segment only
#                     n lock the resident segment and the next n-1
#                        virtual segments, where n < 100
#                     -1 lock all resident and virtual segments
# SHMBASE           - The shared memory base address; do not change
# SHMVIRTSIZE       - The initial size, in KB, of the virtual
#                     segment of shared memory
# SHMADD            - The size, in KB, of additional virtual shared
#                     memory segments
# EXTSHMADD         - The size, in KB, of each extension shared
#                     memory segment
# SHMTOTAL          - The maximum amount of shared memory for the server,
#                     in KB. A 0 indicates no specific limit.
# SHMVIRT_ALLOCSEG  - Controls when the server adds a memory segment and
#                     the alarm level if the memory segment cannot
#                     be added.
#                     For the first field, acceptable values are:
#                     - 0 Disabled
#                     - A decimal number indicating the total percentage
#                        of virtual memory used before a segment is added
#                     - The total KB virtual memory remaining when a segment
#                        is added
#                     For the second field, specify an alarm level
```

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# Memory Settings

```
# SHMVIRT_ALLOCSEG - Controls when the server adds a memory segment and
#                    the alarm level if the memory segment cannot
#                    be added.
#                    For the first field, acceptable values are:
#                    - 0 Disabled
#                    - A decimal number indicating the total percentage
#                      of virtual memory used before a segment is added
#                    - The total KB virtual memory remaining when a segment
#                      is added
#                    For the second field, specify an alarm level
#                    from 1 (non-event) to 5 (fatal error).
# SHMNOACCESS      - A list of up to 10 memory address ranges
#                    that the server cannot use to attach shared memory.
#                    Each address range is the start and end memory
#                    address in hex format, separated by a hyphen.
#                    Use a comma to separate each range in the list.
###################################################################

RESIDENT 0
SHMBASE 0x200000000L
SHMVIRTSIZE  1024000
SHMADD 8192
EXTSHMADD 8192
SHMTOTAL 0
SHMVIRT_ALLOCSEG 0,3
SHMNOACCESS

###################################################################
# Checkpoint and System Block Configuration Parameters
```
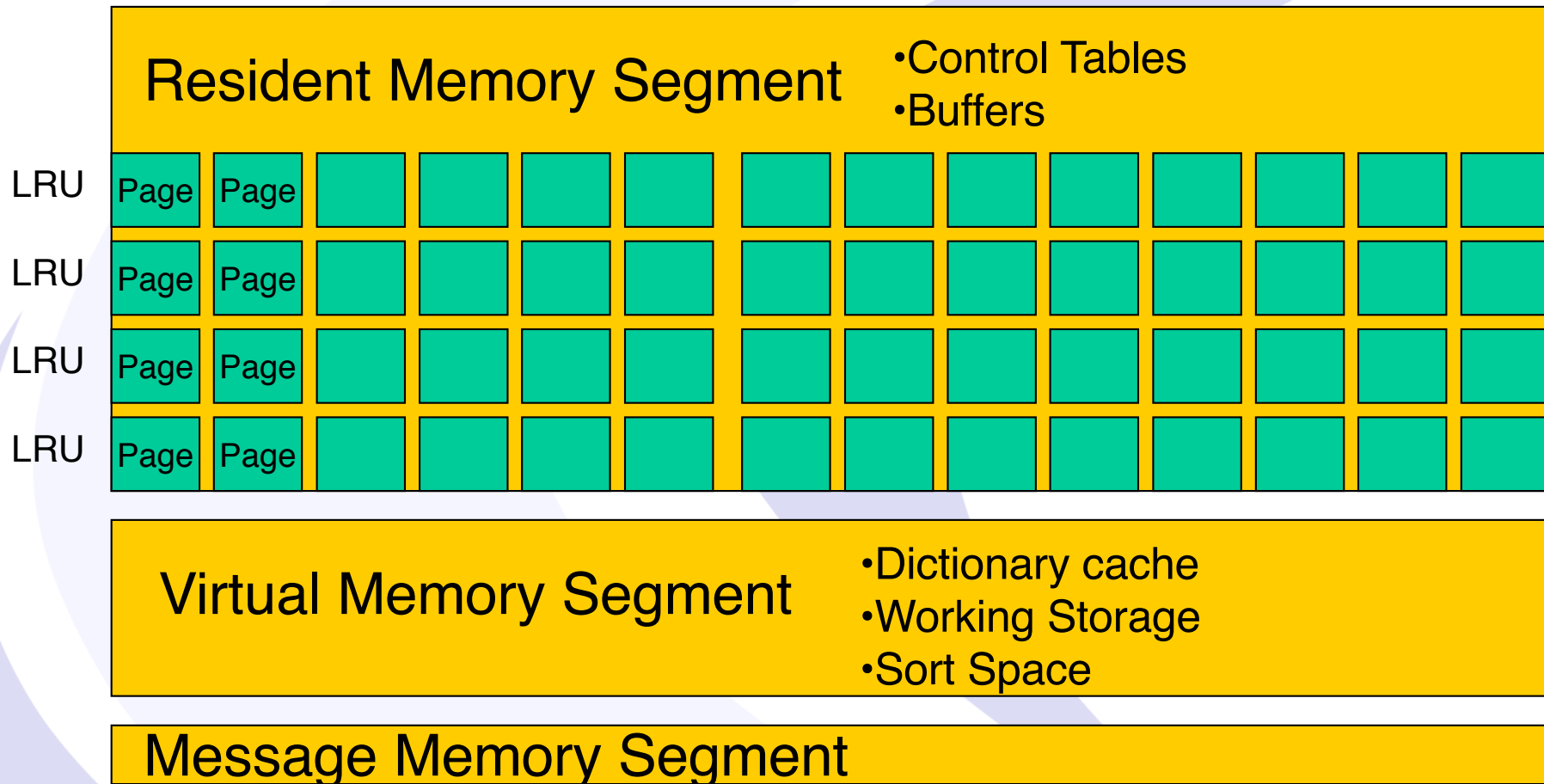
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# Informix Memory Best Practices

- 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***

**Advanced DataTools**

# Informix Shared Memory

**Resident Memory Segment**

- Control Tables
- Buffers

| | | |
|---|---|---|
| LRU | Page | Page |
| LRU | Page | Page |
| LRU | Page | Page |
| LRU | Page | Page |

**Virtual Memory Segment**

- Dictionary cache
- Working Storage
- Sort Space

**Message Memory Segment**

# Informix Shared Memory onstat –g seg

```
informix@train6:~ train6 > onstat -g seg

IBM Informix Dynamic Server Version 12.10.FC6 -- On-Line -- Up 00:30:00 -- 766404 Kbytes

Segment Summary:
id          key         addr            size            ovhd        class blkused  blkfree
32769       525c4801    44000000        4911104         495784      R     1199     0
65538       525c4802    444af000        33439744        393384      V     8030     134
98307       525c4803    46493000        562749440       1           B     137390   0
131076      525c4804    67d41000        166359040       1           B     40615    0
163845      525c4805    71be8000        561152          7848        M     136      1
196614      525c4806    71c71000        8388608         99720       V     1529     519
294919      525c4807    72471000        8388608         99720       V     25       2023
Total:      -           -               784797696       -           -     188924   2677

   (* segment locked in memory)
No reserve memory is allocated
```

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# Informix Memory Classes

- R – Resident Memory Segment

- B – Buffer Pool Segment for data

- V – Virtual Memory Segment for Working Storage

- M – Message Segment for communications between clients

**Advanced DataTools**

# SHMVIRTSIZE Best Practices

- Controls the size of the Informix Virtual Memory Workspace, which can grow if needed.

- Best practice is to set it large enough so it does not need to grow.

  – Monitor with onstat –g seg

**Advanced DataTools**

# ONCONFIG Memory Configuration Settings

- BUFFERPOOL
- SHMVIRTSIZE
- SHMADD
- LOCKS

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# Informix Shared Memory onstat –g seg

```
informix@train6:~ train6 > onstat -g seg

IBM Informix Dynamic Server Version 12.10.FC6 -- On-Line -- Up 00:30:00 -- 766404 Kbytes

Segment Summary:
id          key         addr          size          ovhd      class  blkused   blkfree
32769       525c4801    44000000      4911104       495784    R      1199      0
65538       525c4802    444af000      33439744      393384    V      8030      134
98307       525c4803    46493000      562749440     1         B      137390    0
131076      525c4804    67d41000      166359040     1         B      40615     0
163845      525c4805    71be8000      561152        7848      M      136       1
196614      525c4806    71c71000      8388608       99720     V      1529      519
294919      525c4807    72471000      8388608       99720     V      25        2023
Total:      -           -             784797696     -         -      188924    2677

    (* segment locked in memory)
No reserve memory is allocated
```

**Advanced DataTools**

# Additional Memory Setting

- RESIDENT - Controls whether shared memory is resident. Acceptable values are:
  - 0 off (default)
  - 1 lock the resident segment only
  - n lock the resident segment and the next n-1 virtual segments, where n < 100
  - -1 lock all resident and virtual segments

- SHMADD - The size, in KB, of additional virtual shared memory segments

**Advanced DataTools**

# Checkpoint Settings

```
●  ●  ●                    🏠 lester — vim — 80×30
##################################################################
# Checkpoint and System Block Configuration Parameters
##################################################################
# CKPINTVL          - Specifies how often, in seconds, the server checks
#                     if a checkpoint is needed. 0 indicates that
#                     the server does not check for checkpoints. Ignored
#                     if RTO_SERVER_RESTART is set.
# RTO_SERVER_RESTART - Specifies, in seconds, the Recovery Time
#                     Objective for the server restart after a server
#                     failure. Acceptable values are 0 (off) and
#                     any number from 60-1800, inclusive.
# BLOCKTIMEOUT      - Specifies the amount of time, in seconds,
#                     for a system block.
##################################################################

CKPTINTVL 300
RTO_SERVER_RESTART 0
BLOCKTIMEOUT 3600

##################################################################
# Conversion Guard Related Configuration Parameters
##################################################################
# CONVERSION_GUARD - To turn on conversion guard feature.
#                    - 0 - Off,
#                    - 1 - On, Abort conversion on Conversion Guard error,
#                    - 2 - On, Continue conversion; ignore Conversion
#                          Guard error
#
# RESTORE_POINT_DIR - The directory, which stores the Conversion Guard
```

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# Ontape Backups

```
● ● ●                        🏠 lester — vim — 80×30
####################################################################
# ontape Tape Device Configuration Parameters
####################################################################
# TAPEDEV       - The tape device path for backups. To use standard
#                 I/O instead of a device, set to STDIO.
# TAPEBLK       - The tape block size, in KB, for backups
# TAPESIZE      - The maximum amount of data to put on one backup
#                 tape. Acceptable values are 0 (unlimited) or any
#                 positive integral multiple of TAPEBLK.
####################################################################

TAPEDEV /informixbackups/benchmark6/ontape
TAPEBLK 32
TAPESIZE 0

####################################################################
# ontape Logial Log Tape Device Configuration Parameters
####################################################################
# LTAPEDEV      - The tape device path for logical logs
# LTAPEBLK      - The tape block size, in KB, for backing up logical
#                 logs
# LTAPESIZE     - The maximum amount of data to put on one logical
#                 log tape. Acceptable values are 0 (unlimited) or any
#                 positive integral multiple of LTAPEBLK.
####################################################################

LTAPEDEV /informixbackups/benchmark6/logs
LTAPEBLK 32
LTAPESIZE 0
```

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# SQL Cache

```
###################################################################
# SQL Statement Cache Configuration Parameters
###################################################################
# STMT_CACHE         - Controls SQL statement caching. Acceptable
#                      values are:
#                      0 Disabled
#                      1 Enabled at the session level
#                      2 All statements are cached
# STMT_CACHE_HITS    - The number of times an SQL statement must be
#                      executed before becoming fully cached.
#                      0 indicates that all statements are
#                      fully cached the first time.
# STMT_CACHE_SIZE    - The size, in KB, of the SQL statement cache
# STMT_CACHE_NOLIMIT - Controls additional memory consumption.
#                      Acceptable values are:
#                      0 Limit memory to STMT_CACHE_SIZE
#                      1 Obtain as much memory, temporarily, as needed
# STMT_CACHE_NUMPOOL - The number of pools for the SQL statement
#                      cache. Acceptable value is a positive
#                      integer between 1 and 256, inclusive.
###################################################################

STMT_CACHE 0
STMT_CACHE_HITS 0
STMT_CACHE_SIZE 512
STMT_CACHE_NOLIMIT 0
STMT_CACHE_NUMPOOL 1


###################################################################
```

# Session Configuration

```
################################################################
# Operating System Session-Related Configuration Parameters
################################################################
# USEOSTIME        - The precision of SQL statement timing.
#                    Accepted values are 0 (precision to seconds)
#                    and 1 (precision to subseconds). Subsecond
#                    precision can degrade performance.
# STACKSIZE        - The size, in KB, for a session stack
# ALLOW_NEWLINE    - Controls whether embedded new line characters
#                    in string literals are allowed in SQL
#                    statements. Acceptable values are 1 (allowed)
#                    and any number other than 1 (not allowed).
# USELASTCOMMITTED - Controls the committed read isolation level.
#                    Acceptable values are:
#                    - "NONE" Waits on a lock
#                    - "DIRTY READ" Uses the last committed value in
#                      place of a dirty read
#                    - "COMMITTED READ" Uses the last committed value
#                      in place of a committed read
#                    - "ALL" Uses the last committed value in place
#                      of all isolation levels that support the last
#                      committed option
################################################################

USEOSTIME 0
STACKSIZE 256
ALLOW_NEWLINE 0
USELASTCOMMITTED "ALL"
```

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# Index Settings



```
######################################################################
# Index Related Configuration Parameters
######################################################################
# FILLFACTOR          - The percentage of index page fullness
# MAX_FILL_DATA_PAGES - Enables (1) or disables (0) filling data
#                       pages that have variable length rows as
#                       full as possible
# BTSCANNER           - Specifies the configuration settings for all
#                       btscanner threads. The format is:
#                       BTSCANNER num=<#>,threshold=<#>,rangesize=<#>,
#                       alice=(0-12),compression=[low|med|high|default]
# ONLIDX_MAXMEM       - The amount of memory, in KB, allocated for
#                       the pre-image pool and updator log pool for
#                       each partition.
######################################################################

FILLFACTOR 90
MAX_FILL_DATA_PAGES 0
BTSCANNER num=1,threshold=5000,rangesize=-1,alice=6,compression=default
ONLIDX_MAXMEM 5120

######################################################################
# Parallel Database Query (PDQ) Configuration Parameters
######################################################################
# MAX_PDQPRIORITY     - The maximum amount of resources, as a
#                       percentage, that PDQ can allocate to any
#                       one decision support query
# DS_MAX_QUERIES      - The maximum number of concurrent decision
```

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# Parallel Database Query

```
# Parallel Database Query (PDQ) Configuration Parameters
######################################################################
# MAX_PDQPRIORITY      - The maximum amount of resources, as a
#                        percentage, that PDQ can allocate to any
#                        one decision support query
# DS_MAX_QUERIES       - The maximum number of concurrent decision
#                        support queries
# DS_TOTAL_MEMORY      - The maximum amount, in KB, of decision
#                        support query memory
# DS_MAX_SCANS         - The maximum number of concurrent decision
#                        support scans
# DS_NONPDQ_QUERY_MEM  - The amount of non-PDQ query memory, in KB.
#                        Acceptable values are 128 to 25% of
#                        DS_TOTAL_MEMORY.
# DATASKIP             - Specifies whether to skip dbspaces when
#                        processing a query. Acceptable values are:
#                        - ALL Skip all unavailable fragments
#                        - ON <dbspace1> <dbspace2>... Skip listed
#                          dbspaces
#                        - OFF Do not skip dbspaces (default)
######################################################################

MAX_PDQPRIORITY 100
DS_MAX_QUERIES
DS_TOTAL_MEMORY
DS_MAX_SCANS 1048576
DS_NONPDQ_QUERY_MEM 256
DATASKIP
```

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# Optimizer Settings

```
################################################################
# OPTCOMPIND     - Controls how the optimizer determines the best
#                  query path. Acceptable values are:
#                  0 Nested loop joins are preferred
#                  1 If isolation level is repeatable read,
#                    works the same as 0, otherwise works same as 2
#                  2 Optimizer decisions are based on cost only
# DIRECTIVES     - Specifies whether optimizer directives are
#                  enabled (1) or disabled (0). Default is 1.
# EXT_DIRECTIVES - Controls the use of external SQL directives.
#                  Acceptable values are:
#                  0 Disabled
#                  1 Enabled if the IFX_EXTDIRECTIVES environment
#                    variable is enabled
#                  2 Enabled even if the IFX_EXTDIRECTIVES
#                    environment is not set
# OPT_GOAL       - Controls how the optimizer should optimize for
#                  fastest retrieval. Acceptable values are:
#                  -1 All rows in a query
#                  0 The first rows in a query
# IFX_FOLDVIEW   - Enables (1) or disables (0) folding views that
#                  have multiple tables or a UNION ALL clause.
#                  Disabled by default.
# STATCHANGE     - In automatic mode, rebuild statistics only for
#                  table, fragment or index changed by STATCHANGE
#                  percentage since last statistics run.
# USTLOW_SAMPLE  - Enables (1) or disables (0) the use of sampling
#                  during update statistics low operations that gather
#                  index statistics for large indexes.
```

# SQL Trace

```
################################################################
# SQL Tracing and EXPLAIN Plan Configuration Parameters
################################################################
# EXPLAIN_STAT  - Enables (1) or disables (0) including the Query
#                 Statistics section in the EXPLAIN output file
# SQLTRACE      - Configures SQL tracing. The format is:
#                 SQLTRACE level=(low|med|high),ntraces=<#>,size=<#>,
#                 mode=(global|user)
#                 Example:
#                 SQLTRACE level=low,ntraces=1000,size=2,mode=global
################################################################


EXPLAIN_STAT 1


################################################################
# Security Configuration Parameters
################################################################
# DBCREATE_PERMISSION       - Specifies the users who can create
#                             databases (by default, any user can).
#                             Add a DBCREATE_PERMISSION entry
#                             for each user who needs database
#                             creation privileges. Ensure user
#                             informix is authorized when you
#                             first initialize the server.
#                             Example:
#                             DBCREATE_PERMISSION informix
# DB_LIBRARY_PATH           - Specifies the locations, separated
#                             by commas, from which the server can use
#                             UDR or UDT shared libraries. If set,
```

# Security

```
# UNSECURE_ONSTAT             - Controls whether non-DBSA users are
#                               allowed to run all onstat commands.
#                               Acceptable values are:
#                               1 Enabled
#                               0 Disabled (Default)
# ADMIN_USER_MODE_WITH_DBSA   - Controls who can connect to the server
#                               in administration mode. Acceptable
#                               values are:
#                               1 DBSAs, users specified by
#                                  ADMIN_MODE_USERS, and the user
#                                  informix
#                               0 Only the user informix (Default)
# ADMIN_MODE_USERS            - Specifies the user names, separated by
#                               commas, who can connect to the server in
#                               administration mode, in addition to
#                               the user informix
# SSL_KEYSTORE_LABEL          - The label, up to 512 characters, of
#                               the the server certificate used in Secure
#                               Sockets Layer (SSL) protocol
#                               communications.
# TLS_VERSION                 - Specifies which TLS levels will be
#                               allowed. Default is 1.0,1.1,1.2
################################################################
IFX_EXTEND_ROLE 1
SECURITY_LOCALCONNECTION
UNSECURE_ONSTAT
ADMIN_USER_MODE_WITH_DBSA
ADMIN_MODE_USERS
SSL_KEYSTORE_LABEL
```

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# Diagnostic Settings

```
# Diagnostic Dump Configuration Parameters
####################################################################
# DUMPDIR      - The location Assertion Failure (AF) diagnostic
#                files
# DUMPSHMEM    - Controls shared memory dumps. Acceptable values
#                are:
#                0 Disabled
#                1 Dump all shared memory
#                2 Exclude the buffer pool from the dump
# DUMPGCORE    - Enables (1) or disables (0) whether the server dumps a
#                core using gcore
# DUMPCORE     - Enables (1) or disables (0) whether the server dumps a
#                core after an AF
# DUMPCNT      - The maximum number of shared memory dumps or
#                core files for a single session
####################################################################

DUMPDIR $INFORMIXDIR/tmp
DUMPSHMEM 1
DUMPGCORE 0
DUMPCORE 0
DUMPCNT 1


####################################################################
# Alarm Program Configuration Parameters
####################################################################
# ALARMPROGRAM      - Specifies the alarm program to display event
#                     alarms. To enable automatic logical log backup,
#                     edit alarmprogram.sh and set BACKUPLOGS=Y.
```

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# Alarm Program

```
#####################################################################
# Alarm Program Configuration Parameters
#####################################################################
# ALARMPROGRAM       — Specifies the alarm program to display event
#                      alarms. To enable automatic logical log backup,
#                      edit alarmprogram.sh and set BACKUPLOGS=Y.
# ALRM_ALL_EVENTS     — Controls whether the alarm program runs for
#                      every event. Acceptable values are:
#                      0 Logs only noteworthy events
#                      1 Logs all events
# STORAGE_FULL_ALARM — <time interval in seconds>,<alarm severity>
#                      specifies in what interval:
#                      — a message will be printed to the online.log file
#                      — an alarm will be raised
#                      when
#                      — a dbspace becomes full
#                        (ISAM error —131)
#                      — a partition runs out of pages or extents
#                        (ISAM error —136)
#                      time interval = 0 : OFF
#                      severity = 0 : no alarm, only message
# SYSALARMPROGRAM     — Specifies the system alarm program triggered
#                      when an AF occurs
#####################################################################

ALARMPROGRAM $INFORMIXDIR/etc/alarmprogram.sh
ALRM_ALL_EVENTS 0
STORAGE_FULL_ALARM 600,3
SYSALARMPROGRAM $INFORMIXDIR/etc/evidence.sh
```

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# Trusted Hosts

```
● ● ●                    🏠 lester — vim — 80×30
######################################################################
# REMOTE_SERVER_CFG — Specifies the name of a file that lists the
# remote hosts that are trusted by the computer on which the
# database server resides. The file specified must be located in
# $INFORMIXDIR/etc. If the configuration parameter is set then the
# file specified is used instead of the /etc/hosts.equiv file.
#
# REMOTE_USERS_CFG — Specifies the name of a file that lists names
# of trusted users that exist on remote hosts. The file specified
# must be located in $INFORMIXDIR/etc. If the configuration
# parameter is set then the file specified is used instead of the
# ~/.rhosts file.
#
# S6_USE_REMOTE_SERVER_CFG — Specifies that the server will use
# the value for REMOTE_SERVER_CFG rather than $INFORMIXDIR/etc/hosts.equiv
# when using secured ER/HDR connections (i.e. s=6). If set to 0 then
# the existing behaviour is used ($INFORMIXDIR/etc/hosts.equiv). If
# set to 1 then the value of REMOTE_SERVER_CFG will be used
######################################################################

REMOTE_SERVER_CFG       ifx.hosts
REMOTE_USERS_CFG
S6_USE_REMOTE_SERVER_CFG  0


######################################################################
# Low Memory Parameter
######################################################################
# LOW_MEMORY_RESERVE — the amount of memory reserved for critical
# operations like rollback. If these operations fail then it crashes
```

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# Buffer Pool

```
# TENANT_LIMIT_CONNECTIONS count  1        64k       0 (off)   Reject connection
###################################################################

###################################################################
# Buffer pool and LRU Configuration Parameters
###################################################################
# BUFFERPOOL      - Specifies the default values for buffers and LRU
#                   queues in each buffer pool. Each page size used
#                   by a dbspace has a buffer pool and needs a
#                   BUFFERPOOL entry. The onconfig.std file contains
#                   two initial entries: a default entry from which
#                   to base new page size entries on, and an entry
#                   for the operating system default page size.
#
#                   When you add a dbspace with a different page size,
#                   IDS adds a BUFFERPOOL entry to the onconfig file
#                   with values that are the same as the default
#                   BUFFERPOOL entry, except that the default
#                   keyword is replaced by size=Nk, where N is the
#                   new page size. With interval checkpoints, these
#                   values can now be set higher than in previous
#                   versions of IDS in an OLTP environment.
###################################################################

## Set BUFFERPOOL to 2GB
BUFFERPOOL default,buffers=10000,lrus=8,lru_min_dirty=50.00,lru_max_dirty=60.50
BUFFERPOOL size=4k,buffers=1000000,lrus=8,lru_min_dirty=50,lru_max_dirty=60
BUFFERPOOL size=16k,buffers=100000,lrus=8,lru_min_dirty=50,lru_max_dirty=60
~
```

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# BUFFERPOOL Best Practices

- More Buffers - the better and *faster* your database will perform.

- Goal is to put all the active data into Memory Buffers.

- Goal is to prevent high Memory Buffers Turnover (Art Kagel's rule – less than 8 times and hour).

- Always leave the default BUFFERPOOL line in the ONCONFIG.

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# BUFFERPOOL Settings

- The BUFFERPOOL configuration parameter consists of two lines in the onconfig.std file, as shown in this example for a UNIX platform:

BUFFERPOOL default,lrus=8,buffers=5000,lru_min_dirty=50,lru_max_dirty=60
BUFFERPOOL size=2K,buffers=5000,lrus=8,lru_min_dirty=50,lru_max_dirty=60

- The top line specifies the default values that are used if you create a dbspace with a page size that does not already have a corresponding buffer pool created at startup.

- The next line below the default line specifies the database server's default values for a buffer pool, which are based on the database server's default page size.

- When you add a dbspace with a different page size with the onspaces utility, or when you add a new buffer pool with the onparams utility, a new line is appended to the BUFFERPOOL configuration parameter in the ONCONFIG file. The page size for each buffer pool must be a multiple of the system's default page size.

# BUFFERPOOL Examples

- 3 GB Memory for Buffers – Linux OLTP System
  - BUFFERPOOL size=2k,buffers=1500000,lrus=32,lru_min_dirty=10,lru_max_dirty=20

- 12 GB Memory for Buffers – AIX OLTP System
  - BUFFERPOOL size=4k,buffers=3000000,lrus=128,lru_min_dirty=1,lru_max_dirty=2

- 48 GB Memory for Buffers – Solaris Data Warehouse
  - BUFFERPOOL size=2K,buffers=24000000,lrus=128,lru_min_dirty=60,lru_max_dirty=70

- 15 GB Memory for 4K Buffers and 12.8 GB for 16K Buffers
  - BUFFERPOOL size=4K,buffers=60000000,lrus=256,lru_min_dirty=0.1,lru_max_dirty=0.2
  - BUFFERPOOL size=16K,buffers=800000,lrus=256,lru_min_dirty=20,lru_max_dirty=30

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# Memory LRU Settings

- AUTO_LRU_TUNING - Enables (1) or disables (0)

- BUFFERPOOL LRU Settings
  - lrus=<Number of LRU QUEUES>,
  - lru_max_dirty=<Percent dirty to START cleaning>
  - lru_min_dirty=<Percent dirty to STOP cleaning>

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# Memory LRU Best Practices

- Enable AUTO_LRU_TUNING for turnkey or embedded systems.

- Disable AUTO_LRU_TUNING for high performance systems where you do not want CHECKPOINTS to write a huge amount of data to disk and slow everything down.

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# Memory LRU Settings

- LRU Settings for AUTO_LRU_TUNING Disabled
  - lrus=<Number of LRU QUEUES>,
  - lru_max_dirty=<Percent dirty to START cleaning>
  - lru_min_dirty=<Percent dirty to STOP cleaning>

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# Questions?

Send follow-up questions to
lester@advancedatatools.com

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# Next Webcast
# Informix Best Practices

- **Informix Connection Manager by Thomas Beebe**
  – Thursday, June 29, 2017 at 2:00pm EST

- **Informix Auditing by Mike Walker**
  – Thursday, July 27, 2017 at 2:00pm EST

Please register for each webcast here at:
http://advancedatatools.com/Informix/NextWebcast.html

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# Informix Training in 2017

- April 10-13, 2017
  - **Informix for Database Administrators**
- September 11-14, 2017
  - **Advanced Informix Performance Tuning**
- September 18-21, 2017
  - **Informix for Database Administrators**
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# Questions?

Send follow-up questions to
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# Thank You

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For more information:

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