OpenEdge Database Startup Parameters

The Good, the Bad, and the Obscure

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Abstract: OpenEdge database startup parameters are at the heart of performance, stability, and manageability—but let's face it, some should never be used (*we're looking at you, -i and -F*), while others are simply misunderstood or often overlooked. This session takes a look at both the well-known and the lesser-known parameters, providing practical insights that go beyond the documentation.

We'll cover old favorites, newer parameters, outdated defaults, and important configuration settings that aren't technically "parameters" but still have major impact. You will also learn when to be cautious with powerful tools like `-diagEvent`, and what changes (as well as what **doesn't** change) when you modify parameters online with `proutil increaseto` or `_dbParams`.

Whether you're tuning an existing system or configuring a new one, this session will help you make informed decisions—and avoid common pitfalls.

```
sports2000 –B 10000 –spin 20000 –n 250
```

OpenEdge Database Startup Parameters

The Good, The Bad, And The Obscure

```
> probiw  sports2000
> proaiw  sports2000
> prowdog sports2000
```

```
-diagDir /data/diagnostics –diagEvent LockTable:1 …
```

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A Few Words about the Speaker

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T'aurais pu le dire avant de l'acheter

Agenda

- Never Use These!
- Unreasonable Defaults
- Well Known, But Still Worth Talking About
- Lesser Known, But Important
- SQL Parameters
- New (ish)
- Not a Parameter ™ (but important)
- Making Changes Online

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Never Use These!

Never Use These Parameters!

- -i don't care about my data
  - Supposedly completely eliminates writes to the bi file
  - Actually, only **reduces** bi writes and does them in an unreliable manner
  - If anything goes wrong the database is unrecoverable
    - YOU MUST RESTORE A BACKUP IF THIS HAPPENS
  - **-r** has the same performance benefits with far fewer risks
  - Neither -i nor -r should ever be used in production!
- -Fu...dge data integrity – who cares about that?
  - Often used after a mismatched timestamp error
  - Or right after enjoying an 1124 error
  - Tells the database to pretend that "everything is fine"

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Some Sordid Details

-i
** The last session was run with the no integrity (-i) parameter. (509)
** Your database cannot be repaired. You must restore a backup copy. (510)

-r
** The last session was run with the non-raw (-r) parameter. (517)
** Your database may have been damaged. (518)

-F
** Your database was damaged. Dump its data and reload it. (37)

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Not Dangerous, but…

- -N
- -G
- -directio
- -pinshm
- -semsets #
- -Mf 0

- If I had hair when it was said…it may no longer be valid

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Unreasonable Defaults

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Unreasonable Defaults (as of 12.8)

- -B 3000
- -spin 6000 * #cpus
- -omsize 1024
- -pica 128
- bi cluster size 512
- ai and bi block sizes 8

- biw, aiw, apw, and wdog do not start by default
- After-imaging is not enabled by default

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Better Default Values, Tom Edition

- -B 250000 @4k blocks that is 1GB
- -spin 10000
- -omsize 4096*
- -pica 65536
- bi cluster size 65536 (but keep an eye on syncIO time)
- ai and bi block sizes 16

- Always start BIW, AIW, APW, WDOG, BIM
- Always configure and enable after-imaging

* or... `select count(*) from _storageObject`

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Well Known DB Parameters

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Well Known and Frequently Abused

- -L Lock Table
  - Often ridiculously large for dubious reasons
  - Unreasonably large lock tables *should* trigger code review & fixes
- -B Buffer Pool
  - Used to defer disk IO, -B access is thousands of times faster than disk IO (even SSD)
  - There is no benefit for it to be larger than your database!
- -spin
  - Bigger is not always better!
- -bithold
  - You need a plan to monitor and respond to approaching (or exceeded) thresholds

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Frequently Abused, Network Edition

- -ServerType – NEVER allow the default of “BOTH”
  - Always specify either “4GL” or “SQL”
- -minport, -maxport
  - Ranges are often **much** too wide
  - Or missing entirely
  - Or shared among many brokers
- -Mm
  - Since 11.6 is set on the server side, client is “advisory”
  - Maximum is 32600

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Lesser Known DB Parameters

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Lesser Known *Performance* Parameters

- -lruskips, -lru2skips
  - Systems with a large –B should consider larger values
- -bibufs, -aibufs
  - Systems with high transaction volume should increase these
  - Set them the same (the old advice about ai = 150% of bi is deprecated)
  - Especially useful during maintenance operations like index rebuild
- -omsize
  - Needs to be set to the number of tables + indexes + lobs + a bit of padding
  - System tables need to be included!
- -hash
  - Beware of accidental misconfiguration!
- -pica
  - Magic OpenEdge Replication “go fast” button

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Lesser Known *Network Performance* **Parameters**

- -Mm
- -prefetchDelay
- -prefetchFactor
- -prefetchNumRecs
- -prefetchPriority

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-prefetch* and friends

- Painless parameter changes that will improve performance without requiring code changes!
- Defaults have changed from OpenEdge 11 to OpenEdge 12
- But even the new defaults are “modest”, I suggest:

```
-Mm 16384                 # default 1024 pre oe12, 8192 oe12+
-prefetchDelay            # default disabled pre oe12
-prefetchFactor   100     # default 0 pre oe12, 100 in oe 12+
-prefetchNumRecs 5000     # default 16 pre oe12, 64 in oe12+
-prefetchPriority  10     # default 1
```

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Lesser Known *Reliability* Parameters

- -MemCheck 1
- -DbCheck 1

- Disabled by default
- In theory there is a small performance penalty
- In practice the peace of mind benefits far outweigh that penalty

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Lesser Known *Diagnostic* Parameters

- Table/Index/LOB Statistics
  - -basetable -baseindex -baselob
  - -tablerangesize -indexrangesize –lobrangesize
  - And their _user cousins
  - Defaults to 50
- -diagEvent

  -diagEvent LockTable:1,SysErr:1,BiThold:1 # 3 = summary + details + protrace (be careful!)
- -diagDir
  - Needs to be writable and LARGE
- Rob's DDC PUG Talk:

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Diagnostic non-parameter

- Obtain the line# and call stack of executing code:
  - Client Statement Cache
  - proGetStack

- Video: https://youtu.be/2qZ4LpCSG7I
- PPT:
  https://pugchallenge.org/downloads/2023/america/Real_Time_Visibility_With_CSC.pptx

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Lesser Known *Miscellaneous* Parameters

- -lgArchiveEnable
- -lgArchiveDir
- -lgTruncateFrequency
- -lgTruncateTime

- -pendConnTime
  - Default 30 seconds
  - (Client parameter –ct controls the number of attempts, defaults to 50)

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SQL Parameters

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SQL Parameters

- Nobody ever talks about these…

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SQL Parameters

- Nobody ever talks about these…
- Probably because SQL is an abomination!

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SQL Parameters

```
-SQLTruncateTooLarge OUTPUT    # ON/ALL/OFF/OUTPUT
-SQLWidthUpdate ON             # adjust width of SQL fields automatically
-SQLLockwaitTimeout 5          # 1/5/maxInt32, lock wait timeout for SQL connections

-SQLCursors 50                 # 10/50/512, number of simultaneous SQL cursors
-SQLStack 1000                 # SQL stack size in 1KB units
-SQLStmtCache 100              # number of statements that can be stored

-SQLTempStoreBuff 1000         # Size [1KB units] of SQL Server TT buffer
-SQLTempStoreDisk 500000       # Size [1KB units] of SQL Server TT disk storage, -T
-SQLTempStorePageSize 8        # Size [1KB units] of SQL Server TT datapage
```

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Autonomous Update Statistics (AUS)

- Updates SQL statistics automatically and in the background

```
proserve dbname -SQLAutoStats ON
sqlexp> AUTOUPDATE STATISTICS ON;
```

- Watches executed queries for indications that UPDATE STATISTICS is needed (20% of data has changed)
- By DEFAULT, will update statistics at 10pm every night for "dirty" tables
- You can adjust as needed via:

```
sqlexp>  AUTOUPDATE STATISTICS ALTER ... ;
```

https://docs.progress.com/bundle/openedge-sql-development/page/Run-the-AUS-service.html

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AUS Caveats

- The AUS runs on each SQL broker plus one dedicated AUS Server and needs connections for the threads that it executes
- This will impact -n and –Ma; you will need at least 7 additional connections
- To view properties -SYSSQL_PROPERTIES is the correct name of the table
- The SYSSTATUSE table does not exist
- You still want to run UPDATE STATISTICS after db creation

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Important New (ish) DB Parameters

(and stuff)

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New (ish) DB Parameters

- -hashlatchfactor
- -dbnotifytime -usernotifytime
- -ssj
- -threadedServer

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-hashLatchFactor

- Controls the number of BHT latches to create
- A percentage of the BHT size from 5% to 100%
- Default is 10% of BHT
- BHT is sized by -hash and, by default, is a prime number in the neighborhood of 25% of –B
- Only adjust this if you have BHT or BF* latch waits

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-dbnotifytime and -usernotifytime

- Notify Clients that online changes are being made
- -usernotifytime
  - time in seconds between client polls
  - default 0 (disabled)
  - only used in 12.2+ if -dbnotifytime is 0
  - available since 11.something
- -dbnotifytime
  - time in seconds between client checks for **pushed** messages
  - default 30
  - available since 12.2

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Server Side Joins

- Only available for OpenEdge 12 and better

  -ssj 1 to enable (default)
  -ssj 0 to disable

- Great when it applies!
- But not a panacea

Multithreaded 4GL Servers

- Only available for OpenEdge 12 and better
- Your mileage may vary
- -threadedServer 1 is the default
- -threadedServer 0 to disable and return to pre-OpenEdge 12 behavior
- -threadedServerStack
  - 512KB per thread is the default, 64 is the minimum
  - maxint32 is the maximum allowed value
- -Mn, -Mpb, -Ma, and -Mi should be adjusted when migrating from OE11!
  - You *probably* want fewer servers and more connections per server

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BI Space Manager - PROBIM

- Another entry in the Not A Parameter ™ list
- Proactively Reuses BI Clusters that:
  - Are empty but between the newest and oldest “bi note”
  - This can greatly reduce disk space usage
- -biscantime 10

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Not a Parameter ™

(but important)

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Not a Parameter ™

- Database Block Size
  - 4k or 8k, **NOT** 1k or 2k (removed in 12.7)
- Rows per Block
  - 2^0 thru 2^8
  - Err on the high side
- Blocks per Cluster
  - 0/1, 8, 64, 256, 512
- BI and AI block sizes
  - 16
- BIW/AIW/APW/WDOG/BIM
  - Always run these

`prostrct create`

`proutil / rfutil`

`probiw, proaiw, proapw, prowdog, probim`

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Making Changes Online

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Making Changes Online

- HOWTO
- Caveats and limitations…

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PROUTIL -C increaseto

- Available since … a long time ago
- Ever expanding list of eligible parameters

```
proenv> proutil dbname -C increaseto -B 100000
OpenEdge Release 12.4.1 as of Tue Oct 26 14:01:38 EDT 2021

Waiting for Broker connection to newly added shared memory segments. (14269)
     Usr     Name     Type      Pid
       1      tom      ABL   122252
The database connections above have not attached to recently added shared
memory segments or have not opened newly added semaphores.
Do you wish to recheck? (y/n)
```

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PROUTIL -C increaseto

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The database connections above have not attached to recently added shared
memory segments or have not opened newly added semaphores.
Do you wish to recheck? (y/n)
y
Increase Params increasing buffer pools size (-B) from 3000 to 100000. (13980)
```

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For Successful "increaseto" Operations

- -dbnotifytime **must** be > 0 at db startup
- If it is 0 it is disabled and you **cannot** enable it online!
- If -dbnotifytime >= 0 you can modify it online:
  - Perhaps it is usually 600 seconds
  - 30 minutes prior to a planned maintenance you change it to 10 seconds
  - And then change it back to 10 minutes when you are done

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_dbParams - OpenEdge 11.5+

- Primary db broker startup parameters

```
for each _dbParams exclusive-lock where _dbParams-is-modifiable = yes:
  display
    _dbParams-name
    _dbParams-value
    _dbParams-is-default
//  _dbParams-msg-num
//  _dbParams-desc
   with no-box
  .
  if _dbParams-name = "-dbnotifytime" then
    update _dbParams-value.
end.
```

DbParams-Name	DbParams-Value	Default value
-aiarcdir	Not Enabled	yes
-aiarcdircreate	0	yes
-aiarcinterval	-1	yes
-aistall	0	yes
. . .		
-dbnotifytime	30	no

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_Servers - OpenEdge 11.5+

- Similar to _dbParams but for "Servers”
- _SrvParam* fields added to support per-server parameters for login brokers

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Caveats and Limitations

- -dbnotifytime or -usernotifytime must be enabled
- Parameters whose default value is calculated based on another do not get recalculated, for instance:
  - -hash is based on -B
  - -lkhash is based on –L
  - _user*stat is based -base* and -*range
- Replication sources and targets are not updated, which may interfere with fail-over and restarts

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Summary

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Summary

- Opportunities Abound!
- Not all important configuration options are “parameters”
- Things change over time, you need to review parameters periodically:
  - Obsolete and deprecated parameters that should be removed
  - Changes in behavior
  - Improvements to default values that you might be inhibiting
- Simple mistakes can be catastrophic!

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Questions?

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Thank You!

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- Real time monitoring and detailed drill-down
- Historical trending, zoom in or out across years of data at will
- Insightful alerting – the information needed to act on alerts
- Routine “health checks”
- A single pane of glass dashboard

- It’s not just the database!
  - App servers
  - Pro2
  - CODE behaviors and profiling
  - User defined, application specific metrics

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