ASE Tips & Tricks 2023

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- About the author
- Why this presentation, which tips & tricks, and why?
- A lot of ASE stuff, even a few traceflags
- Some Replication Server stuff
- Product futures, no promises
- You will receive a copy of this presentation

About the author

- 15+ years working with Sybase, including at Sybase
- Principal Database Engineer at Prima Donna Consulting
- Based in London, UK, and Melbourne, Australia
- International Sybase User Group Board of Directors since 2010
- UK Sybase User Group Board of Directors since 2019
- Not a lawyer – no charge for emails!
- If you have Sybase systems, I help you look amazing to your manager

Why this presentation

- The legendary Rob Verschoor write & delivered many versions of this
  - Always the most popular session in any Sybase conference
- Rob is no longer with SAP; a great loss to the industry
- I couldn't bear the idea of no more "Tips & Tricks"
  - I stand on the shoulders of giants

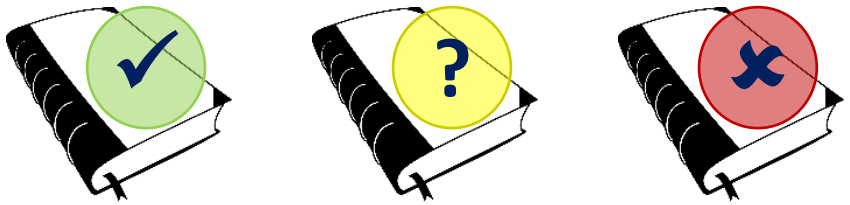
Which tips & tricks, and why? (1 of 2)

- Despite the title, we will also mention Replication Server & Open Client
- Almost everything based on what is available on the SAP web site
  - What's New SAP ASE / SRS 16.0 SP04 PL04
  - What's New SAP ASE / SRS 16.0 SP03 PL14
  - Bug lists for above products and releases
  - Targeted CR list for 16.0 SP04 PL**05**
  - SAP Roadmaps for ASE / SRS / SDK for 2024-2025
  - SAP Wiki

Which tips & tricks, and why? (2 of 2)

- Had to meet at least two of the following criteria to make the list:
  - Be important
  - Be interesting
  - Be in my experience not widely known
- Not necessarily from the latest versions!
  - Some not-new features meet all three of the above criteria
- If documented, then supported and references will be given
- If not documented or supported, will be clearly warned

Is it secret? Is it safe?



- Is it documented?
  - KBA or CR given where possible

- Is it supported?
  - If in a manual, a KBA, or a CR, I assume it is supported
  - Best to confirm with SAP Support

LOAD DATABASE ... with listonly

- ASE 15.7 ESD #2
  - **`load database ... with listonly=create_sql`**
  - **`load database ... with listonly=load_sql`**
  - Originally required dump history to be enabled
    - **`sp_configure "enable dump history", 1`**
- Some time in ASE 16.0 (unclear), this was enhanced
  - Dump history does not seem to be required any more

Backup Server errorlog in ASE (1 of 2)

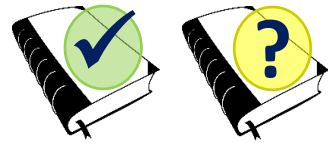
- ASE 16.0 SP03 PL11 / SP04 PL02

```
-- run once
exec sp_configure "buffered messages", 5000
go

-- run every time
exec sp_monbackupservererrorlog
go
select  DBNAME, COMMANDTYPE, TEXT
from    monBackupServerErrorlog
go
```

Backup Server errorlog in ASE (2 of 2)

```
-- run once
exec sp_configure "buffered messages", 5000
go

-- alternate method, run every time
exec SYB_BACKUP...sp_errlog
go
```

Backup Server tuning guidance (1 of 2)



- sp_evaluate_bs_cfg
- Recommend Backup Server config for tuned backup of a database
- Documented for ASE 16.0 SP04 PL04
- Inconsistently documented for ASE 16.0 SP03 PL14
  - Not in What's New ASE 16.0 SP03 PL14
  - But *is* in Reference Manual: Procedures ASE 16.0 SP03 PL14
- Two forms; see next slide
- For earlier versions see KBA 2917434 for (partial) workaround SQL

Backup Server tuning guidance (2 of 2)

```
exec sp_evaluate_bs_cfg db1
go

The current shared memory configuration of 500 MB provides an optimal memory
utilization up to 50 stripes. The number of service threads is currently set
to 48 and should be always equal or greater than the number of stripes. To
configure the number of service threads restart the Backup Server with -P
parameter.

exec sp_evaluate_bs_cfg db1, 50
go

The current shared memory configuration of 300 MB provides an optimal memory
utilization up to 30 stripes. Dumping database 'db1' with 50 stripes requires
500 MB of shared memory for maximum memory utilization. To configure the
shared memory restart the Backup Server with -m parameter. The number of
service threads is currently set to 48 and should be always equal or greater
than the number of stripes. To configure the number of service threads
restart the Backup Server with -P parameter.
```

Backup Server auto-start on dump/load

- sp_configure “enable backupserver ha”
- Originally only for ASE Cluster Edition, now expanded to regular ASE
  - ASE What’s New 16.0 SP04 PL03
  - New behaviour does not appear to be in ASE SP03
- Will auto-start BS for dump/load if not already running
- RUN_SERVER_BS must be in $SYBASE_ASE/install directory
  - If your SOE puts this elsewhere, best practice is to symlink

Literal parameterization enhancement

- sp_configure “enable literal autoparam” been around for ages
- Originally only 0 or 1, now also accepts 2
  - ASE What’s New 16.0 SP04 PL03
  - ASE What’s New 16.0 SP03 PL12
- 0 = disabled, 1 = enabled for everything, 2 = enabled only for ad-hoc
  - ad-hoc only = not stored procedures
  - Recommended
  - Else possible double caching in procedure cache & statement cache

Huge pages enhancement (1 of 2)

- sp_configure “enable hugepages” been around for ages
- 0 = huge pages if possible , 1 = never huge pages, 2 = only huge pages
- Old setting for 0 = all huge pages or no huge pages; no mix
  - Checked only at boot time
  - Problem if ASE memory was increased at run time
  - Mixed was not allowed, so if not enough huge pages, error

Huge pages enhancement (2 of 2)

- 16.0 SP04 PL03 / SP03 PL14
- New setting for 0 = as many huge pages as possible; regular thereafter
  - Applies at boot-time and run-time
  - Allows a mix
- A mix is not actually good for performance
- Idea is that performance loss is better than inability to grow memory
- If you don't agree, boot TF 17014 reverts to old behaviour (no mix)
- **(PS: ask me for my paper on benchmarking and setting huge pages)**

ASE stability (1 of 4)

- Trade-off between consistency and availability
  - Fault isolation during recovery
  - Secondary signal handling (thanks Bart!)
  - “suspend audit when device full”
- Default settings say outage is better than limping along
  - This may or may not make sense for your business needs

ASE stability (2 of 4)

- Fault isolation during recovery been around since at least ASE 15.7
  - 16.0 SP04 PL03 enhanced to cover more scenarios (some signal 11s)
- Default: 20+ suspect pages during recovery = entire database offline
- sp_setsuspect_threshold
  - Above this number entire database always marked suspect
- sp_setsuspect_granularity
  - Entire database, or just individual pages
  - If pages are offline, should the database be offline or just read-only

ASE stability (3 of 4)

- FATAL UNHANDLED EXCEPTION: signal <nn> hit (after prior signal)
  - Instant ASE shutdown in self-defence
  - But you might say it is better to keep ASE up even at a cost
  - ASE process is turned into a zombie (unkillable)
  - See KBA 2682382

CR	Available in	Effect
815844	15.7 SP141, 16.0 SP02 PL07 HF1, 16.0 SP03 PL05	TF 2917 (boot & run-time) prevents ASE shutdown
816486	15.7 SP141, 16.0 SP02 PL08, 16.0 SP03 PL06	sp_configure “secondary signal handling”, 0
818321	15.7 SP141, 16.0 SP02 PL09, 16.0 SP03 PL07	Enhanced to handle more scenarios
826023	16.0 SP03 PL13, 16.0 SP04 PL03	Enhanced to prevent avoidable zombies

ASE stability (4 of 4)

- "suspend audit when device full"
  - Not new
  - Doesn't always clearly report when ASE halted due to audit full
- 16.0 SP04 PL04, 16.0 SP03 PL13
  - is_audit_suspended()
  - Better messages in ASE error log

Never use shutdown with nowait again (1 of 2)

- Common myth: shutdown with nowait same as kill + shutdown
- shutdown with nowait is single-threaded
  - Kills one spid at a time
  - Waits for rollback to finish before starting next kill & rollback
- shutdown with nowait also slows down ASE restart
  - Does not flush in-memory accounting stats
  - Forces free space accounting on next boot
- KBA 2672861

Never use shutdown with nowait again (2 of 2)

- Faster: multiple concurrent kill commands + regular shutdown
- Run each kill in its own session, parallelism up to resource limits
  - kill <spid> with force (ASE 16.0 GA)
    - Not perfect; can't kill a spid holding spinlocks
  - kill <spid> with statusonly (ASE 15.7 ESD#4)
- Which ones first?

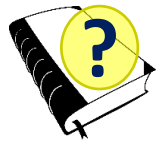
```
select *
from master..syslogshold
order by starttime
```

“max network events”

- New sp_configure parameter added in ASE 16.0 SP04 PL04
- Maximum number of events ASE can read from OS
- Default is 50, max is 500
- Added because of obscure bug involving large IN list and SSL ports
- If OS is tuned for larger network queue depths, increase this also

ASE page signing

- ASE 15.7 SP130
- Add a checksum to every page in a database, updated with each write
- Detects changes since last write; any change can only be a corruption
- One-time overhead when calculating page checksum; none thereafter
- select sign_pages("<database>", "sign")
- Boot TF 12339
  - May take some time to calculate checksum for every page in ASE!
- sp_dboption <database>, "allow page signing", true



Read-only tables

- ASE 16.0 SP03 PL14, SP04 PL02
- exec sp_chgattribute <table>, “read only”
- No INSERTs, UPDATEs, or DELETEs
- No ALTER TABLE… DROP or MODIFY column
  - ADD column is OK

sp_checksource

- ASE 11.5 (!)
- Many scenarios where there are issues due to missing source text
  - Upgrades, XPDL, dbcc upgrade_object
- exec sp_checksource [<object> [, <table> [, <user>]]]
- Can run per compiled object, per table, per user, or for whole database
- Run this ASAP
  - Drop & recreate all objects with missing source code
  - … you do have source code to recreate them, right???

Statement cache (1 of 2)

- TF 11032
  - ASE 16.0 SP04 PL04
  - Better hashing distribution of statements in statement cache
- sp_configure “max cache stmt size”
  - ASE 16.0 SP04 PL02 / SP03 PL12
  - Default 16K, many issues found
  - ASE 16.0 SP04 PL04 raises default to 64K
    - Recommended to raise to 64K in every version parameter exists

Statement cache (2 of 2)

- sp_configure “temp table statement caching”
  - ASE 16.0 SP04 PL01 / SP03 PL10
  - Replaces TF 467
  - Default behaviour now to cache statements with #temp_tables
  - Set to 0 to disable
    - Recommended in every version it exists
    - TF 467 recommended in all earlier versions

Optimizer criteria / optgoals (1 of 3)

- SET_OR_CURSOR
  - ASE 16.0 SP04 PL04
  - Allows OR optimization strategies in cursors
  - Disabled by default
    - Not set in fastfirstrow, allrows_oltp, allrows_mixed, allrows_dss

Optimizer criteria / optgoals (2 of 3)

- optlike_tc
  - ASE 16.0 SP04 PL02
  - Allows transitive closure for LIKE clauses

```
WHERE a.col LIKE "abc%"
AND   a.col = b.col
```

  - Enabled only in allrows_oltp

Optimizer criteria / optgoals (3 of 3)

- index_intersection
  - ASE 15.7 GA
  - Allows more than one index to be used per table in a query
  - Usually an improvement but test carefully
    - Greatly increases possible query plans to search for best
    - Optimization timeouts will apply
  - Enabled only in allrows_dss

User-defined optimization goals (1 of 4)

- Some optimization criteria are not included in any opt goal
- They can only be set with the **`set`** command
  - **`set`** command only affects the current connection
    - Many set inside login trigger will automatically last all session
    - **`set export_options on`** in any proc or login trigger
- Many optimizer settings cannot be set server-wide
- This is a missed opportunity

User-defined optimization goals (2 of 4)

```
set plan optlevel ase_current
set plan optgoal allrows_mix
set SET_OR_CURSOR 1
set optlike_tc 1
set index_intersection 1
go

exec sp_optgoal "ase_tuned", "save"
go

exec sp_configure "optimization goal", 1, "ase_tuned"
go
```

User-defined optimization goals (3 of 4)

- select @@optgoal
- sp_optgoal “<goal>”, “show”
- sp_optgoaldiff “<goal 1>”, “<goal 2>”
- List of optimization criteria not fully documented (???)
  - sp_options “show”
  - sp_options “show”, NULL, non_dflt
  - sp_configure “nondefault”

User-defined optimization goals (4 of 4)

- Many opt criteria are for specific CRs
- Best practice: don't play with these without talking to SAP Support
  - Defaults are probably sensible most of the time
- Possible exceptions: disabled by default, enable and test carefully
  - optlike_tc: already mentioned, transitive closure for LIKE
  - ins_by_bulk: bulk insert mode for INSERTs
  - unptn_pllscan: allow parallel queries on unpartitioned tables
  - cr782580: fix for parallel query plans with negative costs

What's going away?

- ASE compatibility mode deprecated as of ASE 16.0 SP04 GA
- SNAP deprecated as of ASE 16.0 SP04 PL02
- ASE HA premium option deprecated as of ASE 16.0 SP04 PL02
- "This is your notice that it can now be removed without further notice"
- Solaris SPARC and HP-UX retired as of ASE 16.1 GA (!)
  - KBA 3307676; very few details available at this time
  - 16.1 will only be released on RHEL x86_64, Windows x64, and AIX
  - ASE, SRS, SDK, Open Server

What's going away?

- Bonus non-Sybase content
- MS Windows Wordpad deprecated as of 01 September, 2023

https://learn.microsoft.com/en-us/windows/whats-new/deprecated-features

SRS: do we need unique indexes? (1 of 4)

- I still see confusion on this point today
- SAP documentation historically was not clear
- We don't *need* a unique index on every table… if extra steps are taken
- … but we really *really* want one, and it's a bad idea not to

SRS: do we need unique indexes? (2 of 4)

- To fully understand this, remember that SRS does not copy data
- SRS reapplies transactions, usually transformed
- Best way to guarantee transactions work the same way: primary key
  - Any unique index is also acceptable, but if several, which one?
    - Index specified with sp_setreppk (SRS 16.0 SP03 PL03)
    - Whichever unique index (not PK) was created first
    - The index underlying a PK table constraint
    - Unique index with the lowest *indid*

SRS: do we need unique indexes? (3 of 4)

- If there is no unique index of any kind, we must use dsi_top1_enable
  - This is a dsi connection (per *database*, not per table)
- Literally applies the update, delete, or insert… select to first row
  - … but which is the first row?
- ANSI standard for SQL: without an ORDER BY there is no row order
- SQL Server 11.0 and below: a bug where clustered index order was used
- This has not been reliable since ASE 11.5!
- Therefore replicated transactions may differ from source!!

SRS: do we need unique indexes? (4 of 4)

- Only way to guarantee replicated transactions are same as source:
  - Have at least one unique index on every replicated table
  - First question to ask any app vendor if you want to replicate
  - SRS will only ever use one for all its replication of a table
  - Identify the best one and use sp_setreppk (SRS 16.0 SP03 PL03)

SRS: inbound queue vs. outbound queue (1 of 2)

- In a busy SRS there can be tension between IBQ and OBQ
  - Compete for disk space in partitions
    - Earlier versions of SRS: IBQ can eat all partition space
    - SRS 16.0 SP03: ibq_part_proportion
    - Set server-wide; cannot be set per queue
    - Default = 70 = (all) IBQs limited to 70% of total queue space
      - Minimum 1%, maximum 100% (bad idea)
      - Default may be too high… OBQ tends to be slower than IBQ

SRS: inbound queue vs. outbound queue (2 of 2)

- In a busy SRS there can be tension between IBQ and OBQ
  - Compete for memory space in SQM caches
    - Not the same as SQT cache; SQM cache disabled by default
    - Enable with sqm_cache_enable per queue or server-wide
    - Then set sqm_cache_size and sqm_reader_first
    - sqm_reader_first = no writes to cache until reads are caught up
    - Recommendation: set sqm_reader_first for OBQ

SRS: create repdefs in parallel

- Default behaviour: create repdefs only in serial
- SRS 15.7.1 SP300 (?): create_repdef_without_lock
  - Off (default) = create in serial
    - Needed for multiple repdefs on the same table
  - On = create in parallel
    - On different tables only
- Server-level, set with configure replication server

General comment re. releases & patching

- SAP now release the main Sybase products in sync
- Versions will always match for ASE, SRS, SDK, and Open Server
  - No longer separate release schedules; ASE drives all releases
  - Suggestions that IQ will be brought in line later
- This implies that versions should be kept together at your site
- Patching is now a coordinated release of ASE, SRS, SDK, and OSR
  - Not essential but good practice to keep versions in sync
  - Don't forget app and user clients

Product futures

- First, some disclaimers to keep SAP happy
  - I don't work for SAP
  - These are not commitments or promises
  - These are not even predictions
  - These are what at time of writing is public information
  - Everything is subject to change
- 16.0 SP04 PL05 *probably* due any day now (Q3 2023)
- 16.1 *probably* due Q4 2023 (… pushed out once so far)

ASE 16.0 SP03 PL15 & SP04 PL05

- (A partial list per my selection criteria)
- CR548251: if XPDL is going to error, error sooner
- CR823218: bugfix for update stats with hashing on 150k+ unique datetimes (see KBA 2147566)
- CR827929: bugfix for @@dbts large increase during load tran of replicated database (see KBA 3326882)
- SP04 PL05 only: CR697345: progress reports during dbcc checkdb
- SP04 PL05 only: several “in rare circumstances [...] incorrect result set”

ASE 16.1 (1 of 3)

- Security features
  - New SSL certificate types: mTLS, X.509
  - New cipher for secure connections: ECDHE
  - Encrypted backups whether or not database is encrypted
- Developer features
  - Access to jConnect connection properties
  - Sybmon access to monitor counters

ASE 16.1 (2 of 3)

- Performance features
  - CSMD size reduced
    - In current versions these compress very well; recommended
    - Unclear if still needed in ASE 16.1; test it & see
  - DBCC performance improvements (+ better condition detection)
  - Granular permissions will consume fewer resources
  - Triggers will consume fewer resources

ASE 16.1 (3 of 3)

- DBA features
  - AMC support for HADR (GUI for creation & management)
  - Backup directly to cloud object store (e.g. AWS S3)
  - LOAD DATABASE to different page size (!)
    - Strictly only from smaller to larger
    - At this time still only one page size per ASE
    - LOAD TRAN? Upgrade? XPDL? No details yet

SRS 16.1 (1 of 2)

- Security features
  - LDAP support for SRS users
  - Kerberos support for HADR, including RMA Kerberos server
  - Replace SSL certificates without outage in HADR
- Performance features
  - Direct load materialization self-healing resume
  - Direct load materialization into SAP IQ

SRS 16.1 (2 of 2)

- DBA features
  - Sanity check of HADR setup & configuration
  - Drop connection cascade drop subscriptions from that DSI
  - Change RMA hostnames & IPs without HADR outage
  - HADR certified for third-node DR + external replication (in or out)

SDK 16.1 and beyond

- Support for PHP 7.4 and 8.0
- (2025) ASE connection pooling for Perl and Python
  - Will allow sharing/reuse of objects

References

- What's New SAP ASE 16.0 SP04 PL04, no registration required, https://help.sap.com/docs/SAP_ASE/791c41982ee345a19c4ec4b774222c4f/5302bd838d444e2ab67b470508988383.html?locale=en-US
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- Best practices for shutdown – SAP ASE, requires support login, https://me.sap.com/notes/2672861
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References

- ASE 16.0 SP03 PL14 List of Fixes for EBF 30733 (Linux x86_86), available as part of the patch download
- ASE 16.0 SP04 PL04 List of Fixes for EBF 30650 (Linux x86_86), available as part of the patch download
- Targeted ASE 16.x Release Schedule and CR List Information, no registration required, https://wiki.scn.sap.com/wiki/display/SYBASE/Targeted+ASE+16.x+Release+Schedule+and+CR+list+Information

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- Targeted CR List for ASE 16.0 SP03 PL15, requires support login, https://me.sap.com/notes/3347323
- Targeted CR List for ASE 16.0 SP04 PL05, requires support login, https://me.sap.com/notes/3347322
- ASE Roadmap, requires support login, access via https://me.sap.com/notes/2488687
- SRS Roadmap, requires support login, access via https://me.sap.com/notes/2855483

Q & A, and thank you

https://github.com/Prima-Donna-Consulting/presentations

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Too busy putting out fires to reduce your toil?
Answering the on-call phone too often?
Drowning in technical debt?
Hardware refresh cycle coming? Would you look good if you can delay it by one year?

Not a lawyer – no charge for emails!