

# ASE Tips & Tricks

Joe Woodhouse  
02 December 2020

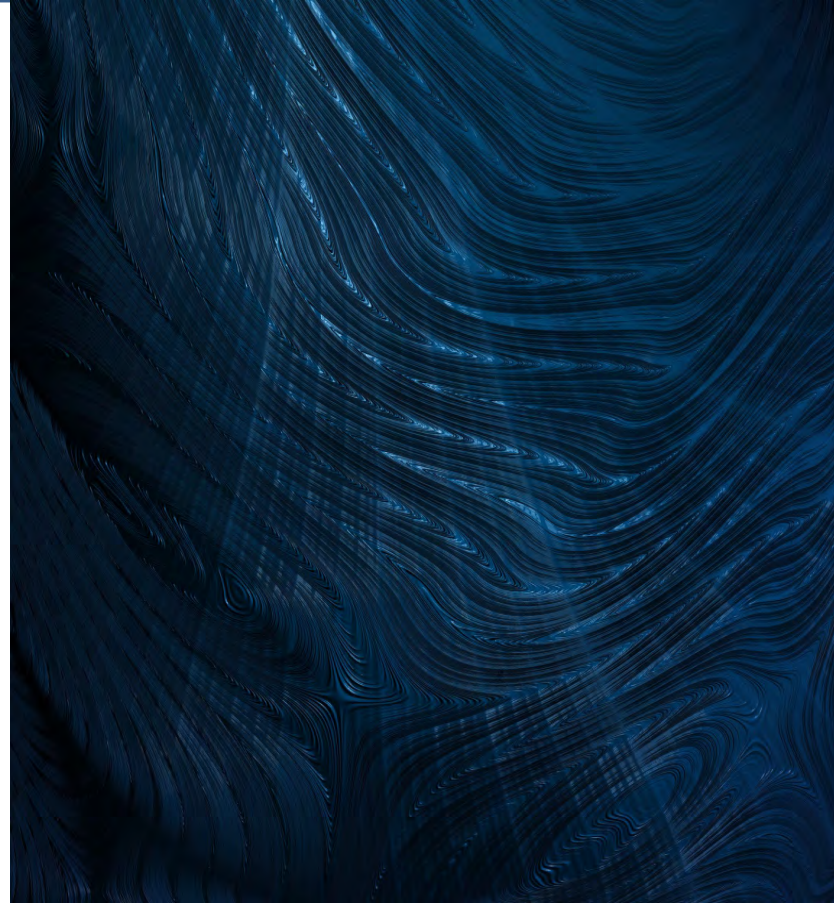


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- Commands & functions
- Stored procedures





# About this presentation

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- The legendary Rob Verschoor wrote and delivered many versions
  - They were always the most popular session in any conference
- Rob started as an freelancer and then joined SAP after the acquisition
- He recently left SAP after a long stay
  - A great loss
- I couldn't bear the idea of no more "ASE Tips & Tricks"
  - "I am standing on the shoulders of giants"

# About the author

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- Sybase Australia 1996 – 2003
- Freelance consultant via Prima Donna Consulting for 17+ years
- Works exclusively with ASE, IQ, and Replication Server for 24+ years
- 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!

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

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- Research
  - What's New SAP ASE 16.0 SP03 (16.0 GA – 16.0 SP03 PL09)
  - What's New SAP ASE 15.7 (15.7 ESD#1 – 15.7 SP141)
  - Bug list for EBF 29247 (15.0 GA – 16.0 SP03 PL09 HF2)
  - Various websites for ASE trace flags, dbcc, etc.
- A tip or trick then had to meet at least two of the following criteria:
  - I thought it was important
  - I thought it was interesting
  - I thought it probably wasn't well known

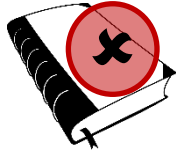
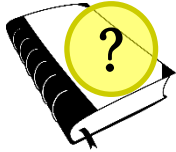
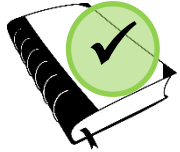
# Which tips & tricks, and why? (2 of 2)

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- Notable absence: ASE trace flags
  - One or two exceptions when directly relevant to another feature
- Two reasons for leaving out ASE trace flags
  - They are dangerous
    - » Usually not officially documented or supported
    - » Can change their meaning between ASE versions
  - We will not finish in time
    - » There were 23 that met the criteria on the previous slide
    - » We would probably need most of another hour just for that
    - » We'll do trace flags another day

# Icons used in this presentation

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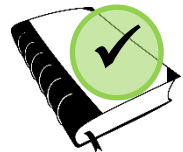
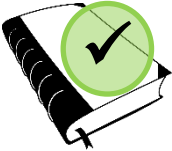
- Is it documented?
  - If no reference given then it's from one of the "What's New" manuals
  - Otherwise I give KBAs or CRs where possible



- Is it supported?
  - I have assumed if it appears in a manual, a KBA from SAP Support, or a file that's part of a software distribution, it is supported
  - Test everything!!

# sp\_configure parameters (1 of 7)

- "enable plan sharing"
  - ASE 15.7 ESD#2
  - Allows query plans in procedure cache to be shared between users
  - Idea is that this will reduce procedure cache needs and turnover, and improve performance
  - Many limitations on when it can be done
    - » Will silently fall back to normal behaviour if needed
- See also "abstract plan sharing" (ASE 15.7 SP60)
  - Does the same thing for abstract query plans
  - Also fully documented and supported





# sp\_configure parameters (2 of 7)

- "enable concurrent dump tran"
  - ASE 15.7 ESD#2
  - Allows (one) dump tran to run on database while dump database runs
  - Why? Long running dump database prevents dump tran running
    - » Prevents both automatic and manual dump tran commands
    - » Transaction logs could fill if using incremental backups
  - Subsequent dumps of any sort will wait and serialise



# sp\_configure parameters (3 of 7)

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- "abstract plan dynamic replace"
  - ASE 16.0 SP02 PL04
  - AQPs can be set in the SQL text, and saved in sysqueryplans
  - Normally anything in the SQL text takes precedence
  - With this parameter set, that precedence is reversed
    - » AQP hints in SQL text are ignored, and AQP in sysqueryplans is used instead



# sp\_configure parameters (4 of 7)

- "lock shared memory"
  - Has been around a long time
  - Has never worked on RHEL... until now
  - ASE 16.0 SP03
  - Incompatible with RHEL Huge Pages (... so maybe shouldn't be used?)
  - Very complicated, see Configuration Guide for UNIX
    - » Requires multiple commands run by root or with sudo
    - » Alters the dataserver binary
  - Test it and time it!!
    - » Probably most useful in a shared environment



# sp\_configure parameters (5 of 7)

- "enable buffered io for load"
  - ASE 16.0 SP03
  - Normally all loads (database | tran) follow ASE's lead in terms of dsync and directio
  - With this setting, Backup Server will ignore ASE settings for dsync and directio
    - » In theory this will be faster if your OS has enough buffer cache memory
  - All buffered i/os will be flushed as load completes, so writes are safe
  - This is the reverse of Backup Server trace flag -D512 (next page)



# sp\_configure parameters (6 of 7)

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- Backup Server boot time trace flag -D512
  - Does the reverse of "enable buffered io for load" (last page)
  - Forces Backup Server to use directio for dumps and loads regardless of ASE device settings
  - Used for both dumps and loads
  - Not available for compressed databases
  - This is not well documented and unclear if it is supported





# sp\_configure parameters (7 of 7)

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- "max number of IN elements"
  - ASE 16.0 SP03 PL07
  - Any SQL statements with more than this number of IN elements fails
  - Beware!
    - » Only applies to all new compilations from this point on
    - » Anything already in procedure cache or statement cache is not checked and may violate this setting



# Commands & functions (1 of 25)

- goto
  - At least as far back as SQL Server 10.0
  - Regarded as heresy by many, but can produce cleaner & faster code
    - » Remember ASE does not do lazy evaluation, so all test expressions are evaluated
    - » Skipping expensive tests can be a performance gain
  - Usage
    - label:
    - [...]
    - goto label



# Commands & functions (2 of 25)

- readpast
  - ASE 11.9.2
  - Seems to be generally known for SELECT
  - Seldom known for DELETE, UPDATE, readtext, writetext
  - Silently skips past all locked rows in underlying data
    - » Will never be blocked by anyone – perfect for picking up jobs from queues
    - » Will still block others in the normal way



# Commands & functions (3 of 25)

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- `asehostname()`
  - ASE 15.0.2
  - Returns the hostname ASE is running in
  - If in a VM, it is the VM's hostname



# Commands & functions (4 of 25)

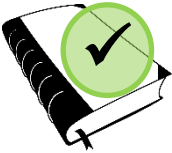
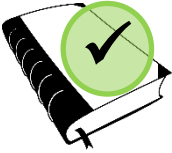
- `set switch`
  - ASE 15.0.2
  - Little known fact: `dbcc traceon()` sets the trace flag for all sessions
  - *set switch* by default sets only for the current session
    - » Can still set server wide as does `dbcc traceon()`
  - Every run-time trace flag can be set using *set switch* instead
  - Boot-time trace flags still need to be on the dataserver command line
    - » Usually that's in a `RUN_SERVER` file
    - » On Windows platforms it is a registry parameter





# Commands & functions (5 of 25)

- `password_random()`
  - ASE 15.0.3
  - Generates a random password
  - It will comply with all currently configured password complexity rules
  - Enhanced in ASE 15.7 SP140 to specify a substring that must not be included
    - » This is also documented and supported



# Commands & functions (6 of 25)

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- `is_singleusermode()`
  - ASE 15.0.3 ESD#3
  - Does what it says on the tin



# Commands & functions (7 of 25)

- transfer table
  - ASE 15.5
  - Intended for use with IMDB but does not require IMDB or any license
  - Is effectively an incremental bcp out
    - » To file, like bcp out
    - » Or to another table
    - » In same ASE, but could be different database or a proxy table
  - Must first set *alter table [...] set transfer table on*
  - First run with copy out all rows
  - All subsequent runs copy out only rows changed since last run



# Commands & functions (8 of 25)

- merge table
  - ASE 15.7
  - Inserts new row if PK not found, updates existing row if PK found
  - Did not fire triggers at all until ASE 15.7 ESD #1
  - Did not fire triggers reliably until ASE 15.7 SP50
  - Enhanced in ASE 15.7 SP130 to include optimisations for
    - » bulk inserts
    - » parallel index updates



# Commands & functions (9 of 25)

- alter table drop column [...] with no datacopy
  - ASE 15.7 ESD#2
  - Dropped column is logically deleted
  - Physical deletion waits until next reorg rebuild
    - » Therefore database space is not reclaimed until reorg rebuild
  - Much faster, and no requirement for free space equal to table size





# Commands & functions (10 of 25)

- load database [...] with listonly = create\_sql
  - ASE 15.7 ESD#2
  - Inspects a database dump and generates all SQL needed for disk init, create database, alter database, and sp\_cacheconfig
  - Dump history must be enabled before database is dumped
    - » sp\_configure "enable dump history", 1
  - Enhanced in ASE 15.7 SP121 to include ASE device mirrors



# Commands & functions (11 of 25)

- load database [...] with listonly = load\_sql
  - ASE 15.7 ESD#2
  - Inspects a database dump and generates all SQL needed for correct sequence of load database and load tran statements
  - Can specify a point in time recovery
  - Dump history must be enabled before database is dumped
    - » sp\_configure "enable dump history", 1



# Commands & functions (12 of 25)

- fast logged bcp in
  - ASE 15.7 ESD#2
  - Allows bcp in to be both fast and logged
  - Only way for fast bcp in to be replicated
  - Database must have "select into" option enabled via sp\_dboption
  - bcp command line must include `--initstring 'set logbulkcopy on'`



# Commands & functions (13 of 25)

- spaceusage()
  - ASE 15.7 ESD#3
  - `select spaceusage(<db_id> [, <object_id> [, <index_id> [, <partition_id> ] ] ] ]`
  - Functionally equivalent to `sp_spaceused` but can be used in expressions



# Commands & functions (14 of 25)

- kill <spid> with statusonly
  - ASE 15.7 ESD#4
  - Prints estimates for % completed and time remaining
  - Will never kill a spid that hasn't already been killed
  - Always safe to run
  - Remember it is always faster to let an actually running kill complete than to restart ASE
    - » Slow-running is not the same as frozen





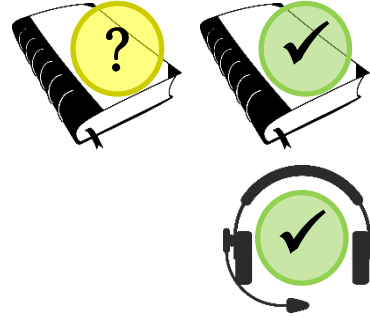
# Commands & functions (15 of 25)

- set sqlnull on
  - ASE 15.7 SP110
  - Forces ANSI behaviour for string concatenation with NULLs
  - For current session only
  - ASE default behaviour:     `"str" + NULL = "str"`
  - ANSI standard behaviour:   `"str" + NULL = NULL`



# Commands & functions (16 of 25)

- ASE page signing
  - ASE 15.7 SP130
  - Each data page is signed with a checksum
  - Detects changes since last write; protects against corruptions
  - Some overhead to sign each page the first time; none thereafter
  - Implement in one of three ways:
    - » `sp_dboption <database>, "allow page signing", "true"` (undocumented)
    - » `select sign_pages("<database>", "sign")` (documented)
    - » Boot-time trace flag -T12339 (every page in ASE) (documented)
      - Expect this to take some time when first enabled!



# Commands & functions (17 of 25)

- `select row_count(..., "noblock")`
  - ASE 15.7 SP130
  - Reads row count from memory structures, not from disk
    - » Fast
    - » Cannot block or be blocked
  - Closely related: `set non_blocking_builtins` on
    - » Does the same thing for `row_count`
    - » Also includes "other functions"
      - Which? Undocumented!



# Commands & functions (18 of 25)

---

- create or replace
  - ASE 16.0 GA
  - Avoids "if exists (...) drop ..."
  - Preserves all existing security and audit settings
  - Warning! Wait until ASE 16.0 SP02 PL07+ or ASE 16.0 SP03 PL04+
    - » CR 811339, old version may continue to be used after create or replace



# Commands & functions (19 of 25)

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- @@triggername
  - ASE 16.0 GA
  - If current context is executing a trigger, this has the trigger's name



# Commands & functions (20 of 25)

- dynamic histograms
  - ASE 16.0 SP01
  - Specify one or more columns in a table to automatically adjust histogram weights in
  - Intended for always-increasing values like IDs, dates, etc.
    - » All other histogram cell weights will slightly reduce as the last cell weight increases
  - Benefit is that no SARG will ever be out of range
    - » More accurate estimates = better query plans
  - Uses the update statistics command; see manuals



# Commands & functions (21 of 25)

- table as datatype
  - ASE 16.0 SP02
  - Allows tables as @variables
  - Allows user-defined functions that return a table
    - » Cannot pass a table variable into a table UDF
  - Extended in ASE 16.0 SP03 to allow tables as procedure @parameters
    - » Must first declare a user-defined datatype for the table
    - » Cannot enumerate table datatype in procedure header itself



# Commands & functions (22 of 25)

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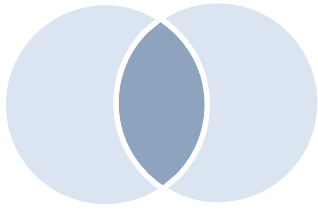
- `select ... limit | offset`
  - ASE 16.0 SP03
  - `limit`: limit the # of rows returned in result set
  - `offset`: skip initial # of rows
  - Can be combined in a single statement



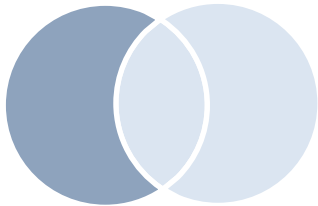


# Commands & functions (23 of 25)

- `select ... intersect | except`
  - ASE 16.0 SP03
  - `intersect`: return rows that are common to two (or more) result sets



- `except`: return rows in first result set that are not in the second



# Commands & functions (24 of 25)

- Global temporary tables
  - ASE 16.0 SP03
  - *Not* the same as shareable/public temp tables
  - Global temp tables are shared between spids
    - » Each spid can only see its own rows
    - » Those rows are automatically deleted when the spid disconnects
    - » The table is dropped when the last spid using it disconnects
  - CR 821261: Global temp tables don't work in IMDB
  - CR 815772: Problems with views that reference global temp tables
  - Both CRs scheduled for fix in ASE 16.0 SP03 PL10 or ASE 16.0 SP04



# Commands & functions (25 of 25)

- drop index ... with nowait
  - ASE 16.0 SP03 PL04
  - Drop index returns almost instantly
  - Most of the work of drop index done asynchronously in the background
    - » Background work does not block DML or DDL
  - This obsoletes trace flag 3710
    - » Which was introduced in ASE 12.5.4 ESD#10 and ASE 15.0.2 ESD#4
    - » TF 3710 improved drop index by releasing locks on system tables sooner



# Stored procedures (1 of 12)

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- `sp_autoformat`
  - Around since at least SQL Server 11.0
  - Removes all trailing spaces and reformats columns of result set to fit
  - Can rename columns
  - Can send result set to #temp table then run `sp_autoformat` against #temp table
  - Was not documented in many early versions but now is



# Stored procedures (2 of 12)

- `sp_helpconfig ... "estimate ..."`
  - ASE 15.7 ESD#3
  - Gives helpful suggestions when one `sp_configure` parameter depends on others
  - Can explicitly supply values to assist with estimating correct values, e.g.

`sp_helpconfig "compression info pool", "estimate using maxconcurrency=0.5"`

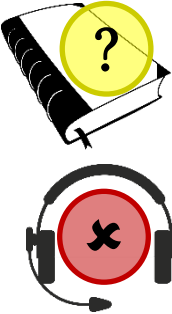
(here 0.5 means "50% of max users will be concurrently logged in")



# Stored procedures (3 of 12)

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- `sp_ddlgen`
  - ASE 15.7 SP131
  - Generates create/alter DDL for one or more databases
    - » Only for databases, no other types of objects
  - Partially documented, unclear if supported



# Stored procedures (4 of 12)

---

- `sp_confighistory`
  - ASE 16.0 GA
  - What configurable parameters were changed, when, by whom, and from what to what
  - Creates a view `sybsecurity..ch_events`



# Stored procedures (5 of 12)

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- `sp_logging_rate`
  - ASE 16.0 GA
  - Calculate log growth over a specified interval





# Stored procedures (6 of 12)

- `sp_add_resource_limit`
  - Enhanced in ASE 16.0 SP02
    - » "lock\_count"
    - » Limits number of locks used by any one spid
  - Enhanced again in ASE 16.0 SP03
    - » "idle\_time"
    - » Take action after this much idle time
  - Both work as do all other resource limits
    - » Specify the scope to measure the limit in (connection, transaction, batch, statement)
    - » Specify the action to take



# Stored procedures (7 of 12)

- `sp_w`, `sp_sp`, `sp_p`
  - ASE 16.0 SP03 PL03
  - Simplified versions of existing stored procedures
  - `sp_w` = simplified `sp_who`
  - `sp_sp` = simplified `sp_showplan`, concise form
  - `sp_p` = simplified `sp_showplan`, longer form



# Stored procedures (8 of 12)

- `sp_altermessage`
  - Enhanced in ASE 16.0 SP03 PL04
  - Can now specify error messages to always be sent to ASE errorlog
    - » Even if normally sent only to client
  - Can also specify severity level and send all errors of that severity or higher
    - » Be careful
    - » Can easily spam your errorlog



# Stored procedures (9 of 12)

---

- `sp_dropdevice ... dropfile`
  - ASE 16.0 SP02 PL04
  - Drop underlying OS file at same time as dropping ASE device
  - Obviously only for file devices, not raw partitions



# Stored procedures (10 of 12)

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- `sp_shrink`
  - ASE 16.0 SP03 PL06
  - Can shrink databases (but so can alter database)
  - Can shrink devices
    - » Only for data devices
    - » Only on databases with data and log separated (at device level)



# Stored procedures (11 of 12)

- `sp_chgattribute ... disable_index`
  - ASE 16.0 SP03 PL09
  - Disables nonclustered index from being chosen by the optimiser
    - » This includes via `forceindex`
  - Index will only be used if appears in an AQP
  - Speculation: intended for COTS apps that create indexes they shouldn't



# Stored procedures (12 of 12)

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- `sp_optgoaldiff`
  - ASE 16.0 SP03 PL09
  - Shows the differences between any two optgoals
  - Includes user-defined custom optgoals





# Q&A, and thank you

Joe Woodhouse

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Joe is a freelance consultant available through Prima Donna Consulting, and can be engaged full-time, part-time, or through a split delivery over time. Minimum engagement of only one day; no premium for after hours, weekends, or public holidays.

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