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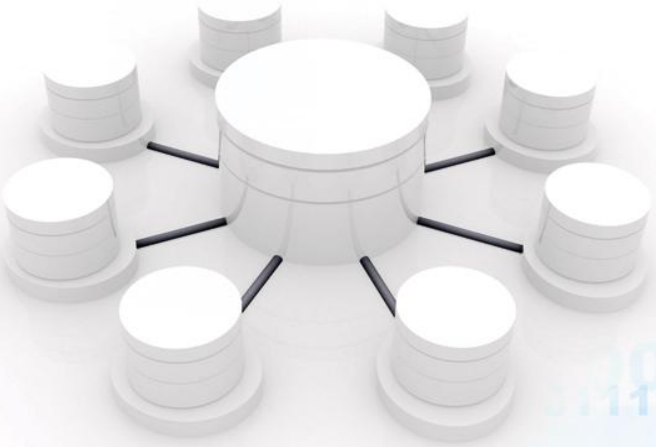

SurveillanceDB™

Enterprise Monitoring & Event Management

Under the Hood of ASE’s Query Optimizer

ASE 15.7 New Performance Features

Presenter: Karl Tharalson
ISUG` Presentation
July 25, 2012

SOFTWARE
500
2010
28th Annual Revenue-Based Ranking
of the
World's Largest Software and Services Companies

About Bradmark

- Independent, global software company founded in 1981
- 30 years of data management expertise
- Large install base includes:
  - More than 10,000 Licenses Worldwide
  - **Surveillance DB**: Flagship database monitoring tool
- U.S. Based Development Team (Houston, TX)
- Strategic Sybase Alliance Partner
- ISUG Platinum Partner

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Agenda

- Recent ASE History
- New Performance Features
  - Optimizer Diagnostic Utility
  - Dynamic SQL Shared Across Connections
  - Abstract Plans in Cached Statements
  - New Adaptive Server Kernel
  - Compressing Data in Adaptive Server

Evolution of Sybase ASE

- 1998 ASE 11.9.2
  - Row locking
  - Distributed joins
- 1999 ASE 12.0
  - High Availability
  - Distributed Transactions

Evolution of Sybase ASE

- 2001 ASE 12.5
  - Dynamic Memory Allocation
  - Mon Tables
- 2005 ASE 15.0
  - New query processor
  - Table partitions
- 2012 ASE 15.7
  - Focus on SAP Integration

What's next

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Optimizer Diagnostic Utility

- Stored procedure named `sp_opt_querystats`
- Showplan and more
- Syntax: sp_opt_querystats “<sql>”, “<option>”
- Interesting values for <option> are:
  - Showplan, resource
- Other options in Adaptive Server Enterprise 15.7 > Reference Manual: Procedures > System Procedures

Optimizer Diagnostic Utility

- Pre-Requisites
  - Job Scheduler
  - sp_opt_querystats
    - js_user_role
    - Non-null password
    - Loopback server external login
  - “Maximum job output” to 1,000,000

Optimizer Diagnostic Utility - Example

```
sp_opt_querystats "select * from master..monSysPlanText", "showplan"
job_output
[ BEGIN QUERY ANALYSIS ]
QUERY PLAN FOR STATEMENT 1 (at line 1).

    STEP 1
        The type of query is SET OPTION ON.

QUERY PLAN FOR STATEMENT 2 (at line 1).
Optimized using Parallel Mode

    STEP 1
        The type of query is SELECT.

        1 operator
```

Optimizer Diagnostic Utility - Example

```
sp_opt_querystats "select * from master..monSysPlanText", “resource"

job_output
[ BEGIN QUERY ANALYSIS ]Statement:
    1 Compile time resource usage: (est worker processes=0 proccache=0),
    Execution time resource usage: (worker processes=0 auxsdesc=0 plansize=2 proccache=2 proccache
                                        hwm=2 tempdb hwm=0)
[ END QUERY ANALYSIS ]
```

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Shared Dynamic SQL

- LWP’s (lightweight procedures) shared

  < 15.7 stored in the *dynamic sql* cache

  >= 15.7 stored in the **statement** cache

- Sharing of the same LWP across connections reduces the number of times SQL is compiled into a LWP.

Shared Dynamic SQL

- Pre-requisites
  - Enable this feature by setting one of these configuration parameters to 1:
    - `sp_configure “streamlined dynamic SQL”, 1`
    - `sp_configure “enable functionality group”, 1`
- NOTE: Both are dynamic, no restart

Shared Dynamic SQL

- Statements not cached
  - Select into
  - Insert-values with all literals and no parameters
  - Queries that do not reference tables
    - sp_configure …
  - Individual prepared statements that contain multiple SQL statements
  - Statements that cause instead-of triggers* to fire

* Also new in 15.7

Shared Dynamic SQL

- Risks
  - According to Sybase: “Reusing dynamic SQL LWPs may have a negative impact on performance because the reused plan is generated with the original set of supplied parameter values.“ (*Chapter 5: Memory Use and Performance in* Adaptive Server Enterprise 15.7 > Performance and Tuning Series: Basics > Memory Use and Performance > Procedure cache > Reducing query processing latency)

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Abstract Plans in Cached Statements

- Abstract Plan

A manually generated execution plan that overrides the plan generated automatically by the query processor.

- Poorly performing SQL can now be tuned on-the-fly
  - When source code changes are not possible
  - Between formal releases
  - A packaged application

Abstract Plans in Cached Statements

- Statement and plan are stored in sysQueryplans
- Starting in 15.7, they both go into the statement cache

Abstract Plans in Cached Statements

- Cautions:
  - Changes good for today may not be for tomorrow
  - Monitor performance with database changes
  - Drop the abstract plan when feasible

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New Adaptive Server Kernel

- New architecture is based on threads
- Recommended by Sybase
- Starting in 15.7 this is the default
- Previous process based architecture is available
  - Set the “kernel mode” parameter to “process”
    - Sp_configure “kernel mode”, 0, “process”

New Adaptive Server Kernel

- The “engine” threads come from thread pools
- These are created and altered to hold a specified number of threads
- Monitor activity with the monThread view and adjust the number of threads as needed

New Adaptive Server Kernel

- monThread table
- Columns KTID and ThreadPoolName allow measurement by thread or thread pool
- IdleTicks, SleepTicks, BusyTicks and TotalTicks columns facilitate assessment of how busy threads and pools are.

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  - **Compressing Data in Adaptive Server**

Compressing Data in ASE

- This is a separately paid and licensed feature that does the following
  - Compresses and decompresses data automatically
  - Avoids compression if it is not efficient
- Which results in
  - Reduced storage usage
  - Reduced cache usage
  - Reduced IO demand

Compressing Data in ASE

- Tradeoffs
  - Extra processing done to compress or decompress
- It does have a few limitations
  - Compressed LOBS cannot be replicated
  - Restricted for in-memory databases

Compressing Data in ASE

- From Sybase
  - Generally, compression is restricted for in-memory databases. Loading and recovering compressed objects in disk-resident or relaxed-durability in-memory databases is permitted. However, Adaptive Server often restricts access to compressed objects in the target in-memory database. Adaptive Server provides minimal support for disabling compression in the target database or in tables defined for compression, so you may revert to using uncompressed data (Source: Limits for Database Compression in the Compression Users guide).

Summing Up

- Optimizer Diagnostic Utility
  - Show plan and then some
- Dynamic SQL Shared Across Connections
  - Reduce Memory and CPU usage
- Abstract Plans in Cached Statements
  - Improved use of Abstract Plans

Summing Up

- New Adaptive Server Kernel
  - Big performance improvements
- Compressing Data in Adaptive Server
  - Improved resource usage

Closing Thoughts

- There are some very useful new tools in 15.7
- There is always something new to learn about performance tuning.
- Let's keep the conversation going. E-Mail me at ktharalson@bradmark.com with any thoughts or questions about this presentation or ASE performance tuning in general.

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Thank You!

Q & A

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