PASS 2011 SUMMIT

Important Trace Flags That Every DBA Should Know

DBA-309

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Abstract

There are a number of important trace flags that should be implemented in most production environments, yet many DBAs think that trace flags should only be used for testing purposes (or to "show off" at conferences) and that they are not supported. Nothing could be further from the truth! Take trace flag 4199, for example (and yes, it's probably worth your while reading KB974006 to understand what trace flag 4199 does!).

In this session, Victor will present the important trace flags that all DBAs should know, what they do, when to implement them, and how best to implement them in a production environment.

Speaker

Victor Isakov is a Database Architect and trainer who provides consulting and training services to various organizations in the public, private, and NGO sectors globally.

He regularly speaks at international conferences such as Microsoft Tech·Ed, SQL Connections, PASS Summit, and SQL Code Camp.

He has authored a number of books on SQL Server and worked with Microsoft to develop the SQL Server exams and certification.

In 2007, Victor was invited by Microsoft to attend the "SQL Ranger" program in Redmond, WA.

Consequently, he was one of the first IT professionals to achieve both the *Microsoft Certified Master: SQL Server* and *Microsoft Certified Architect: SQL Server* certifications globally. (When it actually meant something! ☺)

Microsoft Certified Master

Microsoft CERTIFIED Master

Speaker

Julie Koesmarno is a Senior SQL Server Developer and a Development DBA.

She is an MCITP and has been working with SQL Server for nearly a decade.

She has worked on very large 24/7 online systems where over10 million records are processed in a day.

Agenda

- What is a Trace Flag
- Caveats
- Implementing Trace Flags
- PROD Trace Flags
- DEV / UAT Trace Flags

What is a Trace Flag

- A trace flag is a directive used to "set specific server characteristics or to switch off a particular behaviour"
- Startup
- Enabled at different scope:
  - Global
  - Session
- Documentation sources:
  - BOL
  - KB articles / Service Pack & Cumulative Update "readme"s
  - White papers
  - Blogs / user groups / "water cooler"

Caveat Emptor

- Make sure you understand what a trace flag does
  - Recommended to test in DEV / UAT environment first
- **Microsoft seems to be saying that trace flags are only supported if they are "documented"**
- "Documented":
  - BOL
  - KB articles
  - White papers
  - Service Pack and Cumulative Update "readme"s

"**WARNING:** These trace flags should be used under the guidance of Microsoft SQL Server support. They are used in this post for discussion purposes only and may not be supported in future versions."

Controlling Trace Flags

- DBCC TRACEON
  - Use -1 to turn on trace flag globally
- DBCC TRACEOFF
- DBCC TRACESTATUS

- -T startup flag

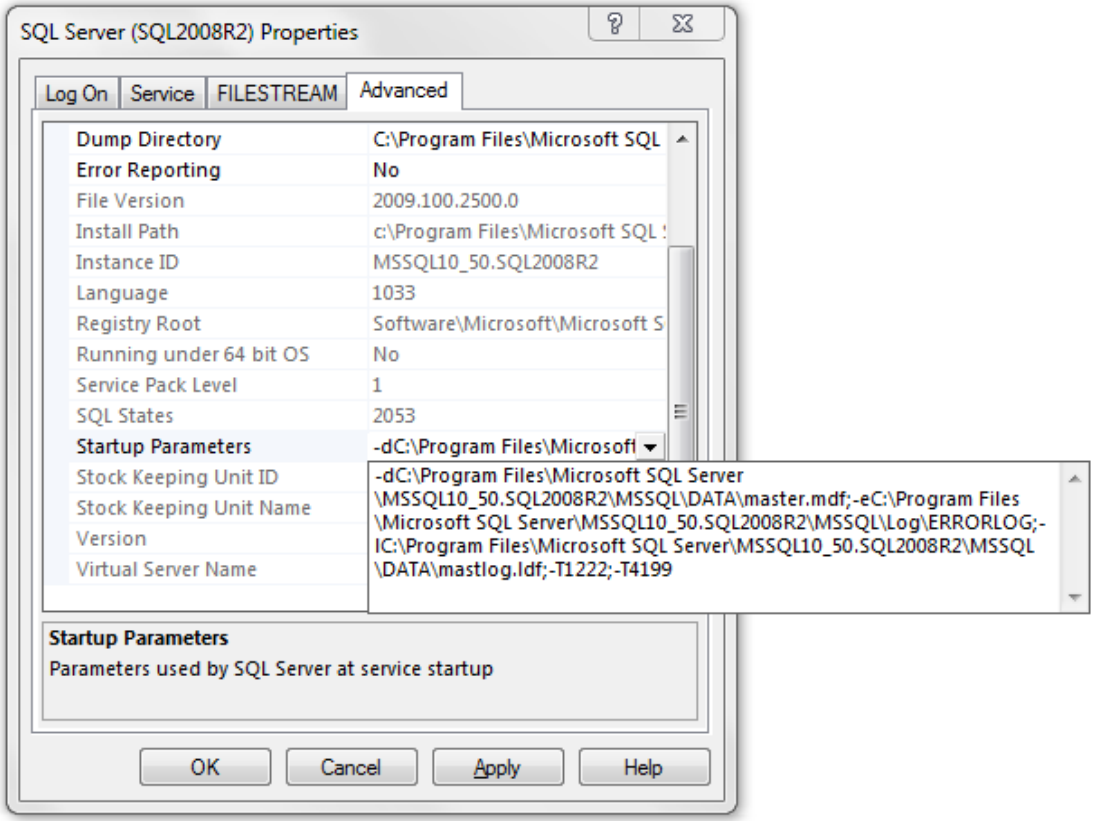
- Sometime trace flags seem to do "nothing"
  - DBCC TRACEON (3604)
    - Send output to console
  - DBCC TRACEON (3605)
    - Send output to ERRORLOG

Implementing Trace Flags

- Microsoft says that you should do it by modifying the registry
  - Use –T# separated by semi-colon (;)
  - http://msdn.microsoft.com/en-us/library/ms345416.aspx
- SQL Server Configuration Manager
- Registry Editor

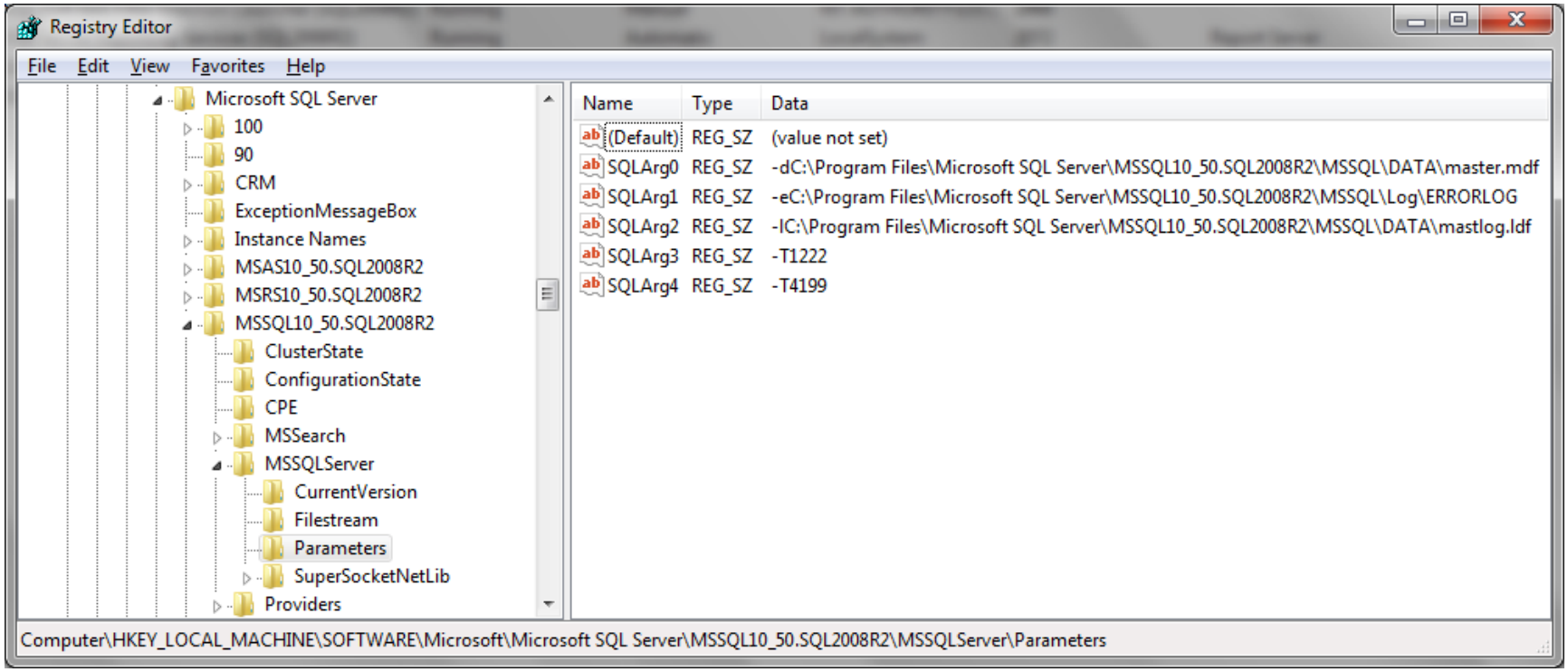
DEMO

Implementing Trace Flags: SQL Configuration Manager

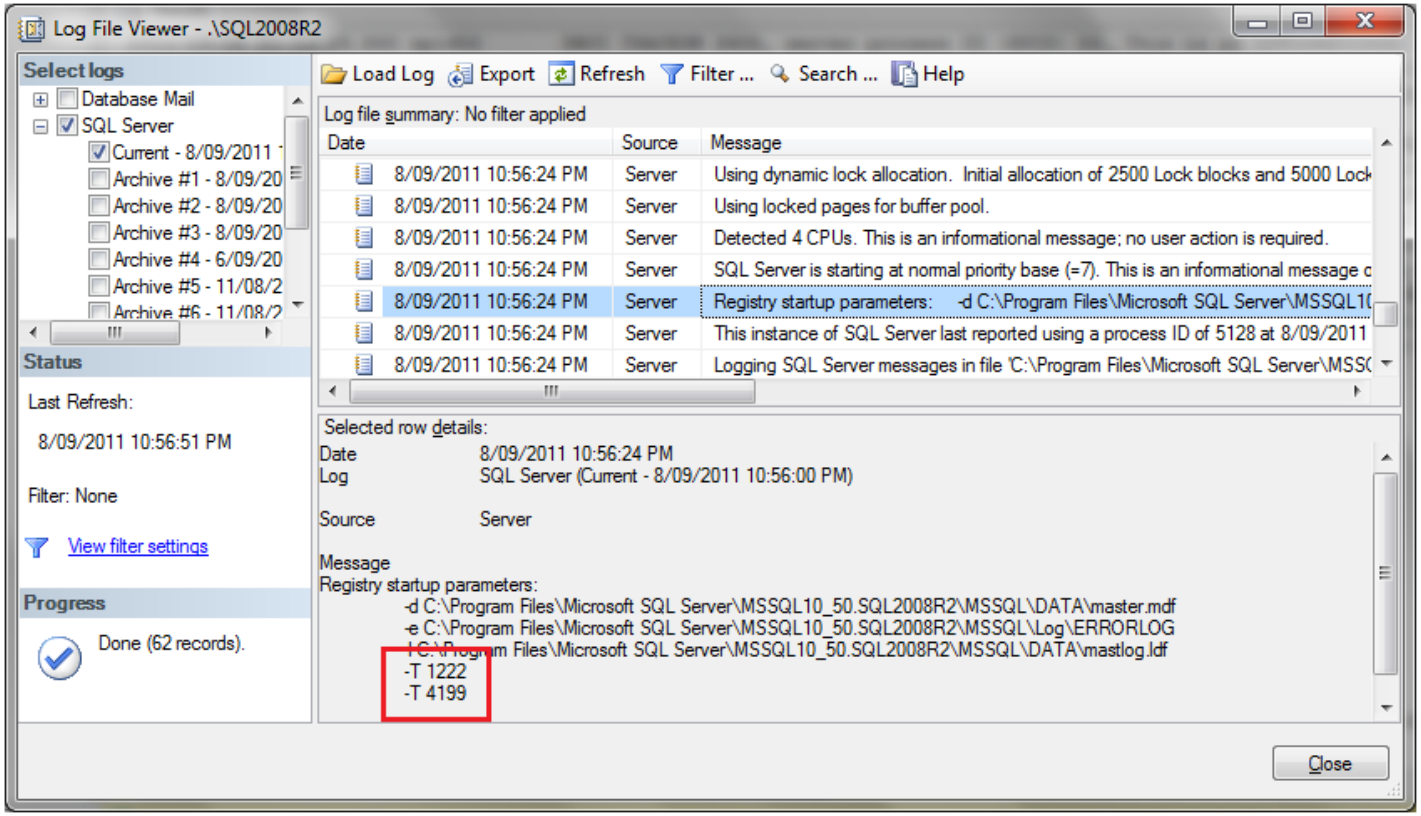


DEMO

Implementing Trace Flags: REGEDT32



Implementing Trace Flags: ERRORLOG



Implementing Trace Flags: Victor's Alternative

- Create a stored procedure in the MASTER database that enables various trace flags
- Mark the above stored procedure as to 'autostart'

```
sp_procoption  [ @ProcName = ] 'procedure' ,
               [ @OptionName = ] 'option' ,
               [ @OptionValue = ] 'value'
```

```
EXEC sp_procoption  'EnableTraceFlags',
                    'autostart',
                    'TRUE'
```

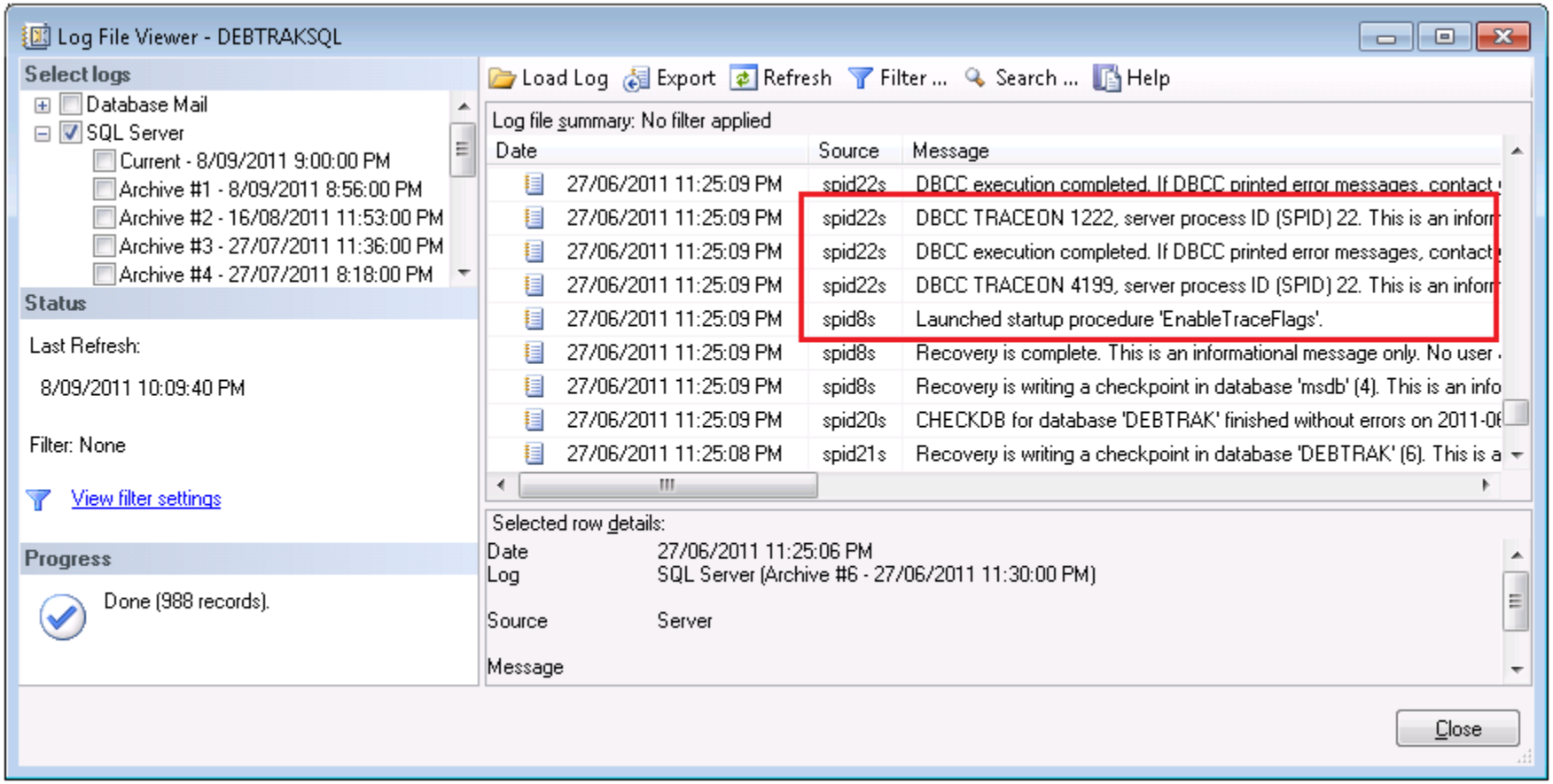
DEMO

Implementing Trace Flags: master.dbo.EnableTraceFlags

```
USE [master]
GO
CREATE PROC [dbo].[EnableTraceFlags]
-- Author  : Victor Isakov
-- Company : SQL Server Solutions (http://www.sqlserversolutions.com.au)
-- Purpose : Enable global trace flags upon SQL Server startup.
-- Notes   : Need to execute sp_procoption to enable this stored procedure to autoexecute whenever
--           SQL Server instance starts:
--               EXEC sp_procoption 'dbo.EnableTraceFlags', 'startup', 'true'
-- Bugs    : None
-- Version : 1.0
-- History : DATE       DESCRIPTION
--           ========== ==================================================
--           11/04/2011 Version 1.0 released.
AS
DBCC TRACEON (4199, -1);     -- Enable Query Optimiser fixes (http://support.microsoft.com/kb/974006)
--DBCC TRACEON (1204, -1);   -- Write deadlocks to errorlog (BOL)
DBCC TRACEON (1222, -1);     -- Write deadlocks to errorlog (BOL)
--DBCC TRACEON (2528, -1);   -- Disables parallel checking of objects by DBCC CHECKDB, DBCC CHECKFILEGROUP, and DB
--DBCC TRACEON (3004, -1);   -- Disable hardware compression for tape drivers (BOL)
--DBCC TRACEON (3205, -1);   -- WritesDisable hardware compression for tape drivers (BOL)
--DBCC TRACEON (3226, -1);   -- Suppress successful backup operations being written to ERRORLOG (BOL)
--DBCC TRACEON (3502, -1);   -- Writes CHECKPOINT information to ERRORLOG
```

DEMO

Implementing Trace Flags: ERRORLOG



Implementing Trace Flags: Startup Trace Flags

- Don't forget that not all trace flags can be enabled using DBCC TRACEON

```
DBCC TRACEON (835)
```

Messages

```
Ignoring trace flag 835. It is either an invalid trace flag or a trace
flag that can only be specified during server startup.

DBCC execution completed. If DBCC printed error messages, contact your
system administrator.
```

PROD Trace Flags

- The following set of trace flags represent trace flags that you might want to implement in a PROD environment
- Change default behavior of the product
  - Improved performance
  - Improved troubleshooting
- Generally "documented"
- Generally "low risk" ☺
- Might want to consider enabling them on your "standard build"
- **Please don't sue us if something goes wrong!**

Trace Flag 610

- Trace flag 610 controls minimally logged inserts into indexed tables
- Allows for high volume data loading
- Less information is written to the transaction log
- Transaction log file size can be greatly reduced
- Introduced in SQL Server 2008
  - "Very fussy"
- Documented:
  - **Data Loading Performance Guide** white paper
  - http://msdn.microsoft.com/en-us/library/dd425070(v=sql.100).aspx

DEMO

Trace Flag 834

- Trace flag 834 allows SQL Server 2005 to use large-page allocations for the memory that is allocated for the buffer pool.
  - May prevent the server from starting if memory is fragmented and if large pages cannot be allocated
  - Best suited for servers that are dedicated to SQL Server 2005
- Page size varies depending on the hardware platform
  - Page size varies from 2 MB to 16 MB.
- Improves performance by increasing the efficiency of the translation look-aside buffer (TLB) in the CPU
- Only applies to 64-bit architecture
- Startup
- Documented: KB920093
- Now automatic:
  - Enterprise / Developer Edition
  - "Lock Pages in Memory" privilege
  - >= 8GB RAM

Trace Flag 835

- Trace flag 835 enables "Lock Pages in Memory" support for SQL Server Standard Edition
- Enables SQL Server to use AWE APIs for buffer pool allocation
  - Avoids potential performance issues due to trimming working set
  - http://msdn.microsoft.com/en-us/library/ms187499.aspx
- Introduced in:
  - SQL Server 2005 Service pack 3 Cumulative Update 4
  - SQL Server 2008 Service Pack 1 Cumulative Update 2
- Only applies to 64-bit architecture
- Startup
- Documented: KB970070

Trace Flag 835: Example

23/06/2011 8:56:39 PM	spid12s	Starting up database 'model'.
23/06/2011 8:56:38 PM	spid9s	The resource database build version is 10.50.1777. This is an informational message only. No user action is required.
23/06/2011 8:56:38 PM	spid9s	Starting up database 'mssqlsystemresource'.
23/06/2011 8:56:38 PM	spid9s	SQL Trace ID 1 was started by login "sa".
23/06/2011 8:56:38 PM	spid9s	FILESTREAM: effective level = 0, configured level = 0, file system access share name = 'MSSQLSERVER'.
23/06/2011 8:56:38 PM	spid9s	SQL Server Audit has started the audits. This is an informational message. No user action is required.
23/06/2011 8:56:38 PM	spid9s	SQL Server Audit is starting the audits. This is an informational message. No user action is required.
23/06/2011 8:56:38 PM	spid9s	Resource governor reconfiguration succeeded.
23/06/2011 8:56:38 PM	spid9s	Recovery is writing a checkpoint in database 'master' (1). This is an informational message only. No user action is required.
23/06/2011 8:56:38 PM	spid9s	Starting up database 'master'.
23/06/2011 8:56:38 PM	Server	Node configuration: node 1: CPU mask: 0x000000000000000f:0 Active CPU mask: 0x000000000000000f:0. This message provides a description of the NUM
23/06/2011 8:56:38 PM	Server	Node configuration: node 0: CPU mask: 0x00000000000000f0:0 Active CPU mask: 0x00000000000000f0:0. This message provides a description of the NUM
23/06/2011 8:56:38 PM	Server	Using dynamic lock allocation. Initial allocation of 2500 Lock blocks and 5000 Lock Owner blocks per node. This is an informational message only. No user
23/06/2011 8:56:37 PM	Server	Cannot use Large Page Extensions: lock memory privilege was not granted.
23/06/2011 8:56:37 PM	Server	Detected 8 CPUs. This is an informational message; no user action is required.
23/06/2011 8:56:37 PM	Server	SQL Server is starting at normal priority base (=7). This is an informational message only. No user action is required.
23/06/2011 8:56:37 PM	Server	Registry startup parameters: -d D:\MSSQL10_50.MSSQLSERVER\MSSQL\DATA\master.mdf -e D:\MSSQL10_50.MSSQLSERVER\MSSQL\Log\ERR
23/06/2011 8:56:37 PM	Server	This instance of SQL Server last reported using a process ID of 1012 at 23/06/2011 8:56:24 PM (local) 23/06/2011 10:56:24 AM (UTC). This is an informatio
23/06/2011 8:56:37 PM	Server	Logging SQL Server messages in file 'D:\MSSQL10_50.MSSQLSERVER\MSSQL\Log\ERRORLOG'.
23/06/2011 8:56:37 PM	Server	Authentication mode is MIXED.
23/06/2011 8:56:37 PM	Server	System Manufacturer: 'Cisco Systems Inc', System Model: 'N20-B6625-1'.
23/06/2011 8:56:37 PM	Server	Server process ID is 552.
23/06/2011 8:56:37 PM	Server	All rights reserved.
23/06/2011 8:56:37 PM	Server	(c) Microsoft Corporation.
23/06/2011 8:56:37 PM	Server	Microsoft SQL Server 2008 R2 (RTM) - 10.50.1777.0 (X64) Apr 8 2011 14:16:38 Copyright (c) Microsoft Corporation Enterprise Edition (64-bit) on Windo

Trace Flag 835: Example

13/07/2011 11:18:26 PM	spid7s	FILESTREAM: effective level = 1, configured level = 1, file system access share name = 'SQL2008R2'.
13/07/2011 11:18:26 PM	spid7s	SQL Server Audit has started the audits. This is an informational message. No user action is required. <{39B75A24-0837-4CEC-AFDF-B960027AE07E}...
13/07/2011 11:18:26 PM	spid7s	SQL Server Audit is starting the audits. This is an informational message. No user action is required.
13/07/2011 11:18:26 PM	spid7s	Resource governor reconfiguration succeeded.
13/07/2011 11:18:26 PM	spid7s	Recovery is writing a checkpoint in database 'master' (1). This is an informational message only. No user action is required.
13/07/2011 11:18:26 PM	spid7s	Starting up database 'master'.
13/07/2011 11:18:26 PM	Server	Node configuration: node 0: CPU mask: 0x000000000000000f:0 Active CPU mask: 0x000000000000000f:0. This message provides a description of t...
13/07/2011 11:18:26 PM	Server	Using dynamic lock allocation. Initial allocation of 2500 Lock blocks and 5000 Lock Owner blocks per node. This is an informational message only. N...
13/07/2011 11:18:26 PM	Server	10208 MB of large page memory allocated.
13/07/2011 11:18:26 PM	Server	Using large pages for buffer pool.
13/07/2011 11:18:26 PM	Server	Large Page Allocated 32MB.
13/07/2011 11:18:26 PM	Server	Large Page Granularity: 2097152.
13/07/2011 11:18:26 PM	Server	Large Page Extensions enabled.
13/07/2011 11:18:26 PM	Server	Using locked pages for buffer pool.
13/07/2011 11:18:26 PM	Server	Detected 4 CPUs. This is an informational message; no user action is required.
13/07/2011 11:18:26 PM	Server	SQL Server is starting at normal priority base (=7). This is an informational message only. No user action is required.
13/07/2011 11:18:26 PM	Server	Registry startup parameters: -d C:\Program Files\Microsoft SQL Server\MSSQL10_50.SQL2008R2\MSSQL\DATA\master.mdf -e C:\Program File...
13/07/2011 11:18:26 PM	Server	This instance of SQL Server last reported using a process ID of 1988 at 13/07/2011 11:18:03 PM (local) 13/07/2011 1:18:03 PM (UTC). This is an inf...
13/07/2011 11:18:26 PM	Server	Logging SQL Server messages in file 'C:\Program Files\Microsoft SQL Server\MSSQL10_50.SQL2008R2\MSSQL\Log\ERRORLOG'.
13/07/2011 11:18:26 PM	Server	Authentication mode is WINDOWS-ONLY.
13/07/2011 11:18:26 PM	Server	System Manufacturer: 'SAMSUNG ELECTRONICS CO., LTD.', System Model: '90X3A'.
13/07/2011 11:18:26 PM	Server	Server process ID is 1600.
13/07/2011 11:18:26 PM	Server	All rights reserved.
13/07/2011 11:18:26 PM	Server	(c) Microsoft Corporation.
13/07/2011 11:18:26 PM	Server	Microsoft SQL Server 2008 R2 (RTM) - 10.50.1617.0 (X64) Apr 22 2011 19:23:43 Copyright (c) Microsoft Corporation Developer Edition (64-bit) o...

Trace Flag 1118

- Trace flag 1118 directs SQL Server to allocate full extents to each *tempdb* objects (instead of mixed extents)
  - Less contention on internal structures such as SGAM pages
- Story has improved in subsequent releases of SQL Server
- So represents a "edge case"

Scope: Global

Documented: KB328551, KB936185

- **Working with tempdb in SQL Server 2005** white paper
- http://www.microsoft.com/technet/prodtechnol/sql/2005/workingwithtempdb.mspx.

Trace Flag 1204

- Trace flag 1204 writes information about deadlocks to the ERRORLOG in a "text format"
  - Resources
  - Types of locks
- Command affected
- Scope: Global
- Documented: BOL

DEMO

Trace Flag 1204: Example

```
xp_readerrorlog
```

Results

```
2011-09-08 18:35:04.050 spid56      DBCC TRACEON 1204, server process ID (SPID) 56. This is an informational message only; no user action is req
2011-09-08 18:35:28.590 spid6s      Deadlock encountered .... Printing deadlock information
2011-09-08 18:35:28.590 spid6s      Wait-for graph
2011-09-08 18:35:28.590 spid6s      NULL
2011-09-08 18:35:28.590 spid6s      Node:1
2011-09-08 18:35:28.590 spid6s      RID: 2:1:118:0                CleanCnt:2 Mode:X Flags: 0x3
2011-09-08 18:35:28.590 spid6s       Grant List 3:
2011-09-08 18:35:28.590 spid6s         Owner:0x0000000080173040 Mode: X        Flg:0x40 Ref:0 Life:02000000 SPID:59 ECID:0 XactLockInfo: 0x00000
2011-09-08 18:35:28.590 spid6s         SPID: 59 ECID: 0 Statement Type: UPDATE Line #: 3
2011-09-08 18:35:28.590 spid6s         Input Buf: Language Event: BEGIN TRAN
                                                                  UPDATE t2 set ci = 20
                                                                  UPDATE t1 set ci = 20
2011-09-08 18:35:28.590 spid6s      Requested by:
2011-09-08 18:35:28.590 spid6s        ResType:LockOwner Stype:'OR'Xdes:0x00000000872C1950 Mode: U SPID:56 BatchID:0 ECID:0 TaskProxy:(0x00000000
2011-09-08 18:35:28.590 spid6s      NULL
2011-09-08 18:35:28.590 spid6s      Node:2
2011-09-08 18:35:28.590 spid6s      RID: 2:1:114:0                CleanCnt:2 Mode:X Flags: 0x3
2011-09-08 18:35:28.590 spid6s       Grant List 3:
2011-09-08 18:35:28.590 spid6s         Owner:0x000000008016FCC0 Mode: X        Flg:0x40 Ref:0 Life:02000000 SPID:56 ECID:0 XactLockInfo: 0x00000
2011-09-08 18:35:28.590 spid6s         SPID: 56 ECID: 0 Statement Type: UPDATE Line #: 1
2011-09-08 18:35:28.590 spid6s         Input Buf: Language Event: UPDATE t2 set ci = 10
2011-09-08 18:35:28.590 spid6s      Requested by:
2011-09-08 18:35:28.590 spid6s        ResType:LockOwner Stype:'OR'Xdes:0x0000000087721950 Mode: U SPID:59 BatchID:0 ECID:0 TaskProxy:(0x00000000
2011-09-08 18:35:28.600 spid6s      NULL
2011-09-08 18:35:28.600 spid6s      Victim Resource Owner:
2011-09-08 18:35:28.600 spid6s        ResType:LockOwner Stype:'OR'Xdes:0x00000000872C1950 Mode: U SPID:56 BatchID:0 ECID:0 TaskProxy:(0x000000008
```

Trace Flag 1222

- Trace flag 1222 writes information about deadlocks to the ERRORLOG in a "XML format"
- Scope: Global
- Documented: BOL

DEMO

Trace Flag 1222: Example

```
xp_readerrorlog
```

Results

```
2011-09-08 18:41:49.870 spid56      DBCC TRACEON 1222, server process ID (SPID) 56. This is an informational message only; no user action is re
2011-09-08 18:42:36.770 spid25s     deadlock-list
2011-09-08 18:42:36.770 spid25s      deadlock victim=process4ed708
2011-09-08 18:42:36.770 spid25s       process-list
2011-09-08 18:42:36.770 spid25s        process id=process4ed708 taskpriority=0 logused=208 waitresource=RID: 2:1:118:0 waittime=1399 ownerId=792
2011-09-08 18:42:36.770 spid25s         executionStack
2011-09-08 18:42:36.770 spid25s          frame procname=adhoc line=1 stmtstart=16 sqlhandle=0x020000002b0db52d3dacb74792cbd586eccf55c2a9082d31
2011-09-08 18:42:36.770 spid25s     UPDATE [t2] set [ci] = @1
2011-09-08 18:42:36.770 spid25s          frame procname=adhoc line=1 sqlhandle=0x020000007b1f511f76e6f80fd35b35000ed71e33808f42af
2011-09-08 18:42:36.770 spid25s     UPDATE t2 set ci = 10
2011-09-08 18:42:36.770 spid25s         inputbuf
2011-09-08 18:42:36.770 spid25s     UPDATE t2 set ci = 10
2011-09-08 18:42:36.770 spid25s        process id=process4ed048 taskpriority=0 logused=208 waitresource=RID: 2:1:114:0 waittime=11669 ownerId=79
2011-09-08 18:42:36.770 spid25s         executionStack
2011-09-08 18:42:36.770 spid25s          frame procname=adhoc line=1 stmtstart=16 sqlhandle=0x0200000081093435c01fc1d03f8f6342eba45a575e2c32a5
2011-09-08 18:42:36.770 spid25s     UPDATE [t1] set [ci] = @1
2011-09-08 18:42:36.770 spid25s          frame procname=adhoc line=1 sqlhandle=0x020000007d009d02cf0309598eb46aad73fb8898f04b1a38
2011-09-08 18:42:36.770 spid25s     UPDATE t1 set ci = 20
2011-09-08 18:42:36.770 spid25s         inputbuf
2011-09-08 18:42:36.770 spid25s     UPDATE t1 set ci = 20
2011-09-08 18:42:36.770 spid25s       resource-list
2011-09-08 18:42:36.770 spid25s        ridlock fileid=1 pageid=118 dbid=2 objectname=tempdb.dbo.t2 id=lock80122900 mode=X associatedObjectId=273
2011-09-08 18:42:36.770 spid25s         owner-list
2011-09-08 18:42:36.770 spid25s          owner id=process4ed048 mode=X
2011-09-08 18:42:36.770 spid25s         waiter-list
2011-09-08 18:42:36.770 spid25s          waiter id=process4ed708 mode=U requestType=wait
2011-09-08 18:42:36.770 spid25s        ridlock fileid=1 pageid=114 dbid=2 objectname=tempdb.dbo.t1 id=lock80120380 mode=X associatedObjectId=266
2011-09-08 18:42:36.770 spid25s         owner-list
2011-09-08 18:42:36.770 spid25s          owner id=process4ed708 mode=X
2011-09-08 18:42:36.770 spid25s         waiter-list
2011-09-08 18:42:36.770 spid25s          waiter id=process4ed048 mode=U requestType=wait
```

Trace Flag 1211

- Trace flag 1211 disables lock escalation based on memory pressure or number of locks
  - Database engine will not escalate row or page locks to table locks
- Scope: Global | Session
- Documented: BOL
- Trace flag 1211 takes precedence over 1224
- Microsoft recommends using 1224
  - Trace flag 1211 prevents escalation in every case, even under memory pressure
    - Helps avoid "out-of-locks" errors when many locks are being used.
  - Can generate excessive number of locks
    - Can slow performance
    - Cause 1204 errors

Trace Flag 1224

- Trace flag 1224 disables lock escalation based on the number of locks
- Memory pressure can still trigger lock escalation
- Database engine will escalate row or page locks to table locks
  - 40% of memory available for locking
    - sp_configure 'locks'
    - Non-AWE memory
- Scope: Global | Session
- Documented: BOL

Trace Flag 2528

- Trace flag 2528 disables parallel checking of objects during DBCC CHECKDB, DBCC CHECKFILEGROUP and DBCC CHECKTABLE.
- Scope: Global | Local
- Documented: BOL
- Typically leave parallel DBCC checks enabled
  - DBCC operations can dynamically change their degree of parallelism
- Alternatives:
  - MAXDOP option
  - Resource Governor

DEMO

Trace Flag 3226

- Trace flag 3226 prevents successful back operations from being logged
- By default SQL Server logs every successful backup operation to the ERRORLOG and the System event log
- Frequent backup operations can cause log files to grow and make finding other messages harder
- Documented: BOL

Trace Flag 4199 /* IMPORTANT */

- Trace flag 4199 enables all the fixes that were previously made for the query processor under many trace flags
- Policy:
  - Any hotfix that could potentially affect the execution plan of a query must be controlled by a trace flag
    - Except for fixes to bugs that can cause incorrect results or corruption
  - Helps avoid unexpected changes to the execution plan
- Which means that virtually everyone is not necessarily running SQL Server with all the latest query processor fixes enabled
- Scope: Session | Global
- Documented: KB974006
- Consider enabling for "virgin" SQL Server deployments?
- Microsoft are strongly advising not to enable this trace flag unless you are affected

DEV / UAT Trace Flags

- The following set of trace flags represent trace flags that you might want to implement in a DEV / UAT environment
  - Might impact your PROD environment
    - Adversely!
  - Help develop / troubleshoot / learn
- Or to troubleshoot / verify something in PROD environment
  - Generally "low risker" but not something your would want to have permanently enabled
- Generally not "documented"

Trace Flag 806

- Trace Flag 806 enables DBCC audit checks to be performed on pages to test for logical consistency problems.
  - These checks try to detect when a read operation from a disk does not experience any errors but the read operation returns data that is not valid.
  - Pages will be audited every time that they are read from disk
- Page auditing can affect performance and should only be used in systems where data stability is in question.
- Documented: KB841776
  - "SQL Server I/O Basics, Chapter 2" white paper
  - http://technet.microsoft.com/en-au/library/cc917726.aspx

Trace Flag 818

- "Trace flag 818 enables an in-memory ring buffer that is used for tracking the last 2,048 successful write operations that are performed by the computer running SQL Server, not including sort and workfile I/Os"
- Use to further diagnose operating system, driver, or hardware problems causing lost write conditions or stale read conditions
- May see data integrity-related error messages such as errors 605, 823, 3448.
- Documented: KB826433

Trace Flag 3422

- Trace Flag 3422 enables log record auditing
- "Troubleshooting a system that is experiencing problems with log file corruption may be easier using the additional log record audits this trace flag provides"
- "Use this trace flag with caution as it introduces overhead to each transaction log record"
- Similarly to trace flag 806, you would only use this to troubleshoot corruption problems
- Documented:
  - "SQL Server I/O Basics, Chapter 2" white paper
  - http://technet.microsoft.com/en-au/library/cc917726.aspx

DEMO

Trace Flag 1200

- Trace flag 1200 returns locking information in real-time as your query executes
- Use during development / testing phase
- Great for learning how SQL Server implements locking

Trace Flag 1806

- Trace flag 1806 explicitly disables instant file initialization
  - SQL Server will zero initialize files
  - Obviously not same as DOD-compliant secure clearing / sanitizing standard (and other country standards)
- Used to guarantee the physical data file space acquisition during data file creation or expansion, on a thin provisioned subsystem
- Documented: "SQL Server I/O Basics, Chapter 2" white paper
  - http://technet.microsoft.com/en-au/library/cc917726.aspx

DEMO

Trace Flag 3004

- Trace Flag 3004 returns more information about instant file initialization
- Can be used to ensure that SQL Server has been configured to take advantage of IFI correctly

```
DBCC TRACEON (3004, 3605, -1);
CREATE DATABASE DB;
EXEC sp_readerrorlog;
```

Results

```
2011-09-08 21:13:25.840 spid53      DBCC TRACEON 3004, server process ID (SPID) 53. This is an informational message only; no user action is required.
2011-09-08 21:13:25.840 spid53      DBCC TRACEON 3605, server process ID (SPID) 53. This is an informational message only; no user action is required.
2011-09-08 21:13:25.860 spid53      Zeroing C:\Program Files\Microsoft SQL Server\MSSQL10_50.SQL2008R2\MSSQL\DATA\DB3_log.LDF from page 0 to 72 (0x0 to
2011-09-08 21:13:25.870 spid53      Zeroing completed on C:\Program Files\Microsoft SQL Server\MSSQL10_50.SQL2008R2\MSSQL\DATA\DB3_log.LDF
2011-09-08 21:13:25.950 spid53      Starting up database 'DB3'.
2011-09-08 21:13:25.980 spid53      FixupLogTail(progress) zeroing C:\Program Files\Microsoft SQL Server\MSSQL10_50.SQL2008R2\MSSQL\DATA\DB3_log.LDF fr
2011-09-08 21:13:25.980 spid53      Zeroing C:\Program Files\Microsoft SQL Server\MSSQL10_50.SQL2008R2\MSSQL\DATA\DB3_log.LDF from page 3 to 32 (0x6000
2011-09-08 21:13:25.980 spid53      Zeroing completed on C:\Program Files\Microsoft SQL Server\MSSQL10_50.SQL2008R2\MSSQL\DATA\DB3_log.LDF
```

DEMO

Trace Flag 3014

- Trace Flag 3014 returns more information to the ERRORLOG about BACKUP
  - Backup activity
  - Restore activity
  - File creation

```
DBCC TRACEON (3014, 3605, -1);
BACKUP DATABASE DB TO DISK = 'C:\DB.bak';
EXEC sp_readerrorlog;
```

Results

```
2011-09-08 21:23:05.830 spid53      DBCC TRACEON 3014, server process ID (SPID) 53. This
2011-09-08 21:23:05.830 spid53      DBCC TRACEON 3605, server process ID (SPID) 53. This
2011-09-08 21:23:05.850 spid53      Calculating expected total data to write
2011-09-08 21:23:05.850 spid53      Fid(1) ExpectedExt(22) DiffMapAccurate(0)
2011-09-08 21:23:05.850 spid53      Total (1441792)
2011-09-08 21:23:05.850 spid53      Calculating expected total data to write
2011-09-08 21:23:05.850 spid53      Fid(1) ExpectedExt(22) DiffMapAccurate(0)
2011-09-08 21:23:05.850 spid53      Total (1441792)
2011-09-08 21:23:05.860 spid53      BackupStream(0): Starting MSDA of size 22 extents
2011-09-08 21:23:05.880 spid53      Calculating expected total data to write
2011-09-08 21:23:05.880 spid53      Fid(1) ExpectedExt(22) DiffMapAccurate(0)
2011-09-08 21:23:05.880 spid53      Total (1441792)
2011-09-08 21:23:05.880 spid53      Backup: MediaWriter is expecting completion
2011-09-08 21:23:05.880 spid53      BackupStream(0): Total MSDA: 22 extents
2011-09-08 21:23:05.880 spid53      BackupLog: Family(0) StreamSize=0x10000
2011-09-08 21:23:05.880 spid53      BackupLog: Family(0) StreamSize=0x0
2011-09-08 21:23:05.890 Backup      Database backed up. Database: DB, creation date(time
```

DEMO

Trace Flag 3502

- Trace Flag 3502 writes information about CHECKPOINTs to the ERRORLOG

```
DBCC TRACEON (3502, -1);
CHECKPOINT;
EXEC sp_readerrorlog;
```

Results

```
2011-09-08 21:05:09.030 spid53      DBCC TRACEON 3502, server process ID (SPID) 53. This is an informational message only;
2011-09-08 21:05:09.030 spid53      Ckpt dbid 1 started (8)
2011-09-08 21:05:09.030 spid53      About to log Checkpoint begin.
2011-09-08 21:05:09.030 spid53      Ckpt dbid 1 phase 1 ended (8)
2011-09-08 21:05:09.030 spid53      About to log Checkpoint end.
2011-09-08 21:05:09.030 spid53      Ckpt dbid 1 complete
```

Traceflag 3505

- Setting trace flag 3505 disables automatic checkpoints.
  - Setting trace flag 3505 may increase recovery time and can prevent log space reuse until the next checkpoint is issued.
  - Make sure to issue manual checkpoints on all read/write databases at appropriate time intervals
- "For high availability systems, such as clusters, Microsoft recommends that you do not change the recovery interval because it may affect data safety and availability. "
- Documented: KB815436

Summary

- Make sure you understand and / or test trace flags before deploying them in PROD environments
- Decide upon a standard set of trace flags that you will enable as part of your "standard build"
  - Decide upon a standard way of deploying trace flags
- Make sure you read up on trace flag 4199
- There are a lot more trace flags "out there"
- What I am planning to do in October 2011 is to blog about a different trace flag every day
  - www.victorisakov.com

Q & A

Questions?

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