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Deadlock and Trace Flags 1204 and 1222

When you are looking for deadlocks there are, like most things in SQL Server, more than one way to find the deadlocks. This article is specifically focused on using the SQL Server ERRORLOG file located in the LOG directory for the SQL instance. If you used the defaults on SQL Server 2012, this log would be at this location:

C:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\Log\ERRORLOG

For SQL Server 2014 it would be here:

C:\Program Files\Microsoft SQL Server\MSSQL12.MSSQLSERVER\MSSQL\Log\ERRORLOG

and in similar locations for other versions of SQL Server.

What is a Deadlock?

A deadlock is a specific case in SQL Server and other databases where, in the simple case of two transactions, the first transaction gets stuck waiting on blocking from the second transaction, and the second transaction gets stuck waiting on blocking for the first transaction.

Imagine traffic so jammed up that one lane of travel is blocking another lane of travel, and vice versa. The deadlock in SQL Server is similar to this, but instead of traffic being blocked, it is queries and transactions being blocked.

Eventually in traffic when cars are blocking, one will give up and back out, and the other will be allowed to drive through. The one that backs out is known as the deadlock victim.

When one query is chosen as the deadlock victim, it looks something like this:

By default, when a deadlock is encountered nothing is logged to the ERRORLOG file in SQL Server, however this can be changed with a couple of trace flags.

Trace Flag 1204

Basic information added into the ERRORLOG file when a deadlock is encountered. This flag was originally introduced in SQL Server 2000.

Here is an example from the ERROR LOG FILE with TRACE FLAG 1204 turned on. The section below is for a single deadlock.

```
2015-04-22 17:00:42.06 spid57 DBCC TRACEON 1204, server process ID (SPID) 57. This
is an informational message only; no user action is required.
2015-04-22 17:01:21.53 spid5s Deadlock encountered .... Printing deadlock information
2015-04-22 17:01:21.54 spid5s Wait-for graph
2015-04-22 17:01:21.54 spid5s
2015-04-22 17:01:21.54 spid5s Node:1

2015-04-22 17:01:21.54 spid5s KEY: 14:72057594039042048 (8194443284a0) CleanCnt:2
Mode:X Flags: 0x1
2015-04-22 17:01:21.54 spid5s Grant List 0:
2015-04-22 17:01:21.54 spid5s Owner:0x00000000FA436540 Mode: X Flg:0x40 Ref:0
Life:02000000 SPID:57 ECID:0 XactLockInfo: 0x00000000F9CB76E8
2015-04-22 17:01:21.54 spid5s SPID: 57 ECID: 0 Statement Type: UPDATE Line #: 9
2015-04-22 17:01:21.54 spid5s Input Buf: Language Event:
BEGIN TRANSACTION;
UPDATE [dbo].[Departments]
SET [Name] = 'xxx';
WAITFOR DELAY '00:00:30';

UPDATE [dbo].[Resources]
SET [Name] = 'yyy';

ROLLBACK TRANSACTION;

2015-04-22 17:01:21.54 spid5s Requested by:
2015-04-22 17:01:21.54 spid5s ResType:LockOwner
Stype:'OR'Xdes:0x00000000FF470D28 Mode: U SPID:58 BatchID:0 ECID:0
TaskProxy:(0x00000000F3E38608) Value:0xfa436580 Cost:(0/992)
2015-04-22 17:01:21.54 spid5s
2015-04-22 17:01:21.54 spid5s Node:2

2015-04-22 17:01:21.54 spid5s KEY: 14:72057594039107584 (8194443284a0) CleanCnt:2
Mode:X Flags: 0x1
2015-04-22 17:01:21.54 spid5s Grant List 2:
```

```
2015-04-22 17:01:21.54 spid5s Owner:0x00000000FA436680 Mode: X Flg:0x40 Ref:0
Life:02000000 SPID:58 ECID:0 XactLockInfo: 0x00000000FF470D68
2015-04-22 17:01:21.54 spid5s SPID: 58 ECID: 0 Statement Type: UPDATE Line #: 8
2015-04-22 17:01:21.54 spid5s Input Buf: Language Event: BEGIN TRANSACTION;
UPDATE [dbo].[Resources]
SET [Name] = 'abc';
WAITFOR DELAY '00:00:30';

UPDATE [dbo].[Departments]
SET [Name] = 'def';

2015-04-22 17:01:21.54 spid5s Requested by:
2015-04-22 17:01:21.54 spid5s ResType:LockOwner
Stype:'OR'Xdes:0x00000000F9CB76A8 Mode: U SPID:57 BatchID:0 ECID:0
TaskProxy:(0x00000000F266E608) Value:0xfa435bc0 Cost:(0/992)
2015-04-22 17:01:21.54 spid5s
2015-04-22 17:01:21.54 spid5s Victim Resource Owner:
2015-04-22 17:01:21.54 spid5s ResType:LockOwner
Stype:'OR'Xdes:0x00000000FF470D28 Mode: U SPID:58 BatchID:0 ECID:0
TaskProxy:(0x00000000F3E38608) Value:0xfa436580 Cost:(0/992)
```

Trace Flag 1222

More details that 1204.

Here is the same deadlock as above with TRACE FLAG 12014 turned off, and TRACE FLAG 1222 turned on.

```
2015-04-22 17:04:44.58 spid57 DBCC TRACEOFF 1204, server process ID (SPID) 57.
This is an informational message only; no user action is required.
2015-04-22 17:04:44.58 spid57 DBCC TRACEON 1222, server process ID (SPID) 57. This
is an informational message only; no user action is required.
2015-04-22 17:05:16.83 spid34s deadlock-list
2015-04-22 17:05:16.83 spid34s deadlock victim=processff035498
2015-04-22 17:05:16.83 spid34s process-list
2015-04-22 17:05:16.83 spid34s process id=processff035498 taskpriority=0 logused=992
waitresource=KEY: 14:72057594039042048 (8194443284a0) waittime=2890
```

ownerId=10178 transactionname=user_transaction
lasttranstarted=2015-04-22T17:04:53.937 XDES=0xff470d28 lockMode=U schedulerid=5
kpid=3472 status=suspended spid=58 sbid=0 ecid=0 priority=0 trancount=2
lastbatchstarted=2015-04-22T17:04:53.937 lastbatchcompleted=2015-04-22T17:04:53.937
lastattention=1900-01-01T00:00:00.937 clientapp=Microsoft SQL Server Management
Studio - Query hostname=XPS8500 hostpid=1996 loginname=sa isolationlevel=read
committed (2) xactid=10178 currentdb=14 lockTimeout=4294967295
clientoption1=671090784 clientoption2=390200
2015-04-22 17:05:16.83 spid34s executionStack
2015-04-22 17:05:16.83 spid34s frame procname=adhoc line=8 stmtstart=36 sqlhandle=0x
020000004b55b71427e224488d8ae60084ba0ba2a74d7b0b0000000000000000000000000
0000000000000000
2015-04-22 17:05:16.83 spid34s UPDATE [dbo].[Departments] set [Name] = @1
2015-04-22 17:05:16.83 spid34s frame procname=adhoc line=8 stmtstart=204 sqlhandle=0
x02000000897eda2351193104cd6f512569b50520ba99bf450000000000000000000000000
000000000000000
2015-04-22 17:05:16.83 spid34s UPDATE [dbo].[Departments]
2015-04-22 17:05:16.83 spid34s SET [Name] = 'def';
2015-04-22 17:05:16.83 spid34s inputbuf
2015-04-22 17:05:16.83 spid34s BEGIN TRANSACTION;
2015-04-22 17:05:16.83 spid34s UPDATE [dbo].[Resources]
2015-04-22 17:05:16.83 spid34s SET [Name] = 'abc';
2015-04-22 17:05:16.83 spid34s WAITFOR DELAY '00:00:20';
2015-04-22 17:05:16.83 spid34s UPDATE [dbo].[Departments]
2015-04-22 17:05:16.83 spid34s SET [Name] = 'def';
2015-04-22 17:05:16.83 spid34s process id=processf313e188 taskpriority=0 logused=992
waitresource=KEY: 14:72057594039107584 (8194443284a0) waittime=4891
ownerId=10085 transactionname=user_transaction
lasttranstarted=2015-04-22T17:04:51.920 XDES=0xf9cb76a8 lockMode=U schedulerid=1
kpid=2340 status=suspended spid=57 sbid=0 ecid=0 priority=0 trancount=2
lastbatchstarted=2015-04-22T17:04:51.920 lastbatchcompleted=2015-04-22T17:04:51.920
lastattention=1900-01-01T00:00:00.920 clientapp=Microsoft SQL Server Management
Studio - Query hostname=XPS8500 hostpid=1996 loginname=sa isolationlevel=read
committed (2) xactid=10085 currentdb=14 lockTimeout=4294967295
clientoption1=671090784 clientoption2=390200
2015-04-22 17:05:16.83 spid34s executionStack
2015-04-22 17:05:16.83 spid34s frame procname=adhoc line=9 stmtstart=36 sqlhandle=0x
020000006ece2303088612d98662d952df74dfa3844a3b6200000000000000000000000000
00000000000000
2015-04-22 17:05:16.83 spid34s UPDATE [dbo].[Resources] set [Name] = @1
2015-04-22 17:05:16.83 spid34s frame procname=adhoc line=9 stmtstart=214
stmtend=314 sqlhandle=0x020000006230041404e58acce4fe1fde7e8d7c189e98ec2f00000

```
00000000000000000000000000000000000
2015-04-22 17:05:16.83 spid34s UPDATE [dbo].[Resources]
2015-04-22 17:05:16.83 spid34s SET [Name] = 'yyy';
2015-04-22 17:05:16.83 spid34s inputbuf
2015-04-22 17:05:16.83 spid34s BEGIN TRANSACTION;
2015-04-22 17:05:16.83 spid34s UPDATE [dbo].[Departments]
2015-04-22 17:05:16.83 spid34s SET [Name] = 'xxx';
2015-04-22 17:05:16.83 spid34s WAITFOR DELAY '00:00:20';
2015-04-22 17:05:16.83 spid34s UPDATE [dbo].[Resources]
2015-04-22 17:05:16.83 spid34s SET [Name] = 'yyy';
2015-04-22 17:05:16.83 spid34s ROLLBACK TRANSACTION;
2015-04-22 17:05:16.83 spid34s resource-list
2015-04-22 17:05:16.83 spid34s keylock hobtid=72057594039042048 dbid=14
objectname=DeadlockBlock.dbo.Departments indexname=PK_Departments
id=lockff6d3800 mode=X associatedObjectId=72057594039042048
2015-04-22 17:05:16.83 spid34s owner-list
2015-04-22 17:05:16.83 spid34s owner id=processf313e188 mode=X
2015-04-22 17:05:16.83 spid34s waiter-list
2015-04-22 17:05:16.83 spid34s waiter id=processff035498 mode=U requestType=wait
2015-04-22 17:05:16.83 spid34s keylock hobtid=72057594039107584 dbid=14
objectname=DeadlockBlock.dbo.Resources indexname=PK_Resource id=lockff6de700
mode=X associatedObjectId=72057594039107584
2015-04-22 17:05:16.83 spid34s owner-list
2015-04-22 17:05:16.83 spid34s owner id=processff035498 mode=X
2015-04-22 17:05:16.83 spid34s waiter-list
2015-04-22 17:05:16.83 spid34s waiter id=processf313e188 mode=U requestType=wait
```

Trace Flag 1204 and 1222 Combined

Even more information, with both trace flags turned on.

```
2015-04-22 17:07:21.31 spid57 DBCC TRACEON 1204, server process ID (SPID) 57. This
is an informational message only; no user action is required.
2015-04-22 17:07:21.32 spid57 DBCC TRACEON 1222, server process ID (SPID) 57. This
is an informational message only; no user action is required.
2015-04-22 17:07:49.55 spid5s Deadlock encountered .... Printing deadlock information
2015-04-22 17:07:49.55 spid5s Wait-for graph
2015-04-22 17:07:49.55 spid5s
2015-04-22 17:07:49.55 spid5s Node:1
```

```
2015-04-22 17:07:49.55 spid5s KEY: 14:72057594039042048 (8194443284a0) CleanCnt:2
Mode:X Flags: 0x1
2015-04-22 17:07:49.55 spid5s Grant List 0:
2015-04-22 17:07:49.55 spid5s Owner:0x00000000FA41BD80 Mode: X Flg:0x40 Ref:0
Life:02000000 SPID:57 ECID:0 XactLockInfo: 0x00000000F9CB76E8
2015-04-22 17:07:49.55 spid5s SPID: 57 ECID: 0 Statement Type: UPDATE Line #: 9
2015-04-22 17:07:49.55 spid5s Input Buf: Language Event:
BEGIN TRANSACTION;
UPDATE [dbo].[Departments]
SET [Name] = 'xxx';
WAITFOR DELAY '00:00:20';

UPDATE [dbo].[Resources]
SET [Name] = 'yyy';

ROLLBACK TRANSACTION;

2015-04-22 17:07:49.55 spid5s Requested by:
2015-04-22 17:07:49.55 spid5s ResType:LockOwner
Stype:'OR'Xdes:0x00000000FF470D28 Mode: U SPID:58 BatchID:0 ECID:0
TaskProxy:(0x00000000F3E38608) Value:0xfa436580 Cost:(0/992)
2015-04-22 17:07:49.55 spid5s
2015-04-22 17:07:49.55 spid5s Node:2

2015-04-22 17:07:49.55 spid5s KEY: 14:72057594039107584 (8194443284a0) CleanCnt:2
Mode:X Flags: 0x1
2015-04-22 17:07:49.55 spid5s Grant List 2:
2015-04-22 17:07:49.55 spid5s Owner:0x00000000FA436680 Mode: X Flg:0x40 Ref:0
Life:02000000 SPID:58 ECID:0 XactLockInfo: 0x00000000FF470D68
2015-04-22 17:07:49.55 spid5s SPID: 58 ECID: 0 Statement Type: UPDATE Line #: 8
2015-04-22 17:07:49.55 spid5s Input Buf: Language Event: BEGIN TRANSACTION;
UPDATE [dbo].[Resources]
SET [Name] = 'abc';
WAITFOR DELAY '00:00:20';

UPDATE [dbo].[Departments]
SET [Name] = 'def';

2015-04-22 17:07:49.55 spid5s Requested by:
2015-04-22 17:07:49.55 spid5s ResType:LockOwner
Stype:'OR'Xdes:0x00000000F9CB76A8 Mode: U SPID:57 BatchID:0 ECID:0
TaskProxy:(0x00000000F266E608) Value:0xfa41b8c0 Cost:(0/992)
```

2015-04-22 17:07:49.56 spid5s
2015-04-22 17:07:49.56 spid5s Victim Resource Owner:
2015-04-22 17:07:49.56 spid5s ResType:LockOwner
Stype:'OR'Xdes:0x00000000FF470D28 Mode: U SPID:58 BatchID:0 ECID:0
TaskProxy:(0x00000000F3E38608) Value:0xfa436580 Cost:(0/992)
2015-04-22 17:07:49.56 spid24s deadlock-list
2015-04-22 17:07:49.56 spid24s deadlock victim=processff035498
2015-04-22 17:07:49.56 spid24s process-list
2015-04-22 17:07:49.56 spid24s process id=processff035498 taskpriority=0 logused=992
waitresource=KEY: 14:72057594039042048 (8194443284a0) waittime=1578
ownerId=12506 transactionname=user_transaction
lasttranstarted=2015-04-22T17:07:27.977 XDES=0xff470d28 lockMode=U schedulerid=5
kpid=3472 status=suspended spid=58 sbid=0 ecid=0 priority=0 trancount=2
lastbatchstarted=2015-04-22T17:07:27.973 lastbatchcompleted=2015-04-22T17:07:27.973
lastattention=1900-01-01T00:00:00.973 clientapp=Microsoft SQL Server Management
Studio - Query hostname=XPS8500 hostpid=1996 loginname=sa isolationlevel=read
committed (2) xactid=12506 currentdb=14 lockTimeout=4294967295
clientoption1=671090784 clientoption2=390200
2015-04-22 17:07:49.56 spid24s executionStack
2015-04-22 17:07:49.56 spid24s frame procname=adhoc line=8 stmtstart=36 sqlhandle=0x
020000004b55b71427e224488d8ae60084ba0ba2a74d7b0b000000000000000000000000
0000000000000000
2015-04-22 17:07:49.56 spid24s UPDATE [dbo].[Departments] set [Name] = @1
2015-04-22 17:07:49.56 spid24s frame procname=adhoc line=8 stmtstart=204 sqlhandle=0
x02000000897eda2351193104cd6f512569b50520ba99bf450000000000000000000000
000000000000000
2015-04-22 17:07:49.56 spid24s UPDATE [dbo].[Departments]
2015-04-22 17:07:49.56 spid24s SET [Name] = 'def';
2015-04-22 17:07:49.56 spid24s inputbuf
2015-04-22 17:07:49.56 spid24s BEGIN TRANSACTION;
2015-04-22 17:07:49.56 spid24s UPDATE [dbo].[Resources]
2015-04-22 17:07:49.56 spid24s SET [Name] = 'abc';
2015-04-22 17:07:49.56 spid24s WAITFOR DELAY '00:00:20';
2015-04-22 17:07:49.56 spid24s UPDATE [dbo].[Departments]
2015-04-22 17:07:49.56 spid24s SET [Name] = 'def';
2015-04-22 17:07:49.56 spid24s process id=processf313e558 taskpriority=0 logused=992
waitresource=KEY: 14:72057594039107584 (8194443284a0) waittime=3240
ownerId=12481 transactionname=user_transaction
lasttranstarted=2015-04-22T17:07:26.317 XDES=0xf9cb76a8 lockMode=U schedulerid=1
kpid=3736 status=suspended spid=57 sbid=0 ecid=0 priority=0 trancount=2
lastbatchstarted=2015-04-22T17:07:26.317 lastbatchcompleted=2015-04-22T17:07:26.317
lastattention=1900-01-01T00:00:00.317 clientapp=Microsoft SQL Server Management

```
Studio - Query hostname=XPS8500 hostpid=1996 loginname=sa isolationlevel=read
committed (2) xactid=12481 currentdb=14 lockTimeout=4294967295
clientoption1=671090784 clientoption2=390200
2015-04-22 17:07:49.56 spid24s executionStack
2015-04-22 17:07:49.56 spid24s frame procname=adhoc line=9 stmtstart=36 sqlhandle=0x
020000006ece2303088612d98662d952df74dfa3844a3b62000000000000000000000000000000
00000000000000
2015-04-22 17:07:49.56 spid24s UPDATE [dbo].[Resources] set [Name] = @1
2015-04-22 17:07:49.56 spid24s frame procname=adhoc line=9 stmtstart=214
stmtend=314 sqlhandle=0x020000007ecfa92c7c563a5b17a5fa429dc44b70198d45fd00000
000000000000000000000000000000000000
2015-04-22 17:07:49.56 spid24s UPDATE [dbo].[Resources]
2015-04-22 17:07:49.56 spid24s SET [Name] = 'yyy';
2015-04-22 17:07:49.56 spid24s inputbuf
2015-04-22 17:07:49.56 spid24s BEGIN TRANSACTION;
2015-04-22 17:07:49.56 spid24s UPDATE [dbo].[Departments]
2015-04-22 17:07:49.56 spid24s SET [Name] = 'xxx';
2015-04-22 17:07:49.56 spid24s WAITFOR DELAY '00:00:20';
2015-04-22 17:07:49.56 spid24s UPDATE [dbo].[Resources]
2015-04-22 17:07:49.56 spid24s SET [Name] = 'yyy';
2015-04-22 17:07:49.56 spid24s ROLLBACK TRANSACTION;
2015-04-22 17:07:49.56 spid24s resource-list
2015-04-22 17:07:49.56 spid24s keylock hobtid=72057594039042048 dbid=14
objectname=DeadlockBlock.dbo.Departments indexname=PK_Departments
id=lockff6b3c00 mode=X associatedObjectId=72057594039042048
2015-04-22 17:07:49.56 spid24s owner-list
2015-04-22 17:07:49.56 spid24s owner id=processf313e558 mode=X
2015-04-22 17:07:49.56 spid24s waiter-list
2015-04-22 17:07:49.56 spid24s waiter id=processff035498 mode=U requestType=wait
2015-04-22 17:07:49.56 spid24s keylock hobtid=72057594039107584 dbid=14
objectname=DeadlockBlock.dbo.Resources indexname=PK_Resource id=lockff6e8d00
mode=X associatedObjectId=72057594039107584
2015-04-22 17:07:49.56 spid24s owner-list
2015-04-22 17:07:49.56 spid24s owner id=processff035498 mode=X
2015-04-22 17:07:49.56 spid24s waiter-list
2015-04-22 17:07:49.56 spid24s waiter id=processf313e558 mode=U requestType=wait
```

Here is the example code that I used to create the deadlocks.

Then I ran the following in one query window in SSMS.

and this query was run in a second query window in SSMS.

The WAITFOR DELAY was used to simulate a long running load. Waiting 20 seconds allowed for plenty of time to kick off the second query in the second query window.

The first time it as run with neither 1204 or 1222 enabled.
Next I enabled just trace flag 1204.

Followed by just 1222.

Then both of them together.

Note the -1 param on DBCC TRACEON or DBCC TRACEOFF globally across all sessions.
Warning: don't do this on a production server.

What was observed in SSMS was identical in all situations, the thing that did vary was the contents of the ERROR log file after a deadlock was encountered.

These DBCC Trace Flags 1204 and 1222 are great ways to track down deadlocks on your SQL Server, however they are not the only way, for instance the Database Health Monitor application can be used to find currently blocking deadlocked queries on your SQL Server.

See Also:

- DBCC commands
- Database Health Monitor