



Defuse the Deadlock!

Photos from <https://unsplash.com/@girlwithredhat>

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Free courses
LittleKendra.com/coursesbytitle

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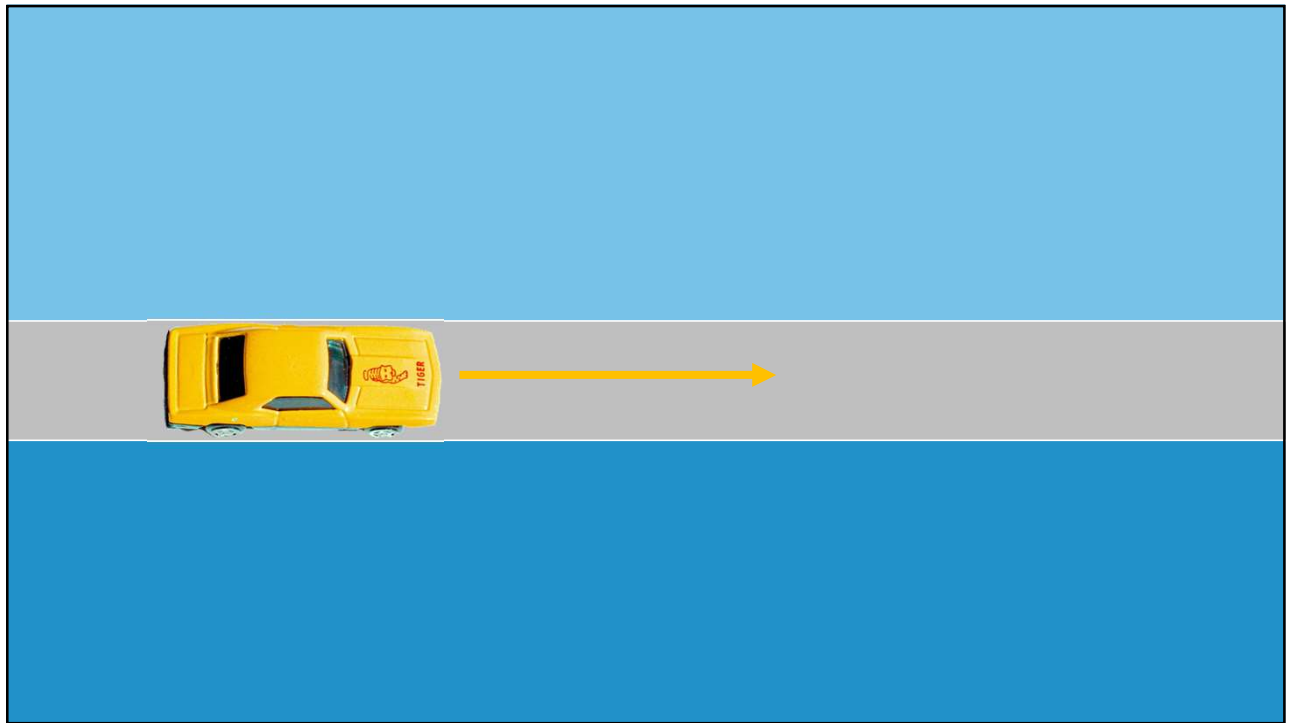
Agenda

	What is a deadlock?		Methods to defuse deadlocks		How to collect the deadlock graph
	Decode the deadlock graph		Defuse the deadlock		Summing up

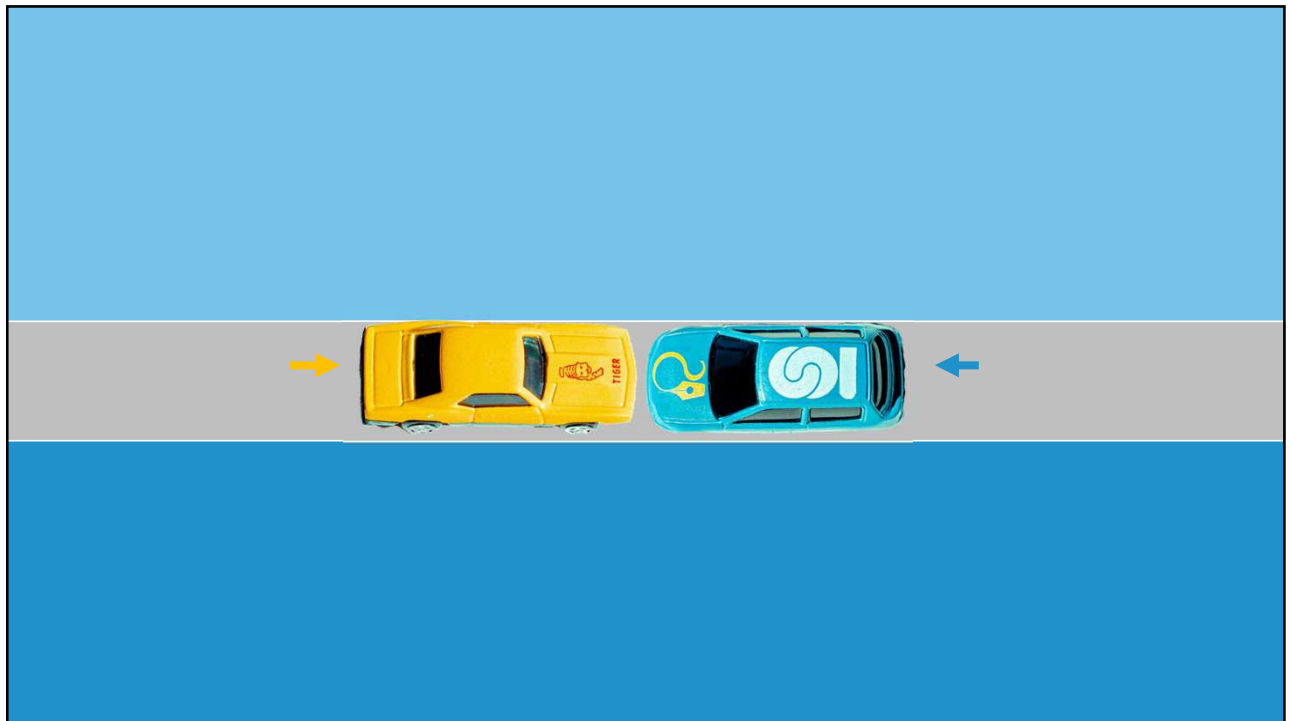
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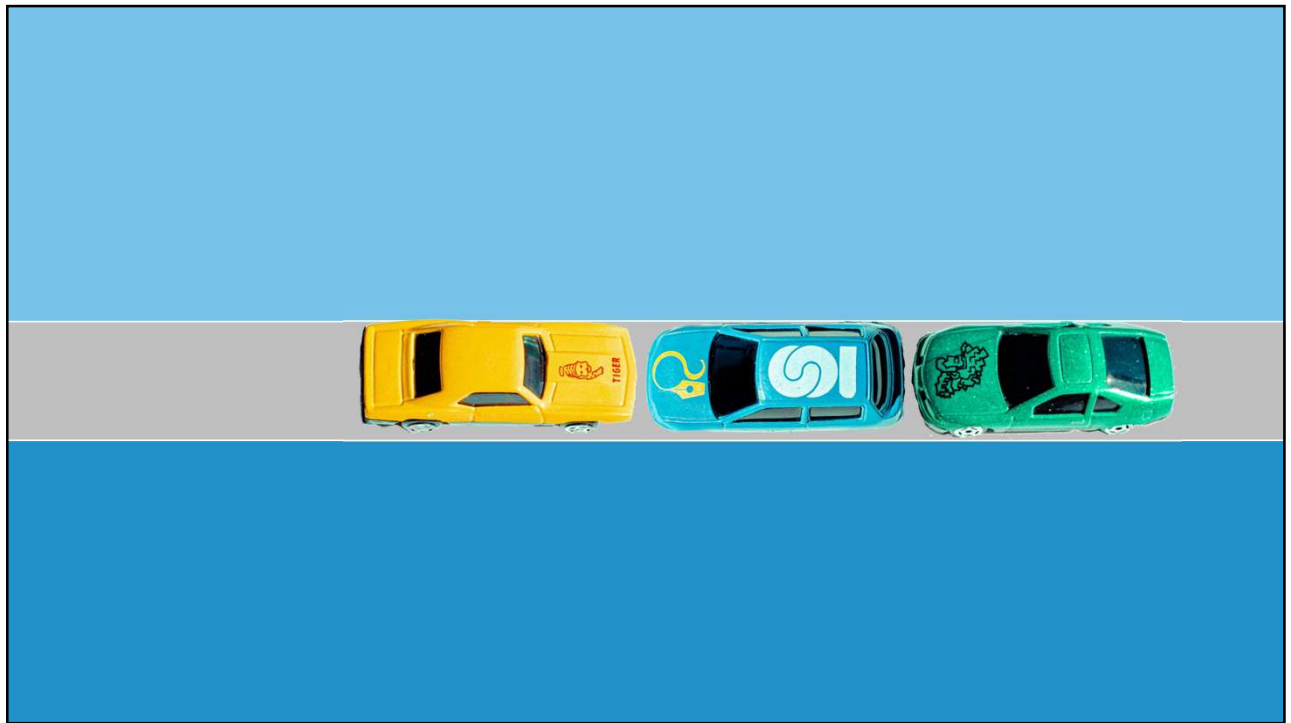
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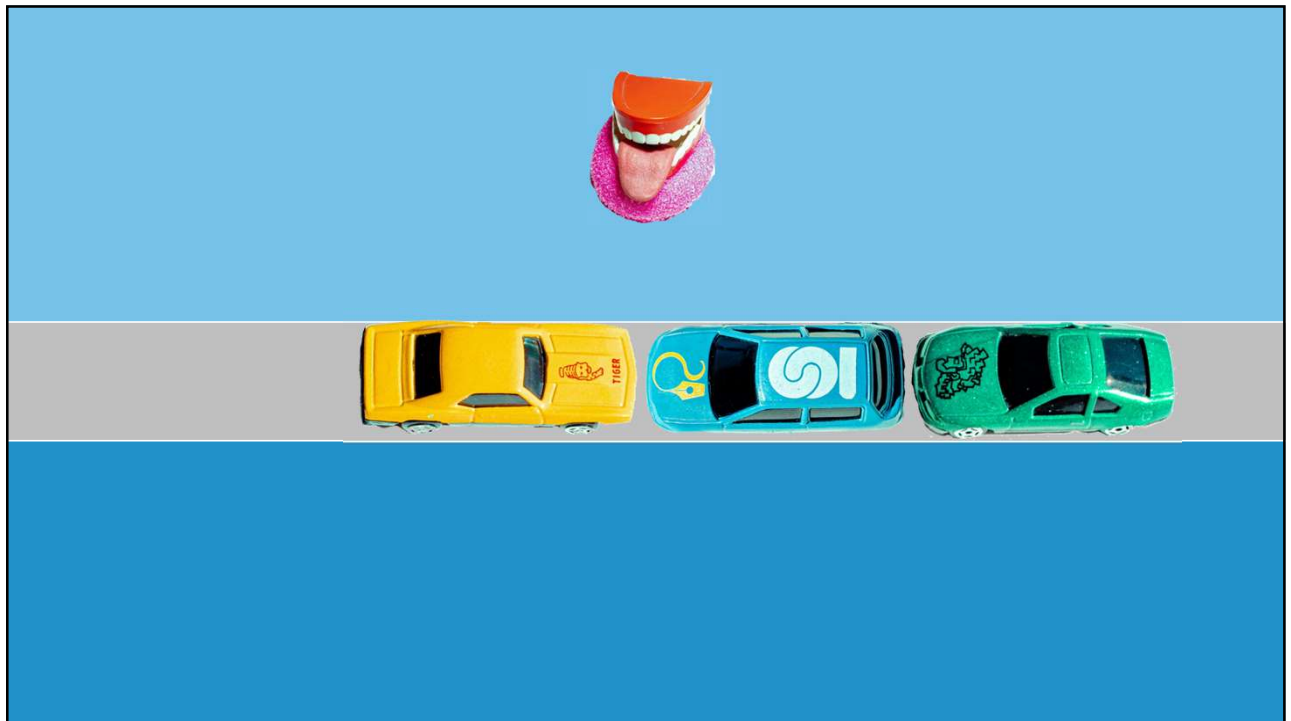
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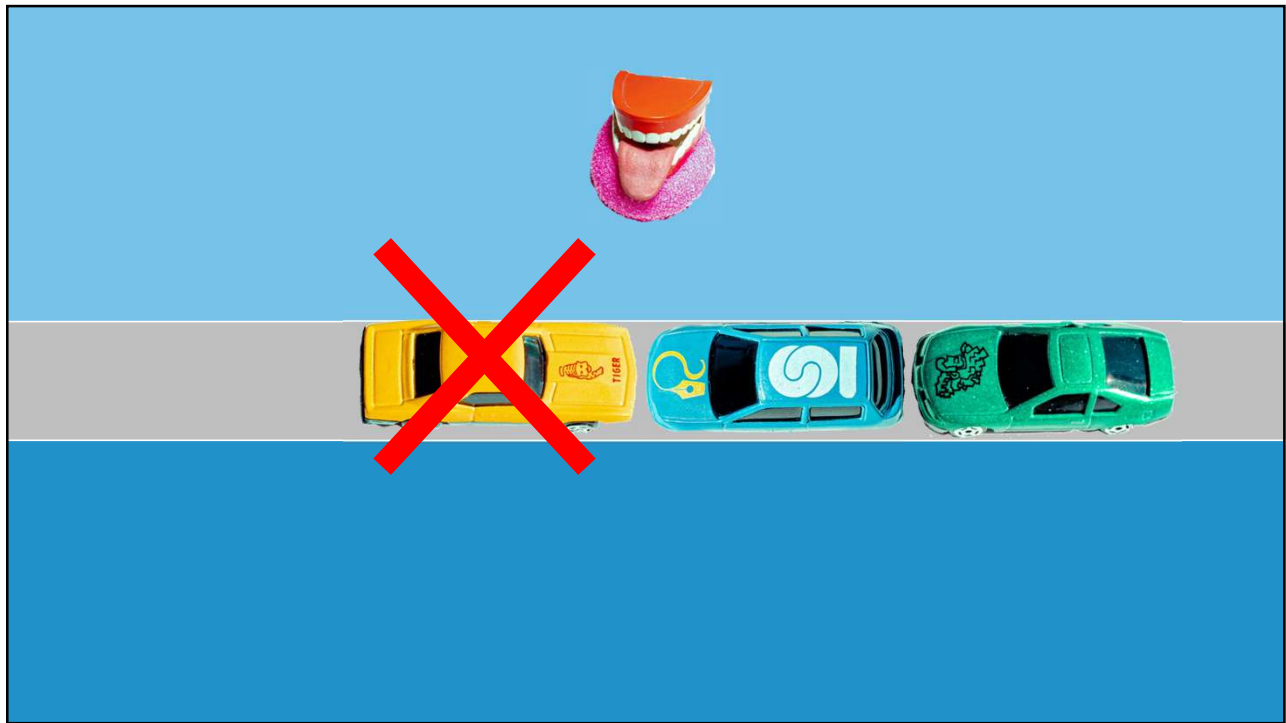
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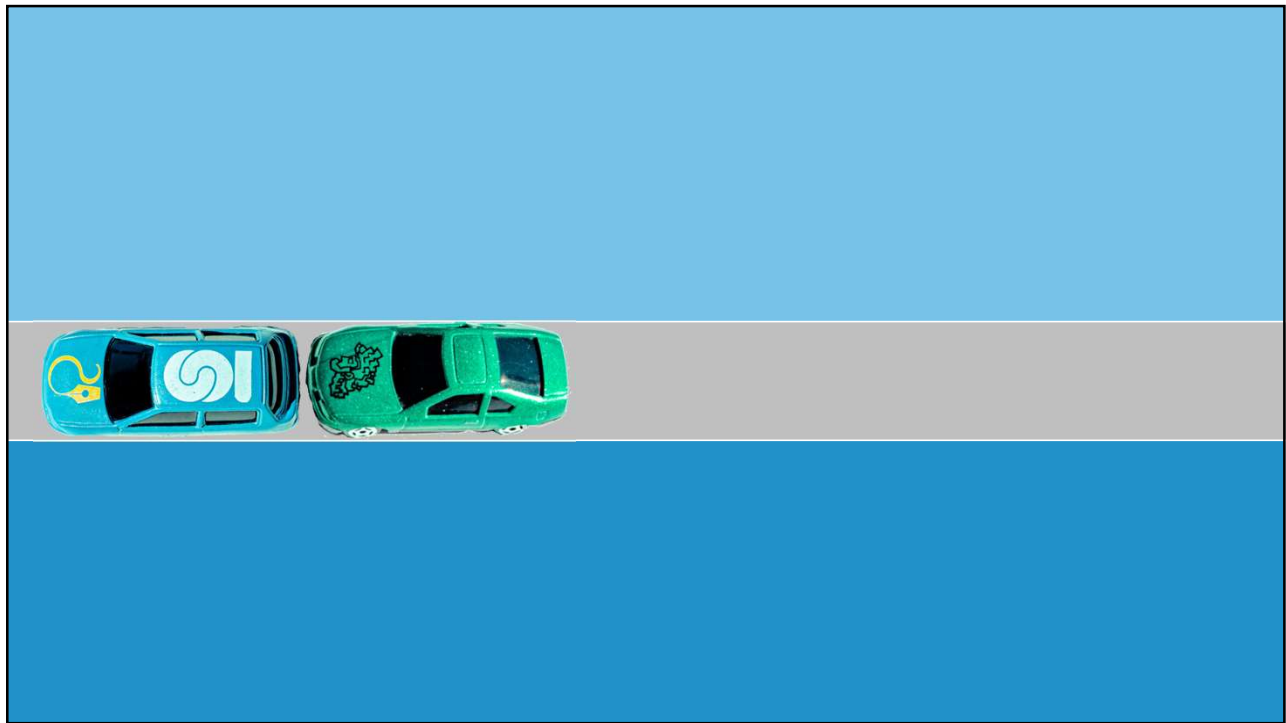
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Methods to defuse deadlocks

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Methods

1. Change the deadlock priority so important queries “win”
2. Create or modify nonclustered indexes
 - Provide different resources (“roads”) so queries can bypass one another
3. TSQL rewrites
 - Changing the queries
 - Restructuring transactions
4. Isolation level changes (sometimes risky)
 - NOLOCK means “I don’t care if the data is correct”
littlekendra.com/course/the-dirty-secrets-of-nolock/
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“Can we fix this with an index?”

Relatively fast to do, low risk, prevents future occurrences

1. Which indexes are being used by the queries now?

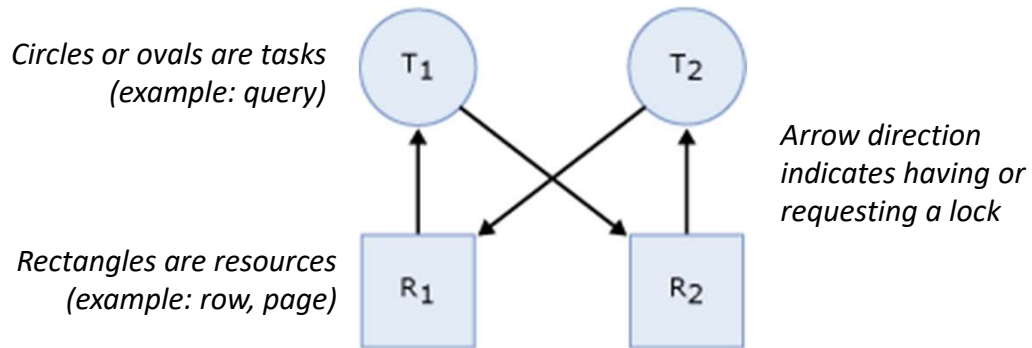
Deadlock graph shows this

1. Is it possible to get a read query to move to an index that isn’t locked by the writes?

Having a repro makes testing this MUCH easier

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Deadlock graph essentials



<https://docs.microsoft.com/en-us/sql/relational-databases/sql-server-transaction-locking-and-row-versioning-guide>

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How to collect
the deadlock
graph

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Collecting deadlock information



Every deadlock is a special monster

You may find the deadlock graph in the System Health event session

I prefer to collect them in a dedicated trace

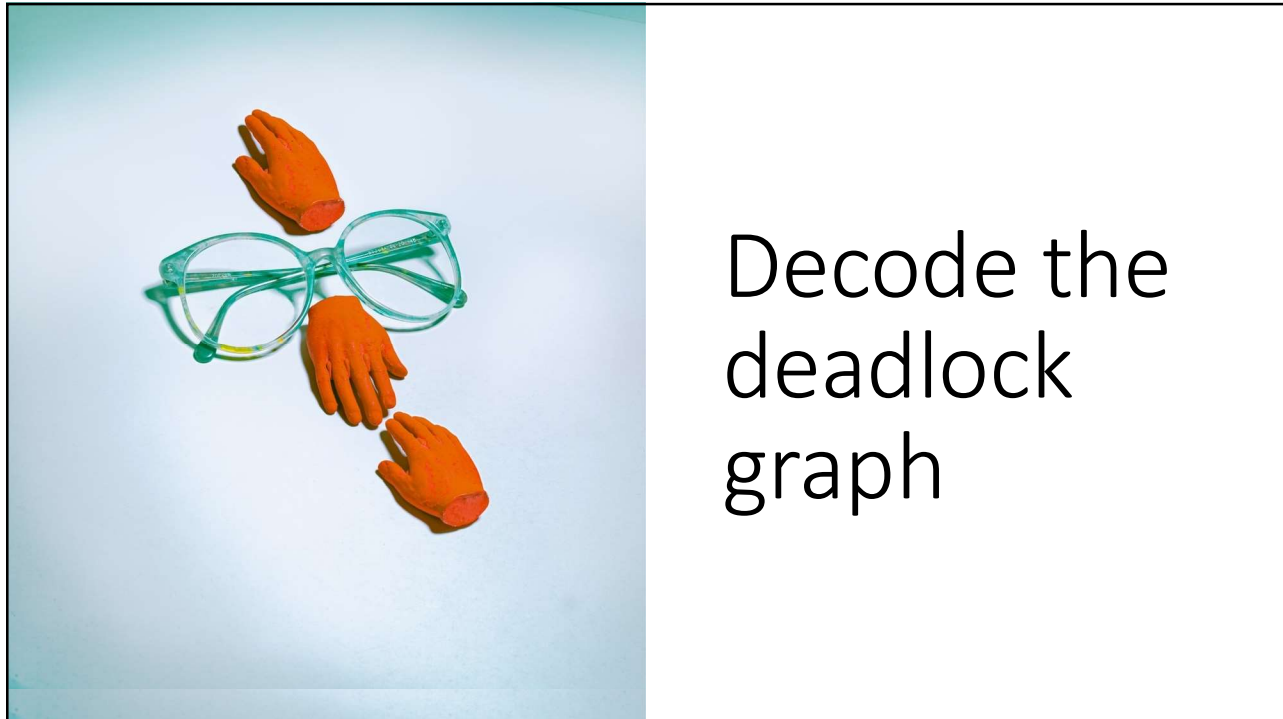
- Server Side SQL Trace: Deadlock Graph Event
- Extended Events: sqlserver.xml_deadlock_report

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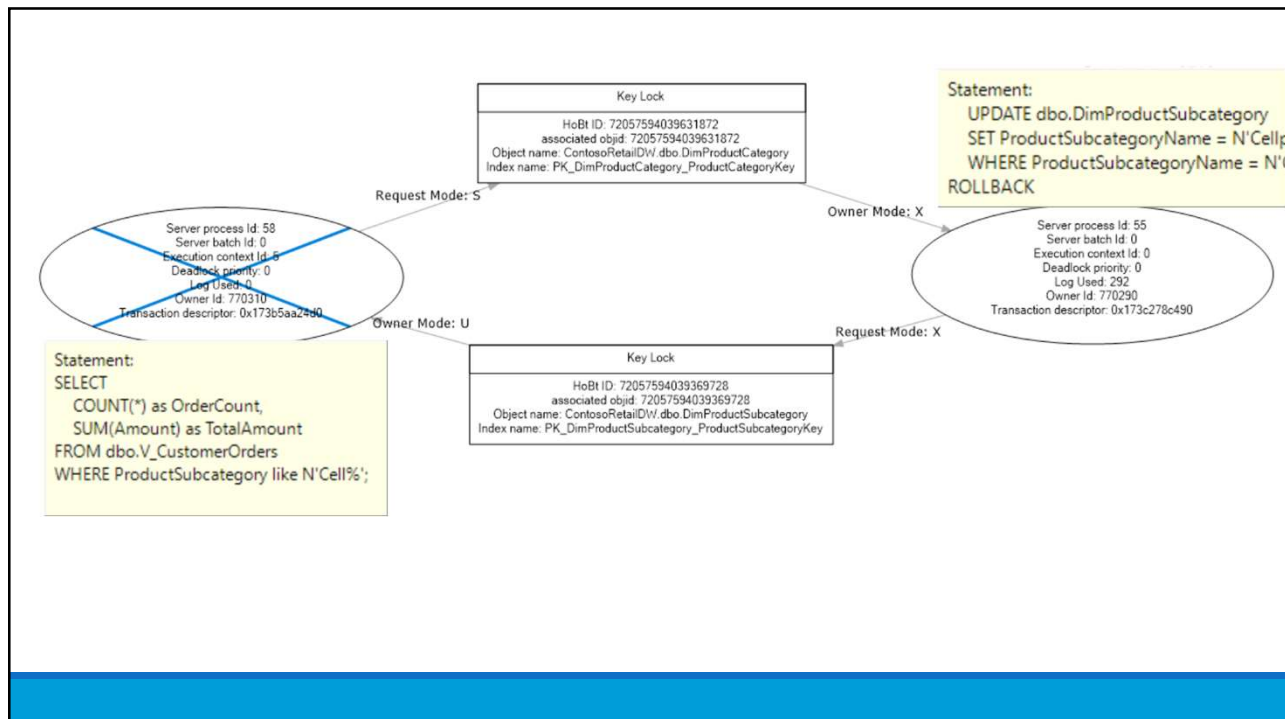


Demo

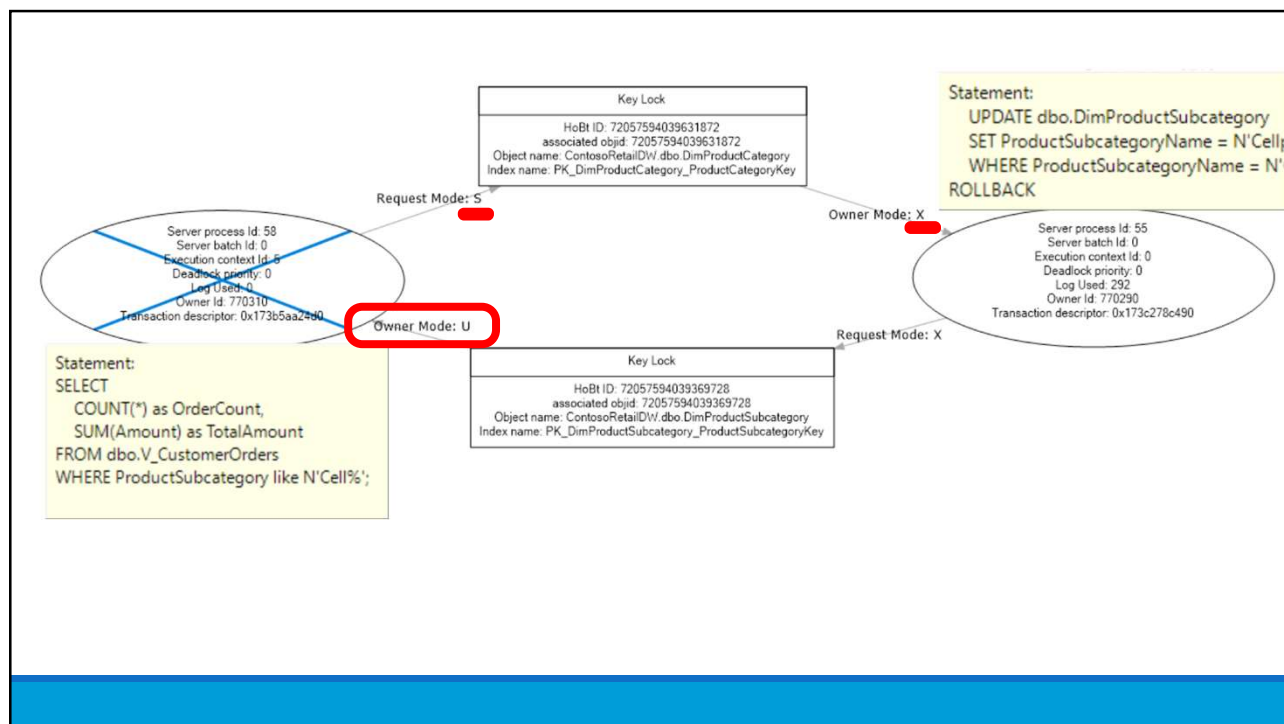
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If we look at the XML...

```
<resource-list>
  <keylock hobtid="72057594039631872" dbid="6" objectname="ContosoRetailDW.dbo.DimProductCategory"
    indexname="PK_DimProductCategory_ProductCategoryKey" id="lock17355ccdb80" mode="X" associatedObjectId="72057594039631872">
    <owner-list>
      <owner id="process173a45ca108" mode="X" />
    </owner-list>
    <waiter-list>
      <waiter id="process173be629088" mode="S" requestType="wait" />
    </waiter-list>
  </keylock>
  <keylock hobtid="72057594039369728" dbid="6" objectname="ContosoRetailDW.dbo.DimProductSubcategory"
    indexname="PK_DimProductSubcategory_ProductSubcategoryKey" id="lock173aa649180" mode="U" associatedObjectId="72057594039369728">
    <owner-list>
      <owner id="process173be629088" mode="S" />
    </owner-list>
    <waiter-list>
      <waiter id="process173a45ca108" mode="X" requestType="convert" />
    </waiter-list>
  </keylock>
</resource-list>
```

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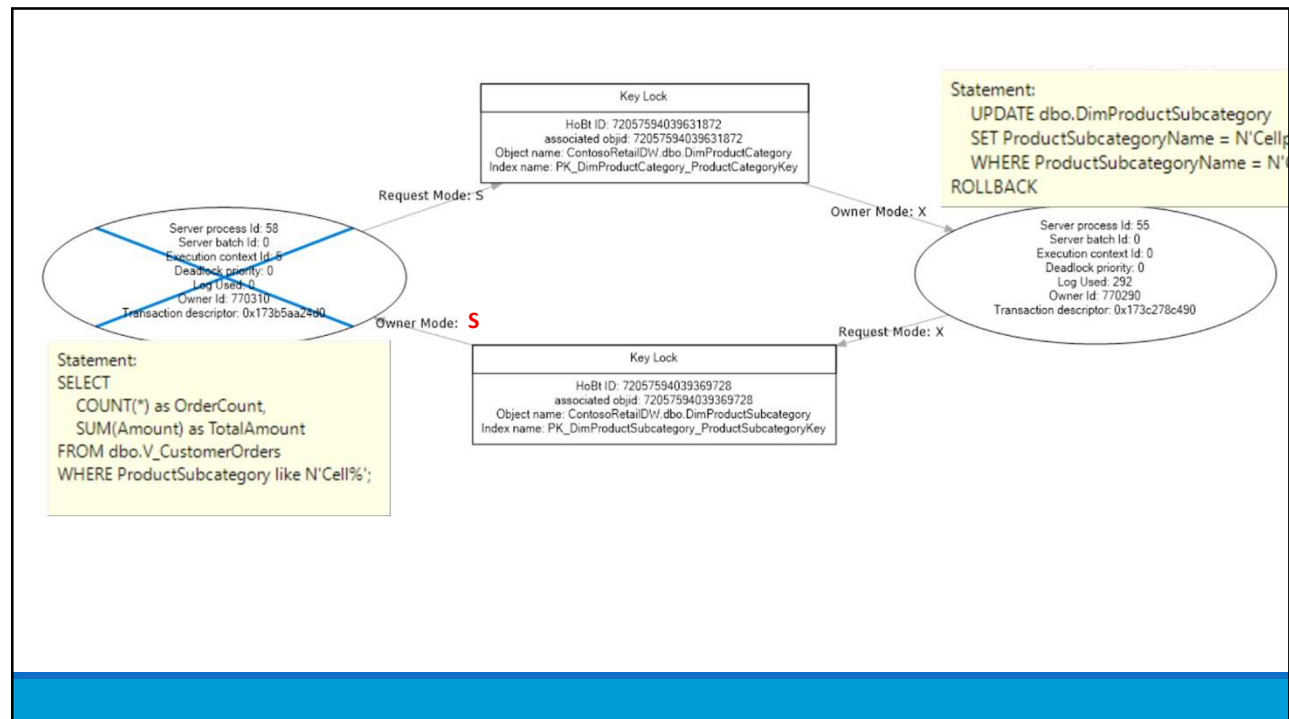
That lyin' graphic display

Our SELECT query only had an S lock – as confirmed by the XML

- This is misrepresented by the graphical display in SSMS
- 'The puzzle of U locks in deadlock graphs' by Remus Rusanu

<http://rusanu.com/2010/05/12/the-puzzle-of-u-locks-in-deadlock-graphs/>

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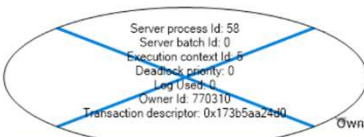
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Defuse the deadlock



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Door #1



Owner Mode: **S**

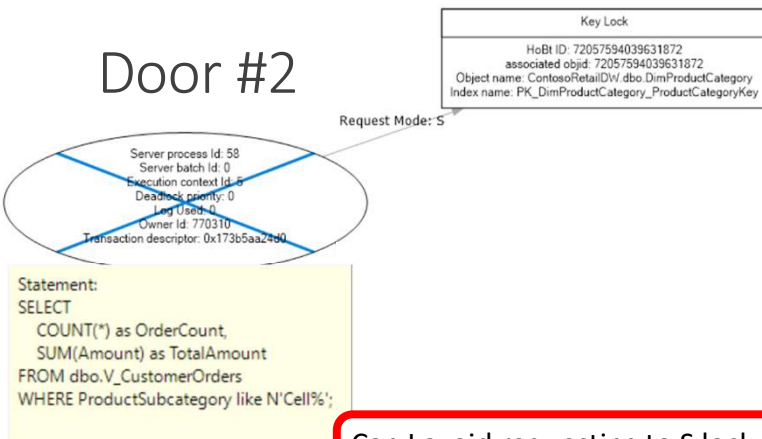
Statement:
SELECT
COUNT(*) as OrderCount,
SUM(Amount) as TotalAmount
FROM dbo.V_CustomerOrders
WHERE ProductSubcategory like N'Cell%';

Key Lock
HoBt ID: 72057594039369728 associated objid: 72057594039369728 Object name: ContosoRetailDW.dbo.DimProductSubcategory Index name: PK_DimProductSubcategory_ProductSubcategoryKey

Can I avoid taking the S lock on the PK of
dbo.DimProductSubcategory?

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Door #2



Can I avoid requesting to S lock the PK on dbo.DimProductCategory?

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Solving deadlocks with indexes

Make sure a new index is the right move

- Is there already an index leading on CountryID which we could modify to include CountryName?
- What is the insert rate and size of the table?

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Demo

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Summing up

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Revisiting methods

1. Change the deadlock priority so important queries “win”
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3. TSQL rewrites
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Three tough things about deadlocks

01

Deadlock graphs are confusing to read

02

You can have more than two sessions involved

03

The “input buffer” is limited

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Comments? Questions?
