Locking in the SQL Server Database Engine

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Overview

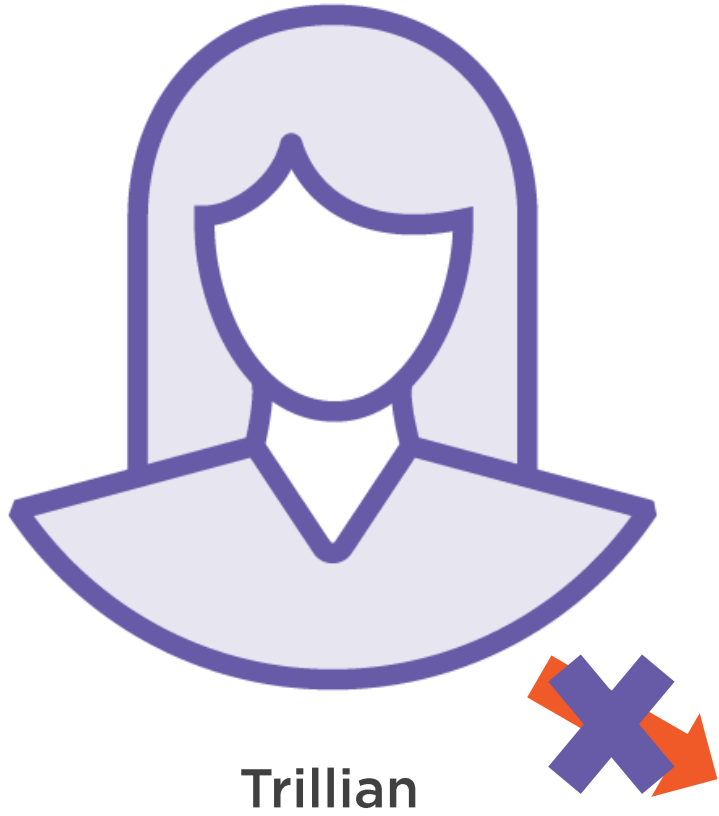Locking mechanism

Lock granularity and hierarchies
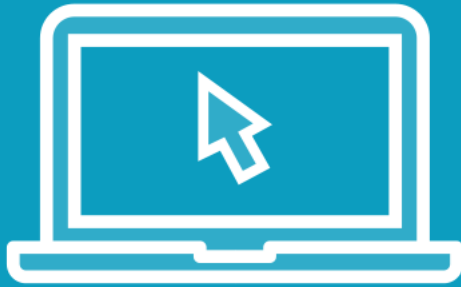
Lock modes

Lock compatibility

Lock escalation and dynamic locking

Deadlocks

Locking in SQL Server

Trillian

Arthur

Demo

Blocking

Locking Granularity and Hierarchy
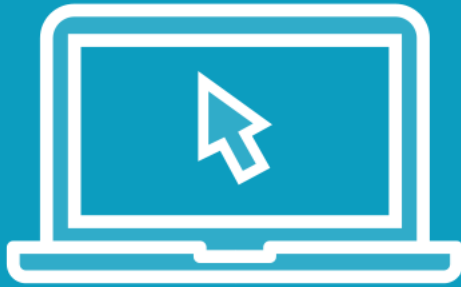
Multigranular locking

Automatic resource locking

Smaller granularity (e.g. rows)

Larger granularity (e.g. table)

Locking hierarchy

Demo

Locking granularity and hierarchy

Locking Granularities

Resource	Description
RID	A row identifier used to lock a single row within a heap.
Key	A row lock within an index used to protect key ranges.
Page	An 8-kilobyte (KB) page in a database, such as data or index pages.
Extent	A contiguous group of eight pages, such as data or index pages.
HoBT	A heap or B-tree.
Table	The entire table, including all data and indexes.
File	A database file.
Application	An application-specified resource.
Metadata	Metadata locks.
Allocation Unit	An allocation unit.
Database	The entire database.

Locking Granularities

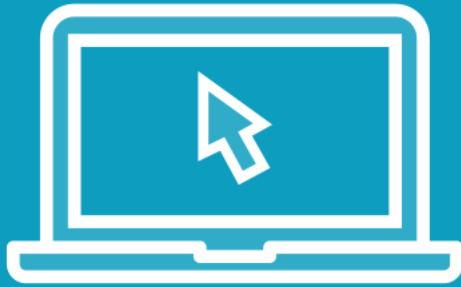| Resource	Description
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Locking Modes

Mode	Description
Shared (S)	Read operations
Update (U)	Resources to be updated
Exclusive (X)	Data modification
Intent (IS, IX, SIX, IU, SIU, UIX)	Establish a lock hierarchy
Schema (Sch-M, Sch-S)	Schema-dependent operations
Bulk Update (BU)	Bulk Update and TABLOCK
Key-Range (RS, RU, RN, RX)	Protect a range of rows

Demo

Locking granularity and modes

Lock Escalation

Concurrency vs lock granularity
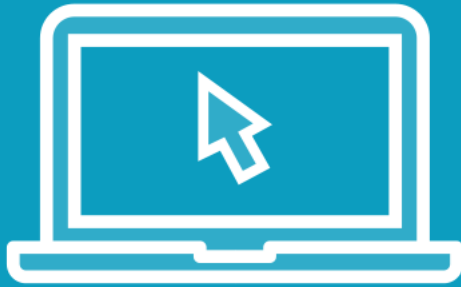
Dynamic locking

Lock escalation

Simplifies database administration

Increases performance

Automatic lock adjustment

Behavior can be set per table
(SQL Server 2008 and later)
AUTO, TABLE, DISABLE

Demo

Lock escalation

Summary

Introduction to locking

Granularity and hierarchy

Locking modes

Escalation