Designing Indexes to Organize Tables

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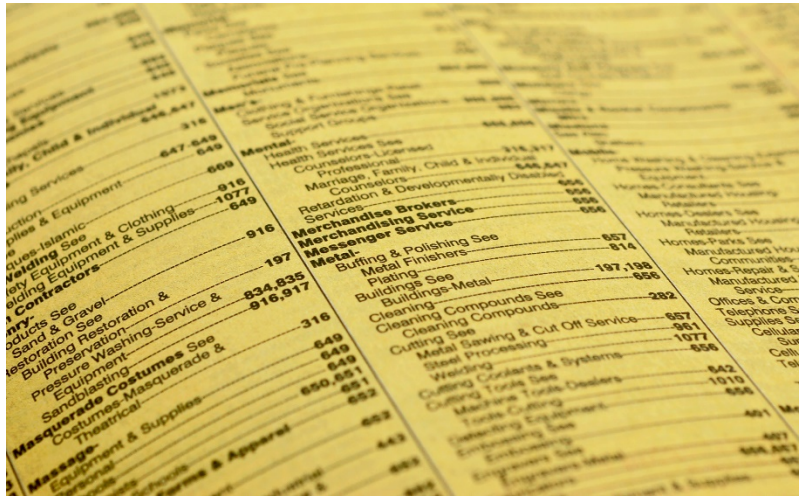
Agenda

- Introducing clustered indexes
- Clustered index debate
- Guidelines

Introducing Clustered Indexes



Index which defines the physical storage of the table

One per table only

Clustered Index Debate

Create the clustered index to organise the table

Create the clustered index on the most frequent access path

Guidelines for Organising the Table

Narrow

Unique

Unchanging

Ever-increasing

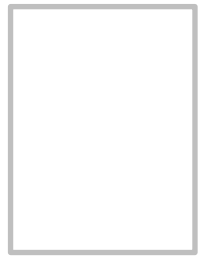
Narrow

A larger index key causes more overhead

May result in a deeper index tree

Clustered index key is used as a “row address” in all other indexes

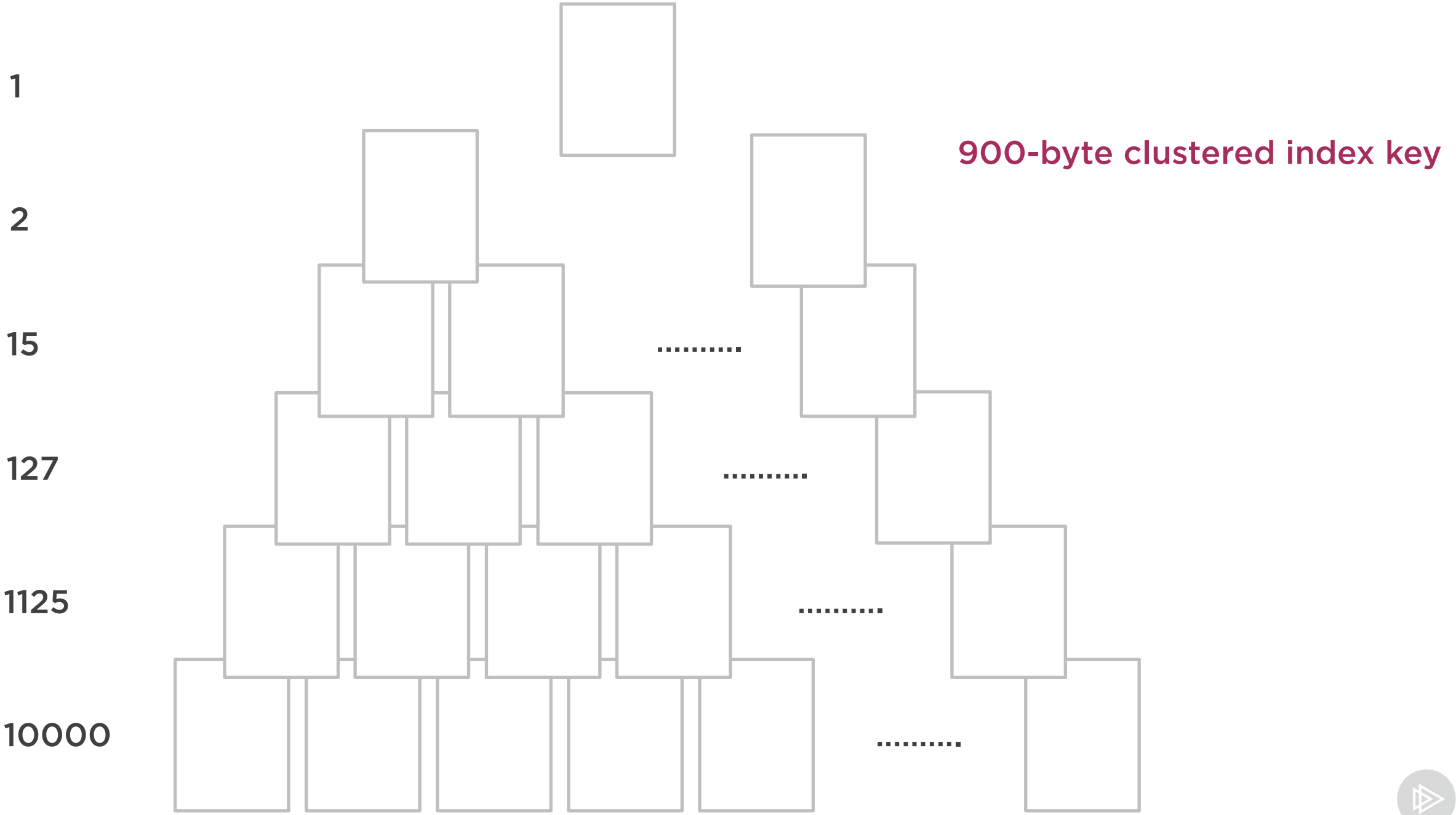
1



4-byte clustered index key

4

10000


1
2
15
127
1125
10000
900-byte clustered index key

Unique

The clustered index key has to be unique as it is used as a row's "address"

If it's not created as UNIQUE, then an extra hidden column is added

This hidden column is a 4-byte integer

Unchanging

The clustered index key defines where a row is found within the index

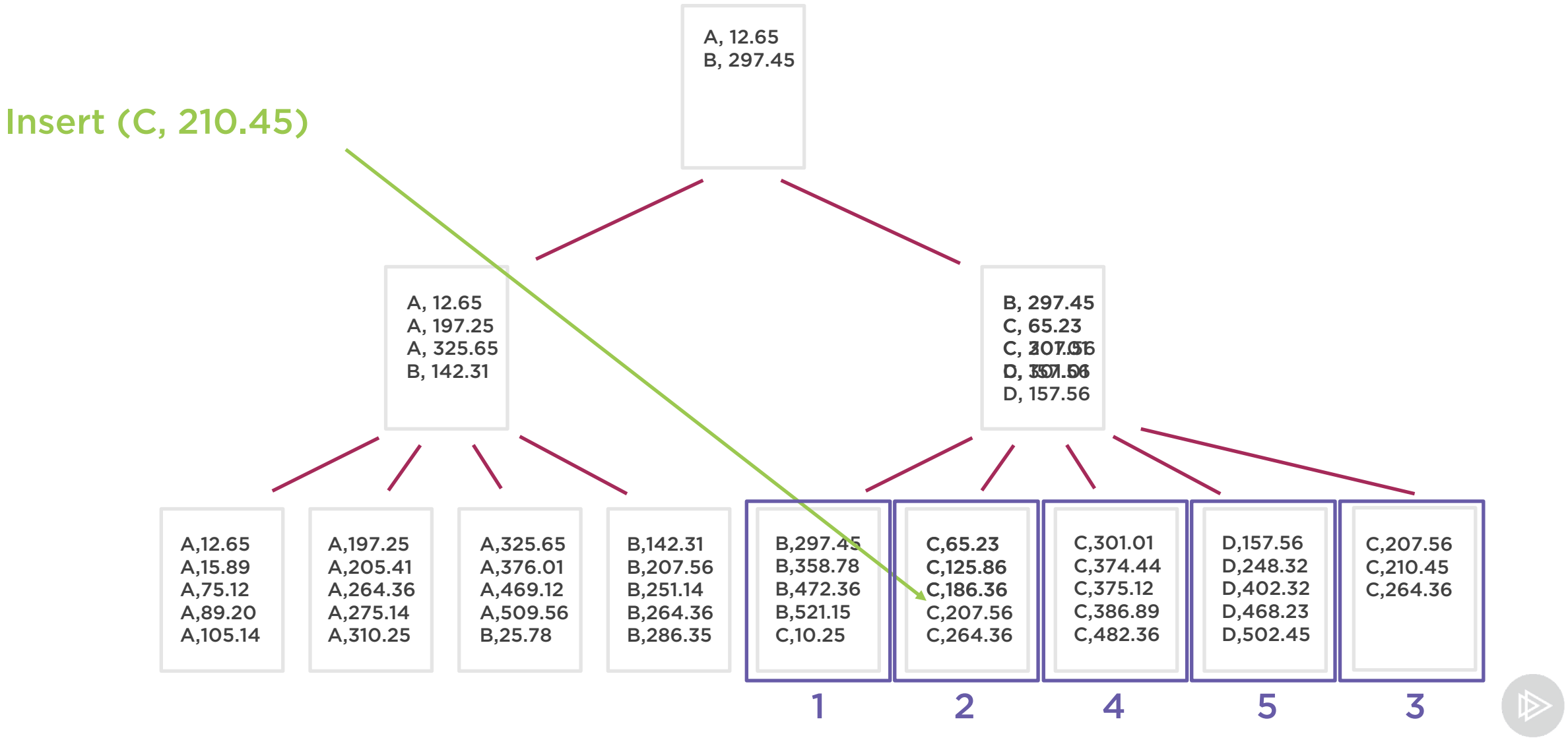
If the key changes, the update has to be split into a delete-insert pair

Can also cause page splits and partially empty pages

Ever-increasing

Inserts into random places within the index cause page splits, which are slow

What's a Page Split?



Demo

Clustered index key guidelines and trade-offs

Clustered Index Trade-Offs

Organise the table

Table is as small as it can be

Minimal page splits

Less overhead on updates

Need additional nonclustered indexes

Support queries

Table may take up more space than necessary

Potentially problematic page splits on inserts and updates

Clustered index can support queries using a frequent access path

Compromise

Go for an index key that supports some queries while satisfying some guidelines

Good example is a date column in a transactional table

Dates in transactional tables

- 8-12 bytes in most cases
- Transaction dates should be unchanging
- Transaction dates are usually increasing in value
- Such tables often queried by date

Summary

What clustered indexes are

Clustered index debate and guidelines