

# Boosting Your Database Performance Using SQL Server Indexes & SSAS Aggregations

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# Agenda

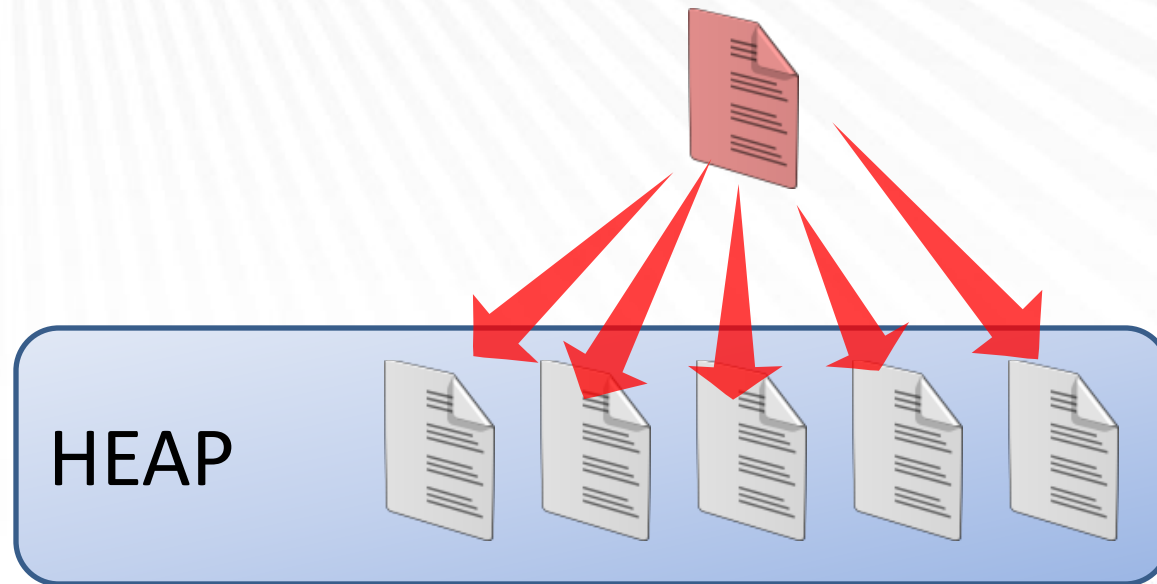
- Indexes Strategy
  - Data structure – HEAP
  - CLUSTURED Indexes
  - NONCLUSTURED Indexes
  - More on Indexes
  - Best Practices
- SSAS Aggregations
  - New Aggregation Designer
  - Best Practices

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# Data Structure – HEAP

- Table with NO CLUSTURED index
- First IAM Page
  - No particular order on the other pages

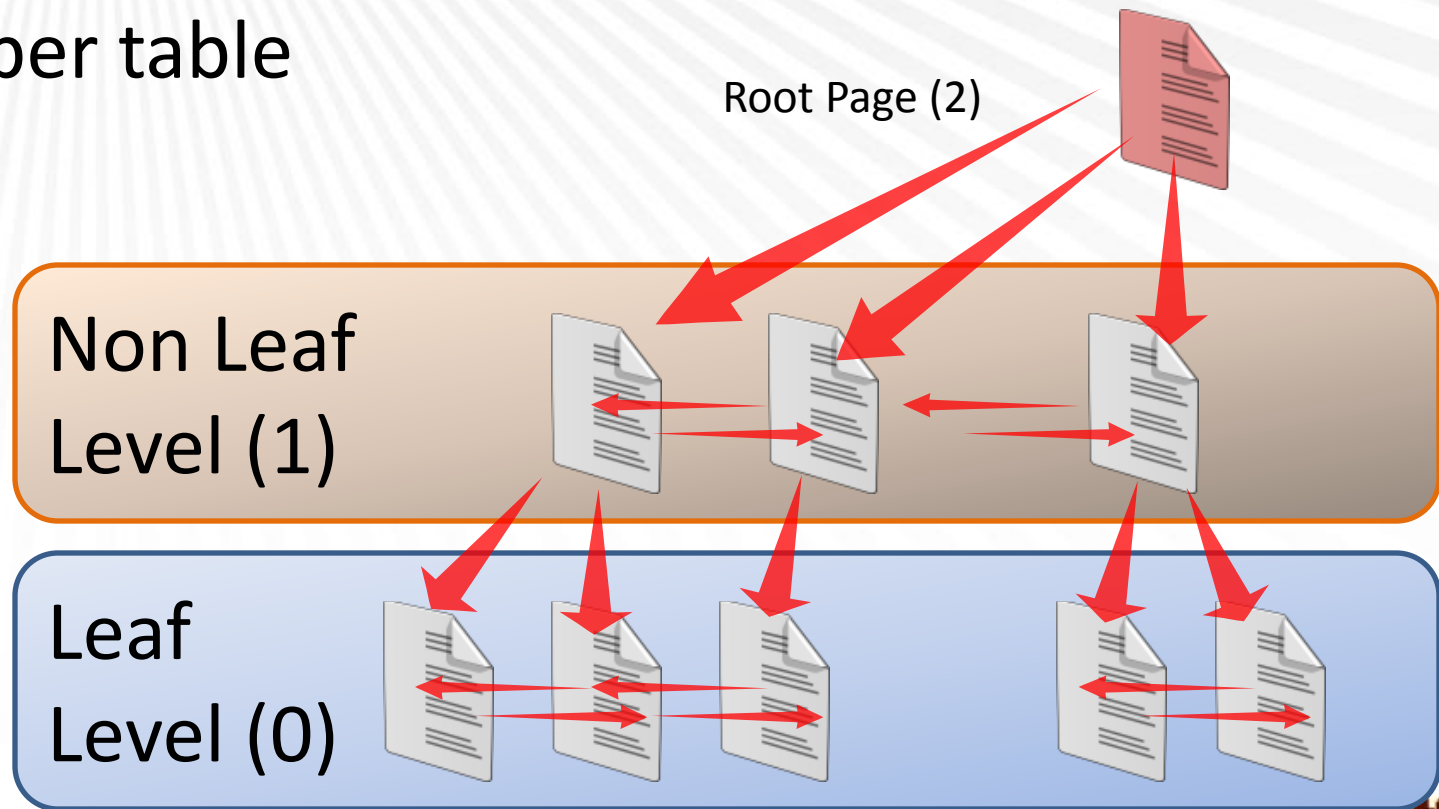


# Data Structure – HEAP

- DEMO

# CLUSTURED Index

- B-Tree – leaf level = data pages
- One per table

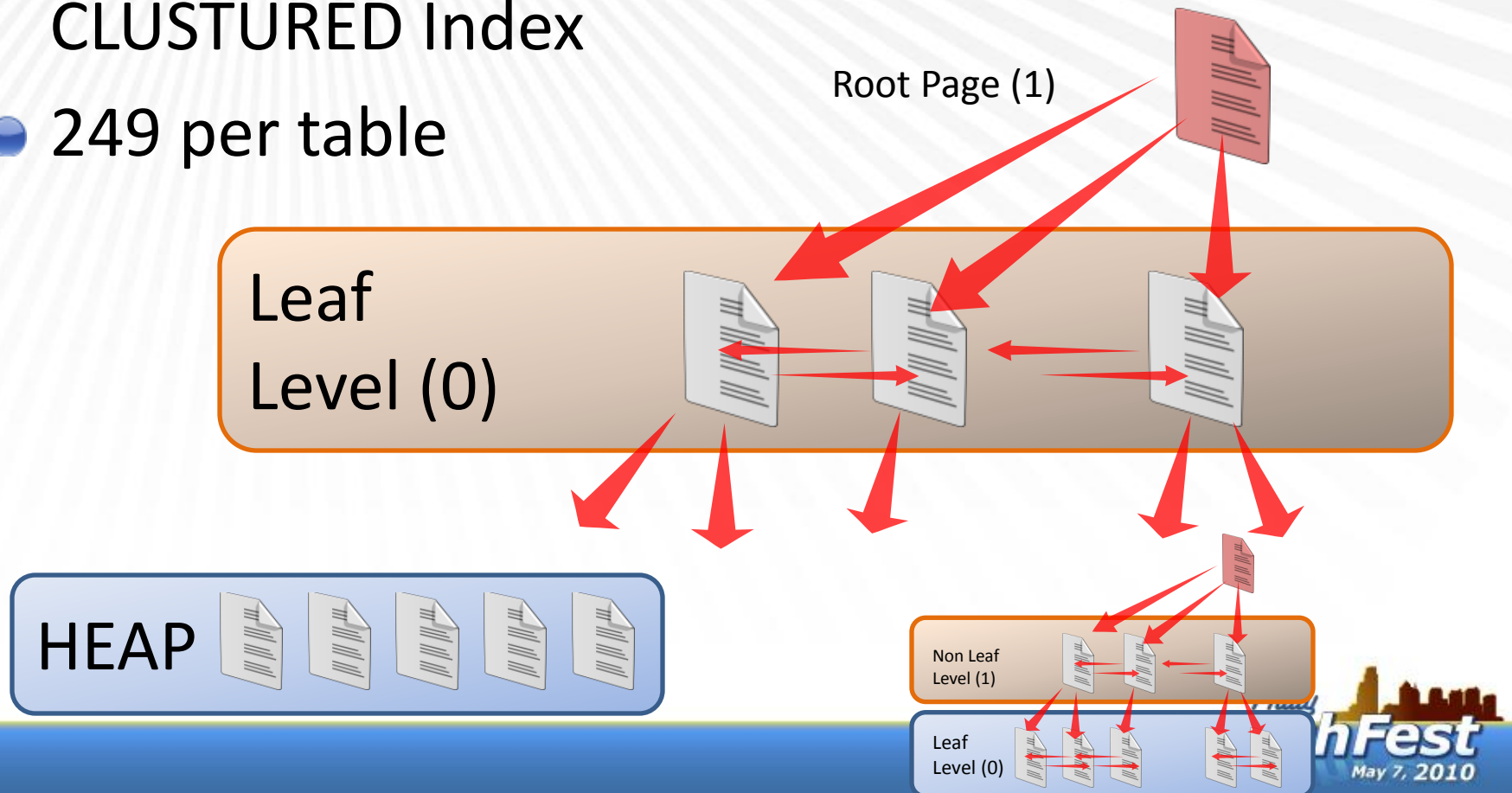


# CLUSTURED Index

- DEMO

# NONCLUSTURED Index

- B-Tree: leaf level → data pages (HEAP) or CLUSTURED Index
- 249 per table



# NONCLUSTURED Index

- DEMO

# More on Indexes

- Query coverage with indexes:
  - Execution plan
  - Included columns
- Indexed views:
  - Will materialize your view – 1<sup>st</sup> index must be an unique clustered
  - Some restrictions apply
    - Create WITH SCHEMABINDING
    - CANNOT have: TOP, UNION, ORDER BY, Subqueries, ...

# More on Indexes

- Partitioned indexes:
  - Partitioned tables
- Filtered indexes:
  - WHERE clause on the index
    - Lots of NULLs (SPARSE)
    - UNIQUE INDEX on not NULLs for example
    - Ranges

# More on Index

- DEMO

# More on Indexes

## ● Index Fragmentation

- Detect: `sys.dm_db_index_physical_stats`
- Fragmentation < 30% → `ALTER ... REORGANIZE`
- Fragmentation > 30% → `ALTER ... REBUILD`

## ● Online Index Building

- Default behavior: exclusive lock on the index
- Two copies
  - Source: queries will read from here
  - Target: writes are taking place here

# Best Practices

## ● CLUSTURED

- USE

- Range queries
- Primary key queries

- DO NOT USE

- Columns that have frequent changes
- Wide keys

## ● NONCLUSTURED

- USE

- Predicates
- Joins
- Aggregation
- Cover queries

# Best Practices

- Use FILL Factor and Pad Indexes accordingly
- Use partitioned indexes with partitioned tables
  - Or at least filtered indexes when appropriate
- Use INCLUDE
- Keep key size to a minimum

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# SSAS Aggregations

- Pre-calculated subtotals stored in either an OLAP or relational format
- Improve performance getting data out
- New Aggregation Designer on SQL 2008
  - For 2005: download Aggregation Manager from [codeplex](#)

# SSAS Agregations

- DEMO

# Best Practices

- Aggregation size between 10 and 30% of the fact table
- When in doubt use Usage based aggregation design

# Q&A

Thank you!

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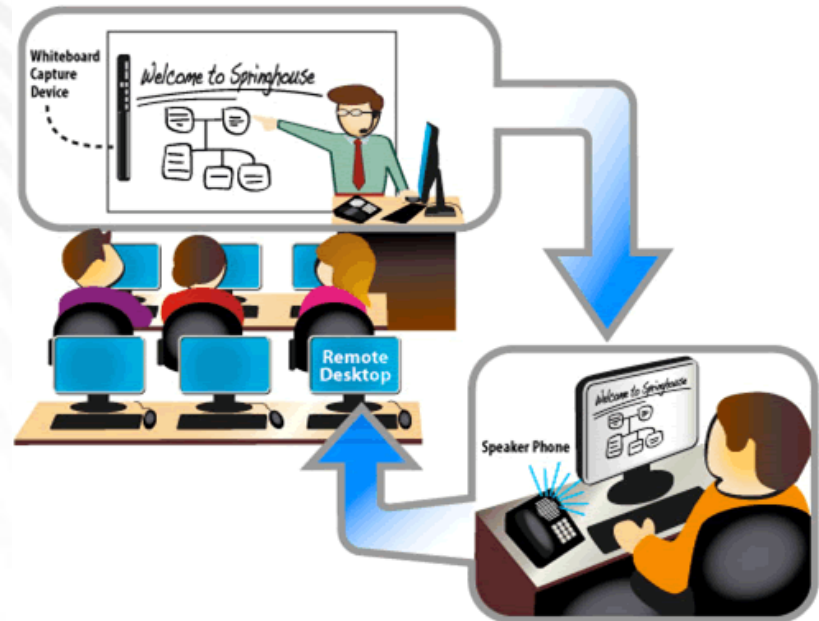
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The Windows 7 logo, featuring the four-pane window icon in blue, green, red, and yellow, followed by the text "Windows 7" in white.

# Upcoming Windows 7 Migration Clinics

Exton, PA – May 13<sup>th</sup>

Malvern, PA – June 29<sup>th</sup>

Reston, VA - May 14<sup>th</sup>

Richmond, VA – June 2<sup>nd</sup> & 11<sup>th</sup>

Washington, DC – June 30<sup>th</sup>

For full event details and registration  
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## Event Overview

This one-day **Windows 7 Migration Clinic** dives deep into the migration and deployment planning strategies for Windows 7. Through a series of in-depth presentations and exercise demonstrations, we will highlight the new tools and technologies designed to enable successful Windows 7 migrations and deployments.