Weekly Maintenance

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Overview

Index maintenance

Statistics maintenance
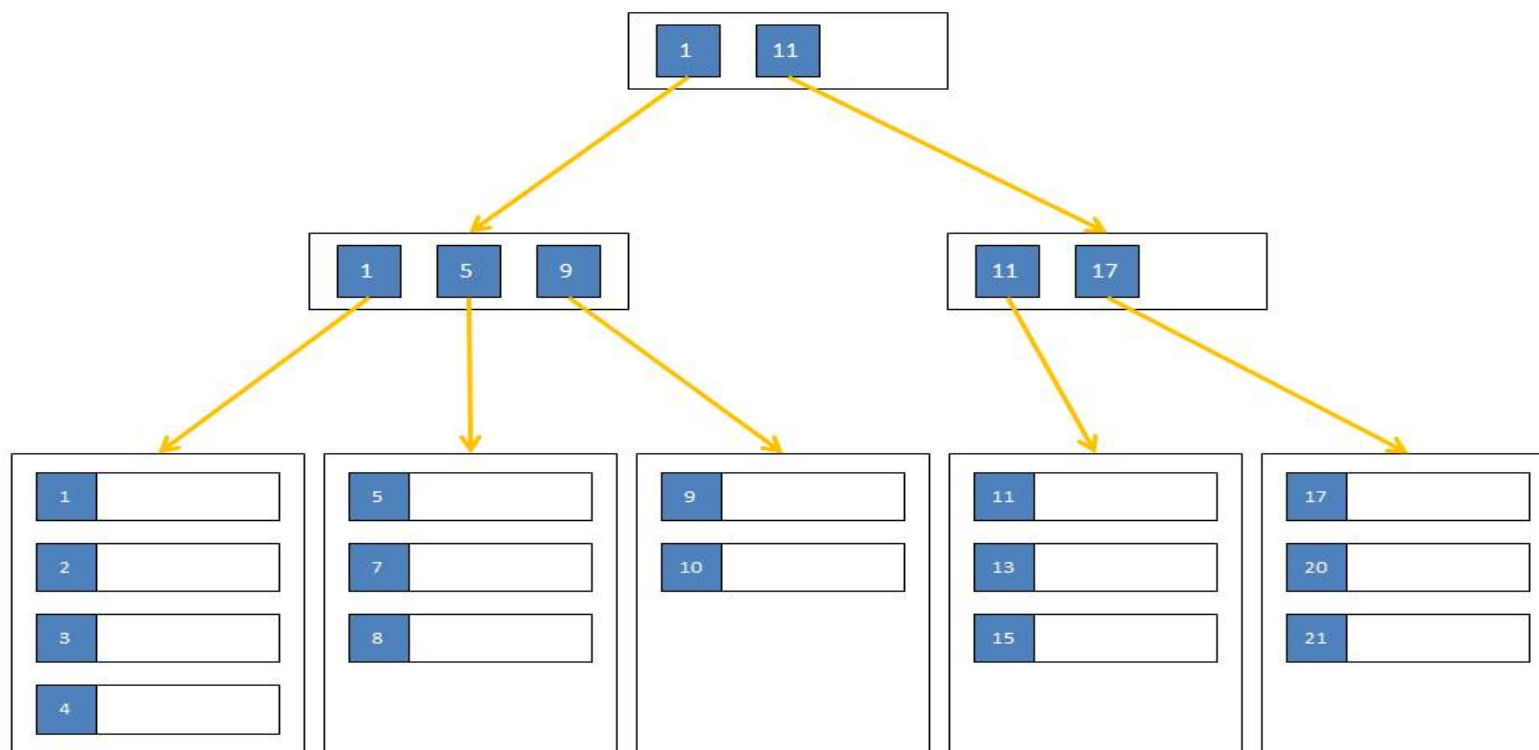
Database consistency

Demo

Index Maintenance

Index

An index is an on-disk structure associated with a table or view that speeds retrieval of rows from the table or view.

-- Microsoft Docs

What's an "on-disk structure" ?

A generic representation of how indexes seek to find the pages they need

Index Types

Clustered

Non-Clustered

We will not cover Columnstore Indexes, Filtered and other specialty in this course

Clustered Index

Index Types

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<u>Non-Clustered</u>

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Non-Clustered Index

Index Maintenance Considerations

Which Indexes?

- Size (page count)
- Fragmentation %
- Frequency
- Rebuild vs. Reorganize
- Duration

Why and How?

Why do we do this?

- Better memory usage
- Fresh statistics
- Better query plans

How do we do this?

- SQL Server Maintenance Plans
- Custom T-SQL code
- 3rd party tools
- Community scripts

Statistics Maintenance

Statistics

Statistics for query optimization are binary large objects (BLOBs) that contain statistical information about the distribution of values in one or more columns of a table or indexed view.

-- Microsoft Docs

Statistics

What are they?

- Information about the data
- Helper data for the query optimizer

When do they update?

- AutoUpdate at 20%
- Scheduled jobs
- Manually

Statistics Properties - Details

Table Name:	dbo.Users
Statistics Name:	NC_DisplayName

```
Statistics for INDEX 'NC_DisplayName'.
--------------------------------------------------------------------------------

                   Name                      Updated                       Rows
--------------------------------------------------------------------------------

          NC_DisplayName        Jul 14 2020   4:37PM                    6735363

            All Density               Average Length                   Columns
--------------------------------------------------------------------------------

            2.048868E-07                     19.42862               DisplayName
            1.484701E-07                     23.42862           DisplayName, Id

       Histogram Steps
         RANGE_HI_KEY                      RANGE_ROWS                   EQ_ROWS
--------------------------------------------------------------------------------

                 GUIDO                            0                        81
                 Aaron                        29545                      1297
                  Abhi                        22520                       562
                  Adam                        25885                      2156
                 Ahmad                        44005                       332
                  Ajay                        18977                       500
                Albert                        32063                       435
                  Alex                        17325                      6435
             Alexander                        14863                      1033
                   Ali                        21508                      1095
                  Amir                        45299                       445
                 Anand                        22712                       638
                Andrew                        27091                      2959
                  Andy                        18519                      2028
             Anonymous                        40775                       994
                Anurag                        25727                       252
                 Arjun                        30293                       271
                  Arun                        23311                       877
                   Ash                        12736                       585
                  Atul                        32233                       176
                  Bala                        46149                       347
```

Database Consistency / CheckDB

DBCC CheckDB

"Checks the logical and physical integrity of all the objects in the specified database..."

-- Microsoft Docs

What does DBCC CheckDB check?

Lower level checks

- Disk space allocation structures
- Table level integrity
- System metadata
- Options exist

What if CheckDB reports problems?

Stop everything!

- [Read this article](#) from Brent Ozar
- Don't panic
- Verify backups exist
- When was the last successful CheckDB
- Don't try to fix it yet
- Call Microsoft

Where can I run CheckDB?

You have choices

- On the server
- [From a restored backup](#)
- Availability Group secondary replica

Demo

Index maintenance plan

- Rebuild

- Reorganize

- Update statistics

Summary

What we learned:

- Index types
  - Clustered
  - Non-Clustered
  - What, why and how
- Statistics
  - Data about data
- Check DB
  - When and where