

Part 36 - Clustered & NonClustered indexes

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In this session we will learn

- Different types of indexes in sql server
- What are clustered indexes
- What are NonClustered indexes
- Difference between clustered and non clustered indexes

Prerequisite:

Part 35 – Introduction to Indexes in SQL Server

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Index Types

1. Clustered
2. Nonclustered
3. Unique
4. Filtered
5. XML
6. Full Text
7. Spatial
8. Columnstore
9. Index with included columns
10. Index on computed columns

In this session: Clustered and Nonclustered

Clustered Index

A clustered index determines the physical order of data in a table. For this reason, a table can have only one clustered index.

```
CREATE TABLE [tblEmployee]
(
    [Id] int Primary Key,
    [Name] nvarchar(50),
    [Salary] int,
    [Gender] nvarchar(10),
    [City] nvarchar(50)
)
```

Note that Id column is marked as primary key. Primary key, constraint create clustered indexes automatically if no clustered index already exists on the table.

To confirm: Execute `sp_helpindex tblEmployee`

Note that, the values for Id column are not in a sequential order

```
Insert into tblEmployee Values(3, 'John', 4500, 'Male', 'New York')
Insert into tblEmployee Values(1, 'Sam', 2500, 'Male', 'London')
Insert into tblEmployee Values(4, 'Sara', 5500, 'Female', 'Tokyo')
Insert into tblEmployee Values(5, 'Todd', 3100, 'Male', 'Toronto')
Insert into tblEmployee Values(2, 'Pam', 6500, 'Female', 'Sydney')
```

```
Select * from tblEmployee
```

Id	Name	Salary	Gender	City
1	Sam	2500	Male	London
2	Pam	6500	Female	Sydney
3	John	4500	Male	New York
4	Sara	5500	Female	Tokyo
5	Todd	3100	Male	Toronto

Clustered Index

A **clustered index** is analogous to a telephone directory, where the data is arranged by the last name. We just learnt that, a table can have only one clustered index. However, the index can contain multiple columns (a composite index), like the way a telephone directory is organized by last name and first name.

Create a composite clustered Index on the Gender and Salary columns

```
Create Clustered Index IX_tblEmployee_Gender_Salary  
ON tblEmployee (Gender DESC, Salary ASC)
```

```
Select * from tblEmployee
```

Id	Name	Salary	Gender	City
1	Sam	2500	Male	London
5	Todd	3100	Male	Toronto
3	John	4500	Male	New York
4	Sara	5500	Female	Tokyo
2	Pam	6500	Female	Sydney

NonClustered Index

```
Create NonClustered Index IX_tblEmployee_Name  
ON tblEmployee (Name)
```

Id	Name	Salary	Gender	City	Name	Row Address
1	Sam	2500	Male	London	John	Row Address
5	Todd	3100	Male	Toronto	Pam	Row Address
3	John	4500	Male	New York	Sam	Row Address
4	Sara	5500	Female	Tokyo	Sara	Row Address
2	Pam	6500	Female	Sydney	Todd	Row Address

A nonclustered index is analogous to an index in a textbook. The data is stored in one place, the index in another place. The index will have pointers to the storage location of the data.

Since, the nonclustered index is stored separately from the actual data, a table can have more than one non clustered index, just like how a book can have an index by Chapters at the beginning and another index by common terms at the end.

In the index itself, the data is stored in an ascending or descending order of the index key, which doesn't in any way influence the storage of data in the table.

Difference

1. **Only one clustered index** per table, where as you can have more than one non clustered index
2. **Clustered index is faster** than a non clustered index, because, the clustered index has to refer back to the table, if the selected column is not present in the index.
3. **Clustered index determines the storage order** of rows in the table, and hence doesn't require additional disk space, but where as a Non Clustered index is stored separately from the table, additional storage space is required.

Additional Resources

- PRAGIM Home Page:

- <http://www.PragimTech.com>

- Resources:

- ASP.NET Interview Questions
- <http://www.VenkatASPInterview.Blogspot.com>
- C# Interview Questions
- <http://www.VenkatCSharpInterview.Blogspot.com>

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