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## Part 36 - Clustered & NonClustered indexes

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### 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

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## 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] varchar(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: `EXEC sp_helpindex tblEmployee`

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

```
Insert into tblEmployee Values(1,'John',6500,'Male','New York')
Insert into tblEmployee Values(2,'Sam',2500,'Male','London')
Insert into tblEmployee Values(4,'Max',5500,'Male','Moscow')
Insert into tblEmployee Values(3,'John',4500,'Male','New York')
Insert into tblEmployee Values(5,'Sara',8500,'Female','Tokyo')
Insert into tblEmployee Values(6,'Tudor',3100,'Male','Toronto')
```

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	Tudor	3100	Male	Toronto

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## 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	1100	Male	Toronto
3	John	4500	Male	New York
4	Sara	3500	Female	Tokyo
2	Pam	6500	Female	Sydney

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## NonClustered Index

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

ID	Name	Salary	Gender	City
1	Sam	2500	Male	London
5	Todd	1100	Male	Toronto
3	John	4500	Male	New York
4	Sara	3500	Female	Tokyo
2	Pam	6500	Female	Sydney

Name	Row Address
John	Row Address
Pam	Row Address
Sam	Row Address
Sara	Row Address
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.

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## 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.

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3 comments:

**Unknown** October 6, 2013 at 1:07 PM

Hello sir, i am Rajiv. In the difference b/w clustered and non-clustered indexes, in 2nd difference --> clustered index is faster than non-clustered index, because the clustered index has to refer back to the table. The reason should be non-clustered index has to refer back to the table, but its mentioned as clustered index has to refer back to the table. Correct me if i am wrong. Waiting for your reply.  
Thank you.

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**Venkat** October 6, 2013 at 2:14 PM

Hi Rajiv, you are 100% correct. That's a typo in the slide. Sorry about that.



**Unknown** October 7, 2013 at 12:08 PM

Thank you sir.

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