# 9.9.4 Index Hints

Index hints give the optimizer information about how to choose indexes during query processing. Index hints, described here, differ from optimizer hints, described in Section 9.9.3, “Optimizer Hints”. Index and optimizer hints may be used separately or together.

Index hints are specified following a table name. (For the general syntax for specifying tables in a SELECT statement, see Section 14.2.9.2, “JOIN Syntax”.) The syntax for referring to an individual table, including index hints, looks like this:

```
tbl_name [[AS] alias] [index_hint_list]

index_hint_list:
    index_hint [, index_hint] ...

index_hint:
    USE {INDEX|KEY}
      [FOR {JOIN|ORDER BY|GROUP BY}] ([index_list])
  | IGNORE {INDEX|KEY}
      [FOR {JOIN|ORDER BY|GROUP BY}] (index_list)
  | FORCE {INDEX|KEY}
      [FOR {JOIN|ORDER BY|GROUP BY}] (index_list)

index_list:
    index_name [, index_name] ...
```

The `USE INDEX (index_list)` hint tells MySQL to use only one of the named indexes to find rows in the table. The alternative syntax `IGNORE INDEX (index_list)` tells MySQL to not use some particular index or indexes. These hints are useful if EXPLAIN shows that MySQL is using the wrong index from the list of possible indexes.

The `FORCE INDEX` hint acts like `USE INDEX (index_list)`, with the addition that a table scan is assumed to be *very* expensive. In other words, a table scan is used only if there is no way to use one of the named indexes to find rows in the table.

Each hint requires the names of *indexes*, not the names of columns. To refer to a primary key, use the name `PRIMARY`. To see the index names for a table, use SHOW INDEX.

An ***index_name*** value need not be a full index name. It can be an unambiguous prefix of an index name. If a prefix is ambiguous, an error occurs.

Examples:

```
SELECT * FROM table1 USE INDEX (col1_index,col2_index)
  WHERE col1=1 AND col2=2 AND col3=3;

SELECT * FROM table1 IGNORE INDEX (col3_index)
  WHERE col1=1 AND col2=2 AND col3=3;
```

The syntax for index hints has the following characteristics:

- It is syntactically valid to omit ***index_list*** for `USE INDEX`, which means "use no indexes." Omitting ***index_list*** for `FORCE INDEX` or `IGNORE INDEX` is a syntax error.
- You can specify the scope of an index hint by adding a `FOR` clause to the hint. This provides more fine-grained control over the optimizer's selection of an execution plan for various phases of query processing. To affect only the indexes used when MySQL decides how to find rows in the table and how to process joins, use `FOR JOIN`. To influence index usage for sorting or grouping rows, use `FOR ORDER BY` or `FOR GROUP BY`.
- You can specify multiple index hints:

  ```
  SELECT * FROM t1 USE INDEX (i1) IGNORE INDEX FOR ORDER BY (i2) ORDER BY a;
  ```

  It is not an error to name the same index in several hints (even within the same hint):

  ```
  SELECT * FROM t1 USE INDEX (i1) USE INDEX (i1,i1);
  ```

  However, it is an error to mix `USE INDEX` and `FORCE INDEX` for the same table:

  ```
  SELECT * FROM t1 USE INDEX FOR JOIN (i1) FORCE INDEX FOR JOIN (i2);
  ```

If an index hint includes no `FOR` clause, the scope of the hint is to apply to all parts of the statement. For example, this hint:

```
IGNORE INDEX (i1)
```

is equivalent to this combination of hints:

```
IGNORE INDEX FOR JOIN (i1)
IGNORE INDEX FOR ORDER BY (i1)
IGNORE INDEX FOR GROUP BY (i1)
```

In MySQL 5.0, hint scope with no `FOR` clause was to apply only to row retrieval. To cause the server to use this older behavior when no `FOR` clause is present, enable the `old` system variable at server startup. Take care about enabling this variable in a replication setup. With statement-based binary

logging, having different modes for the master and slaves might lead to replication errors.

When index hints are processed, they are collected in a single list by type (USE, FORCE, IGNORE) and by scope (FOR JOIN, FOR ORDER BY, FOR GROUP BY). For example:

```
SELECT * FROM t1
  USE INDEX () IGNORE INDEX (i2) USE INDEX (i1) USE INDEX (i2);
```

is equivalent to:

```
SELECT * FROM t1
   USE INDEX (i1,i2) IGNORE INDEX (i2);
```

The index hints then are applied for each scope in the following order:

1. {USE|FORCE} INDEX is applied if present. (If not, the optimizer-determined set of indexes is used.)
2. IGNORE INDEX is applied over the result of the previous step. For example, the following two queries are equivalent:

   ```
   SELECT * FROM t1 USE INDEX (i1) IGNORE INDEX (i2) USE INDEX (i2);

   SELECT * FROM t1 USE INDEX (i1);
   ```

For FULLTEXT searches, index hints work as follows:

- For natural language mode searches, index hints are silently ignored. For example, IGNORE INDEX(i1) is ignored with no warning and the index is still used.
- For boolean mode searches, index hints with FOR ORDER BY or FOR GROUP BY are silently ignored. Index hints with FOR JOIN or no FOR modifier are honored. In contrast to how hints apply for non-FULLTEXT searches, the hint is used for all phases of query execution (finding rows and retrieval, grouping, and ordering). This is true even if the hint is given for a non-FULLTEXT index.

  For example, the following two queries are equivalent:

  ```
  SELECT * FROM t
    USE INDEX (index1)
    IGNORE INDEX (index1) FOR ORDER BY
    IGNORE INDEX (index1) FOR GROUP BY
    WHERE ... IN BOOLEAN MODE ... ;
  ```

```
SELECT * FROM t
  USE INDEX (index1)
  WHERE ... IN BOOLEAN MODE ... ;
```

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