

Query & Search Optimization Cheatsheet



Overview

When building queries, list views, and reports, it's best to create filter conditions that are selective so Force.com scans only the rows necessary in the objects your queries target—the Force.com query optimizer doesn't use an index to drive queries containing unselective filter conditions, even if the fields those filter conditions reference already have indexes on them. (This cheat sheet's "Index Selectivity Exceptions" section points to several things that automatically make filter conditions unselective.) Because filter conditions are also unselective if they exceed the Force.com query optimizer's thresholds, selectivity is especially important when your queries target objects containing more than one million records. Read on to learn how to write selective filter conditions, minimize your query response times, and optimize the database's overall performance.

Fields with Database Indexes

Indexed Standard Fields, All Objects

| |
|--|
| Id |
| Name |
| OwnerId |
| CreatedDate |
| SystemModstamp |
| RecordType (indexed for all standard objects that feature it) |
| Master-detail fields (custom fields are treated as custom indexes for index selectivity conditions and thresholds) |
| Lookup fields (treated as custom indexes for index selectivity conditions and thresholds) |

Other Indexed Fields

| |
|--------------------|
| Unique fields |
| External ID fields |

Index Selectivity Conditions and Thresholds

| Condition | Thresholds | Index Used |
|-----------------------|--|--------------------------------|
| Unary: standard index | Filter targets less than: <ul style="list-style-type: none"> • 30% of the first million records • 15% of records after the first million records • 1 million total records | Standard index |
| Unary: custom index | Filter targets less than: <ul style="list-style-type: none"> • 10% of the first million records • 5% of records after the first million records • 333,333 total records | Custom index |
| AND | Filter targets less than: <ul style="list-style-type: none"> • Twice the index selectivity thresholds for each filter • The index selectivity thresholds for the intersection of the fields <p>The Force.com query optimizer can detect date and number ranges, and treats their filters on the same field as a single, combined filter.</p> | Composite index |
| OR | Filter targets less than: <ul style="list-style-type: none"> • The index selectivity thresholds for each filter • The index selectivity thresholds for the sum of those fields | Index union |
| LIKE | For conditions that don't start with a leading wildcard, Force.com tests the first 100,000 rows for selectivity. | Standard index or custom index |

Force.com Query Optimizer – Standard Index

| # of records | First Threshold | Second Threshold | Final Threshold |
|---------------|-----------------|------------------|-----------------|
| ≤ 1 million | 30% of total | n/a | 30% of total |
| ≤ 2 million | 300,000 | 150,000 | 450,000 |
| ≤ 3 million | 300,000 | 300,000 | 600,000 |
| ≤ 4 million | 300,000 | 450,000 | 750,000 |
| ≤ 5 million | 300,000 | 600,000 | 900,000 |
| ≤ 5.6 million | 300,000 | 700,000 | 1 million |

Force.com Query Optimizer – Custom Index

| # of records | First Threshold | Second Threshold | Final Threshold |
|---------------|-----------------|------------------|-----------------|
| ≤ 1 million | 10% of total | n/a | 10% of total |
| ≤ 2 million | 100,000 | 50,000 | 150,000 |
| ≤ 3 million | 100,000 | 100,000 | 200,000 |
| ≤ 4 million | 100,000 | 150,000 | 250,000 |
| ≤ 5 million | 100,000 | 200,000 | 300,000 |
| ≤ 5.6 million | 100,000 | 333,333 | 333,333 |

Index Selectivity Exceptions

| Filter Conditions With | In SQL | In Reports and List Views |
|---|--|--|
| Negative filter operators | • != • NOT LIKE • EXCLUDES | • not equal to • does not contain • excludes |
| Comparison operators paired with text fields | • text_field < • text_field > • text_field <= • text_field >= | • text field less than • text field greater than • text field less or equal • text field greater or equal |
| Leading "%" wildcards | LIKE '%string%' | contains |
| References to nondeterministic formula fields | Cross-object formula fields | |

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Search Selectivity Tips

Be as selective as possible. For example, use Michael*, not Mich*.

Remember that Chatter feed searches aren't affected by the scope of your search, and that their results include matches across all objects.

Search for exact phrases using advanced searches.

Limit scope by targeting:

- Specific objects
 - Rows owned by the searcher
 - Rows within a division, when applicable
- Fields with Search Indexes (Vary by Object)

Fields with Search Indexes (Vary by Object)

Name fields

Phone fields

Text fields

Picklist fields

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www.facebook.com/forcedotcom

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Related Resources

On Architect Core Resources: developer.salesforce.com/architect

A Guide to Application Performance Profiling in Force.com (article)

Best Practices for Deployments with Large Data Volumes (paper)

Inside the Force.com Query Optimizer (webinar recording)

On the Salesforce Developers Blog: developer.salesforce.com/blogs

"Collecting Selectivity Statistics for Force.com Queries"

"Dealing with Exception Filters in Force.com"

"Force.com Formula Fields, Indexes, and Performance Gotchas"

"Force.com SOQL Best Practices: Nulls and Formula Fields"

"Maximizing the Performance of Force.com SOQL, Reports, and List Views"

In the Salesforce Help: help.salesforce.com

"Data Filtering Examples" (documentation)

"Getting the Most Out of Filter Logic" (documentation)

"How to Improve Listview Performance" (Salesforce Knowledge article)

"Improve Report Performance" (documentation)

"Find Information with Search" (documentation)