DATABASE

Query & Search Optimization Cheat Sheet

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.

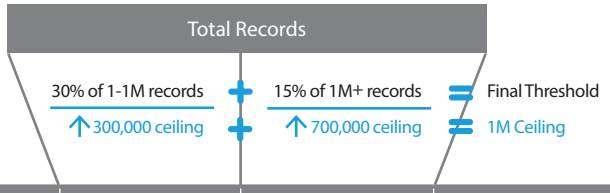
Fields with Database Indexes

Indexed Standard Fields, All Objects
`Id`
`Name`
`OwnerId`
`CreatedDate`
`SystemModstamp`
`RecordType` (indexed for all standard objects that feature it)
Master-detail fields
Lookup fields
Other Indexed Fields
Unique fields
External ID fields

Index Selectivity Conditions and Thresholds

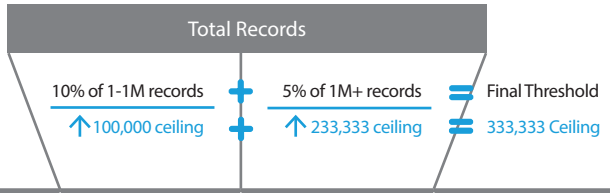
Condition	Thresholds	Index Used
Unary: standard index	Filter targets less than: • 30% of the first million records • 15% of records after the first million records • 1 million total records	Standard index
Unary: custom index	Filter targets less than: • 10% of the first million records • 5% of records after the first million records • 333,333 total records	Custom index
`AND`	Filter targets less than: • Twice the index selectivity thresholds for each filter • The index selectivity thresholds for the intersection of the fields The Force.com query optimizer can detect date and number ranges, and treats their filters on the same field as a single, combined filter.	Composite index
`OR`	Filter targets less than: • 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 SOQL	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 non-deterministic formula fields	Cross-object formula fields	

SOSL

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)
Name fields
Phone fields
Text fields
Picklist fields

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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
"Build Effective Filters" (documentation)
"Getting the Most Out of Filter Logic" (documentation)
"How to Improve Listview Performance" (Salesforce Knowledge article)
"Improve Report Performance" (documentation)
"Search Overview" (documentation)