10 Common Mistakes Developers Make When Writing SQL

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Agenda

- Do not be scared of writing SQL.
- The infamous SELECT *.
- Do you really know how NULL works?
- Is this column integer or varchar?
- The order of the columns doesn't matter, does it?
- We have a lot of memory, let's use it!!
- We need to paginate the result.
- Do not underestimate the power of character encoding.
- Connection pool.
- Let's talk about batch...

Bonus...

- Database transactions.
- The power of the prepared statements.
- The index is our friend!

Do Not Be Scared of Writing SQL

SQL isn't rocket science ;-)

SQL is Our Friend

- SQL is simple and easy to use.
- It can give a very good readability.
- Easier to tune and improve performance.
- Have you ever tried to map a complex join?
- How about batch processing?

Tweak Hundreds of Annotations, or...

```
@NamedEntityGraph(
  name = "post-entity-graph-with-comment-users",
  attributeNodes = {
    @NamedAttributeNode("subject"),
    @NamedAttributeNode("user"),
    @NamedAttributeNode(value = "comments", subgraph = "comments-subgraph"),
  },
  subgraphs = {
    @NamedSubgraph(
      name = "comments-subgraph",
      attributeNodes = {
        @NamedAttributeNode("user")
      }
    )
  }
)
@Entity
public class Post {

    @OneToMany(mappedBy = "post")
    private List<Comment> comments = new ArrayList<>();
    //...
}
```

```
select
    p.id,
    p.subject,
    p.user_id,
    c.post_id,
    c.id,
    c.id,
    c.post_id,
    c.reply,
    c.user_id,
    u.id,
    u.email,
    u.name
from
    post p
    join comment c on p.id = c.post_id
    join user u    on p.user_id = u.id
where p.id = ?
```

Do You Really Need All Columns?

*The infamous SELECT **

- It can prevent optimizations.
  - Index only scans / covered index.
- It can bloat the DB memory footprint.
- Can also bloat the app server memory footprint with massive ResultSet's.
- Let's not forget about our wires… Network will also suffer!

Do You Really Know How NULL Works?

You may be surprised!!

- Even though **JDBC** maps **SQL NULL** to **Java null** they are not the same.
- NULL is also called UNKNOWN.
- SQL “NULL = NULL” is false (not the same as null == null in Java).
- Arithmetic operations with NULL may not results in what you expect!

Is This Column Integer or Varchar?

Data type mismatch in predicates may ruin your day!

- Be careful with the Statements and the Prepared Statements.
- Also when joining tables do not use columns with different data types.
- It may cause data loss (truncate, implicit conversion, etc).
- It can cause the database to avoid an index.

The Order of the Columns Doesn't Matter, Does it?

Not all indexes are the same, nor are the databases!

- The order of the columns is very important for composed indexes.
- The columns are evaluated from the left most in the index creation order.
- The order you declare the columns in the where clause doesn’t impact.
- Cardinality and operators are very important.

Let’s Talk About Java!

It’s time!!!

We Have a Lot of Memory, Let's Use it!

Please, do not process data in Java memory when it can be done by the DB

- NEVER load two tables from separate queries into maps and join them in Java memory.
- Do not order, aggregate, execute nasty maths if it can be done by the DB.
- It is, for most of the cases, easier to write correctly in SQL than in Java.
- The database will probably be faster than your algorithm.
- Remember those wire plugged to your server? They will thank you!

We Need to Paginate the Result

More often than you think!

- The database is your friend and has nice features:
  - LIMIT .. OFFSET, TOP .. START AT, OFFSET .. FETCH
- Remember the memory? How about the wires? They will all love you!
  - In order to be able to sort and paginate, we have to fetch the complete result set into app memory.
- Ordering and paginating on DB is way faster than pagination in memory.
- We can avoid early row lookup and improve the performance even more.

Do Not Underestimate the Power of Character Encoding

My database speaks many languages

- Make sure that the application and DB are using same charset.
- Encoding mismatch can:
  - Completely mess your app “view”.
  - Prevent you from using a specific language or symbols.
  - Cause data loss.
- It can also cause odd errors that are hard to debug:
  - *ORA-01461: can bind a LONG value only for insert into a LONG column.*

Connection Pool

It may be obvious but many people do not use one!

- Standard. It is present in the JDBC specification (3.0).
- Can greatly increase the performance of the app, while reducing overall resource usage.
- Reduced connection creation time.
- Controlled resource usage.

Let's Talk About Batch...

The more the better

- It’s way faster than single inserts.
- JDBC knows batching! Create a batch INSERT with a single SQL statement and multiple bind value sets.
- Try to load the data during off peak time.
- If the above is not possible try to commit smaller batches to:
  - Keep the UNDO log small.
  - Avoid locks and race condition.

Demonstration

Bonus

Do we have time?

Bonus...

- Database Transactions.
- The power of the Prepared Statements.
- The index is our friend!

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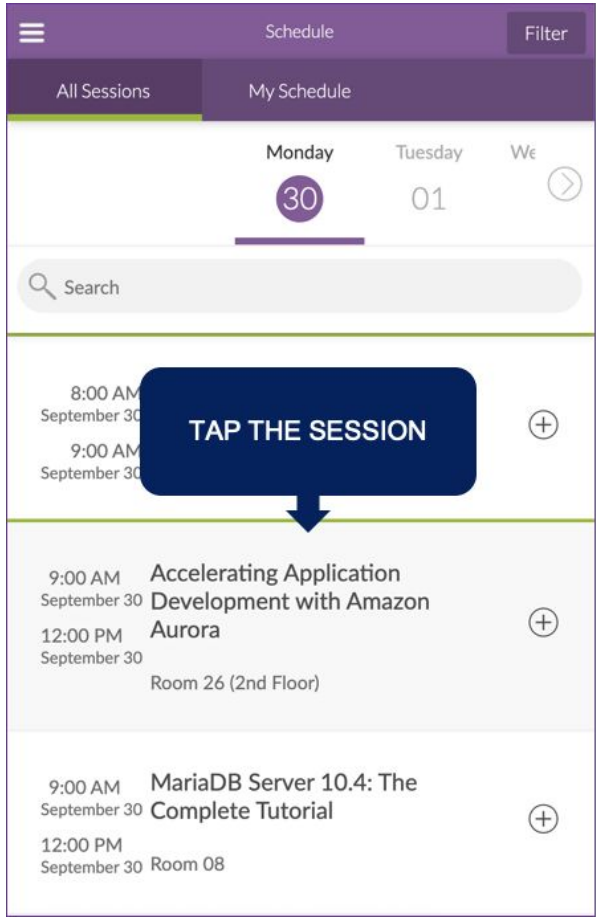

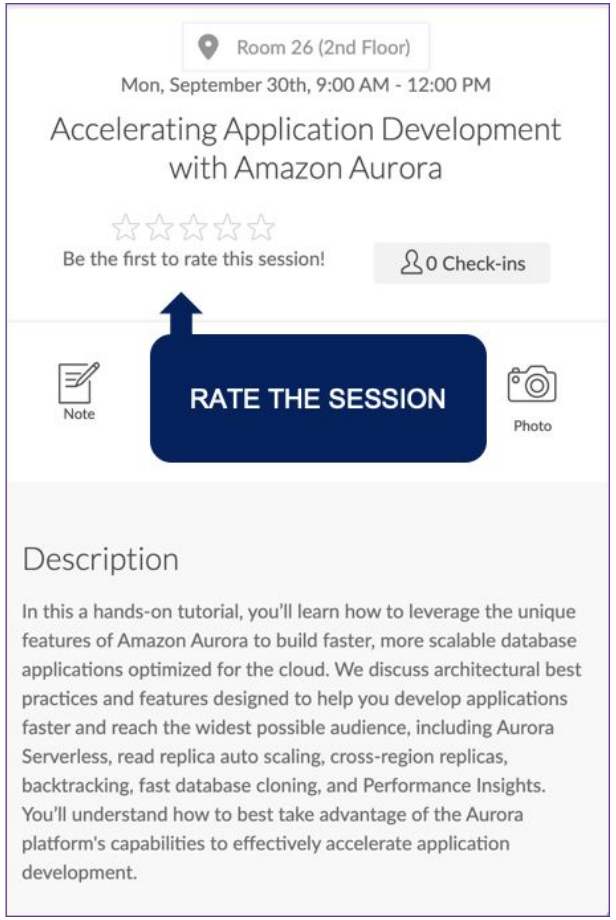

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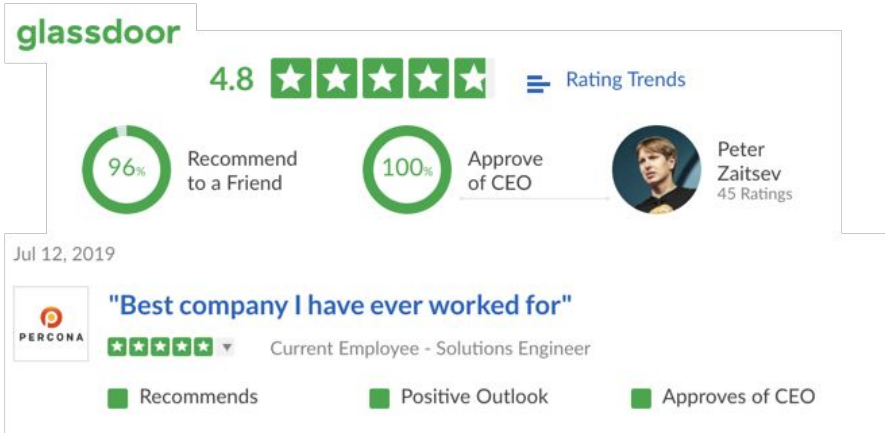

Any Questions?