Oracle SQL Performance

Explain Plan vs. Display Cursor & Bind Peeking

Management Consulting Series

The "Explain Plan" Illusion

Why static SQL analysis often misrepresents the reality of database execution in production environments.

Theory vs. Reality

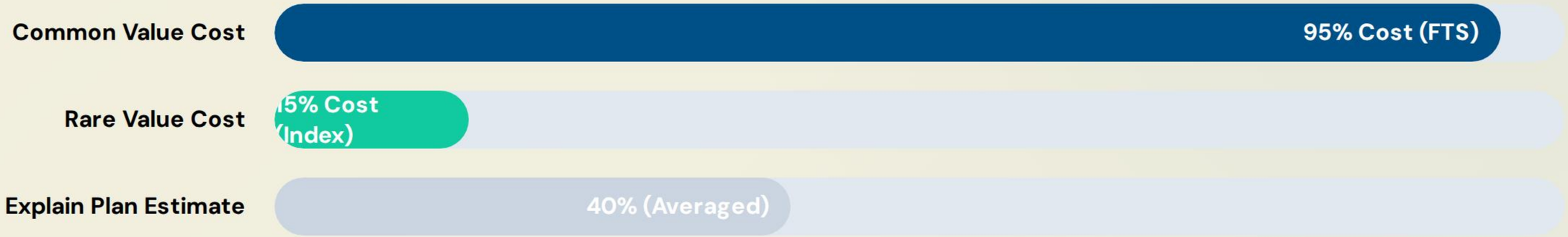
EXPLAIN PLAN

- The **Theoretical Prediction**.
- Based on generic table statistics.
- Ignores actual bind variable values.
- Does not account for Library Cache state.

DISPLAY_CURSOR

- The **Operational Reality**.
- Based on actual values (Bind Peeking).
- Reflects the exact plan in the cache.
- Includes runtime execution metrics.

Impact of Data Skew



Note: Explain Plan uses standard selectivity averages, missing the dramatic cost shift of skewed data.

Why EXPLAIN PLAN Fails

Value Blindness

Cannot access bind variables at the time of static analysis.

Static Estimation

Relies on global averages rather than skewed histograms.

Cache Bypass

Bypasses the Library Cache where actual plans reside.

Inside the Optimizer

During the **Hard Parse** phase, the Oracle Optimizer "peeks" at the initial values of bind variables.

This allows the engine to choose an Index Scan for rare data or a Full Table Scan for common data, ensuring peak performance.

$$\text{Selectivity} = \frac{1}{\text{Distinct Values}}$$

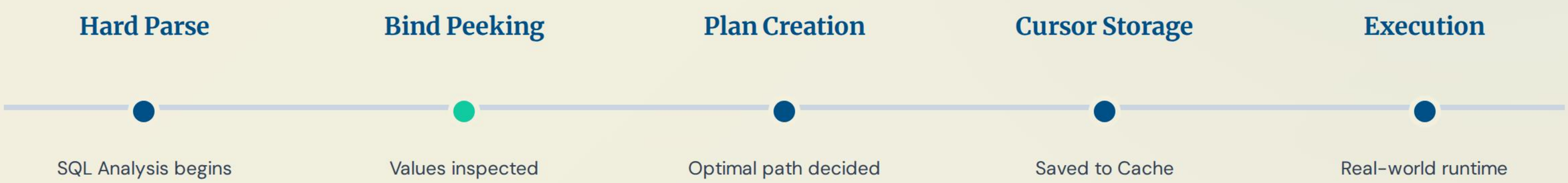
Comparative Analysis Matrix

Feature	EXPLAIN PLAN	DISPLAY_CURSOR
Data Source	Theoretical Calculation	Library Cache (V$SQL_PLAN)
Bind Awareness	None (Uses Averages)	High (+PEEKED_BINDS)
Accuracy	Low (for Binds)	100% Reality
Execution Required	No	Yes (at least once)

Best Practices for SQL Tuning

- **Always verify histograms**: Ensure Oracle understands the data skew on indexed columns.
- **Use +PEEKED_BINDS**: Capture the exact values that triggered the specific execution plan.
- **Monitor Adaptive Cursor Sharing**: Allow Oracle to store multiple plans for different bind values.
- **Test with Literals**: If performance differs, bind peeking is likely the root cause.

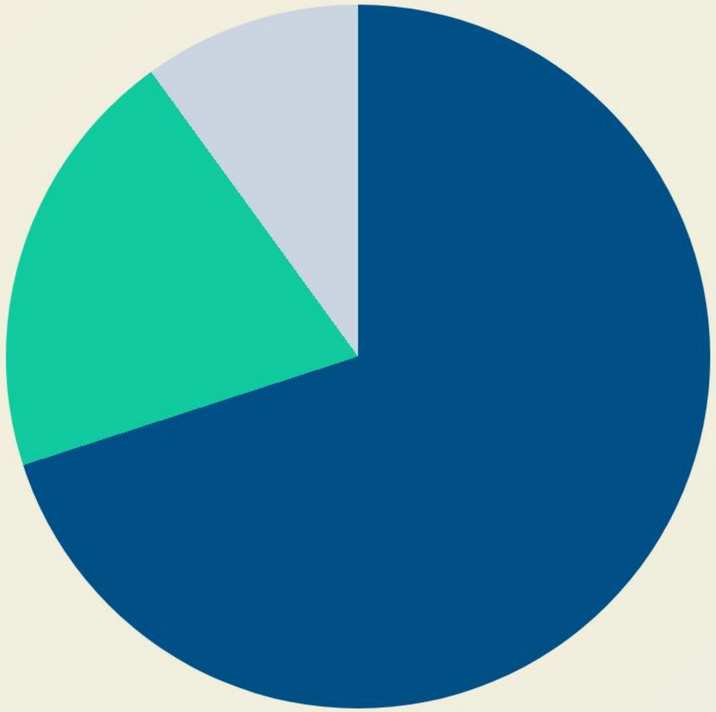
The Execution Lifecycle



"In the world of high-performance Oracle SQL, an execution plan without real data is merely a hypothesis."

— Advanced Tuning Principle

Plan Stability Distribution



- **70% Optimized** (Standard Flow)
- **20% Skew Sensitive** (Peeking Required)
- **10% Sub-optimal** (Tuning Opportunity)

Expert Q&A Session

Optimizing the Oracle Core

Ready to move from theoretical plans to operational excellence?

Performance Engineering Group

Image Sources

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