Views & Materialized Views in PostgreSQL

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About me:

- Java Developer
- Work in Andersen Lab

Agenda

- What Are Database Views?
- What are Materialized Views?
- Comparison
- Decision Matrix
- Summary

Views

Database Views:

- Virtual tables based on the result of a SQL query
- Act as a layer of abstraction over the underlying tables
- Do not store data themselves

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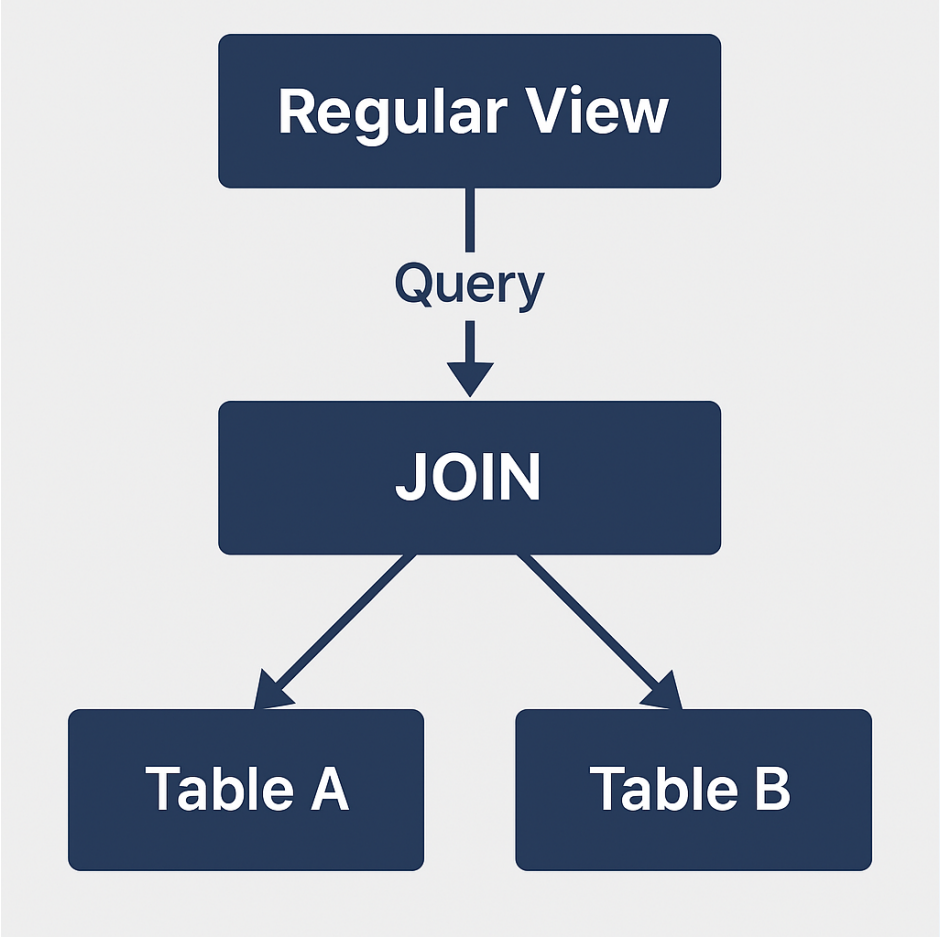
```
CREATE VIEW active_loans_view AS
SELECT
```

Key benefits:

- Simplify complex queries
- Provide a stable interface to data
- Can restrict access to sensitive data
- Enforce business rules consistently

How Regular Views Work



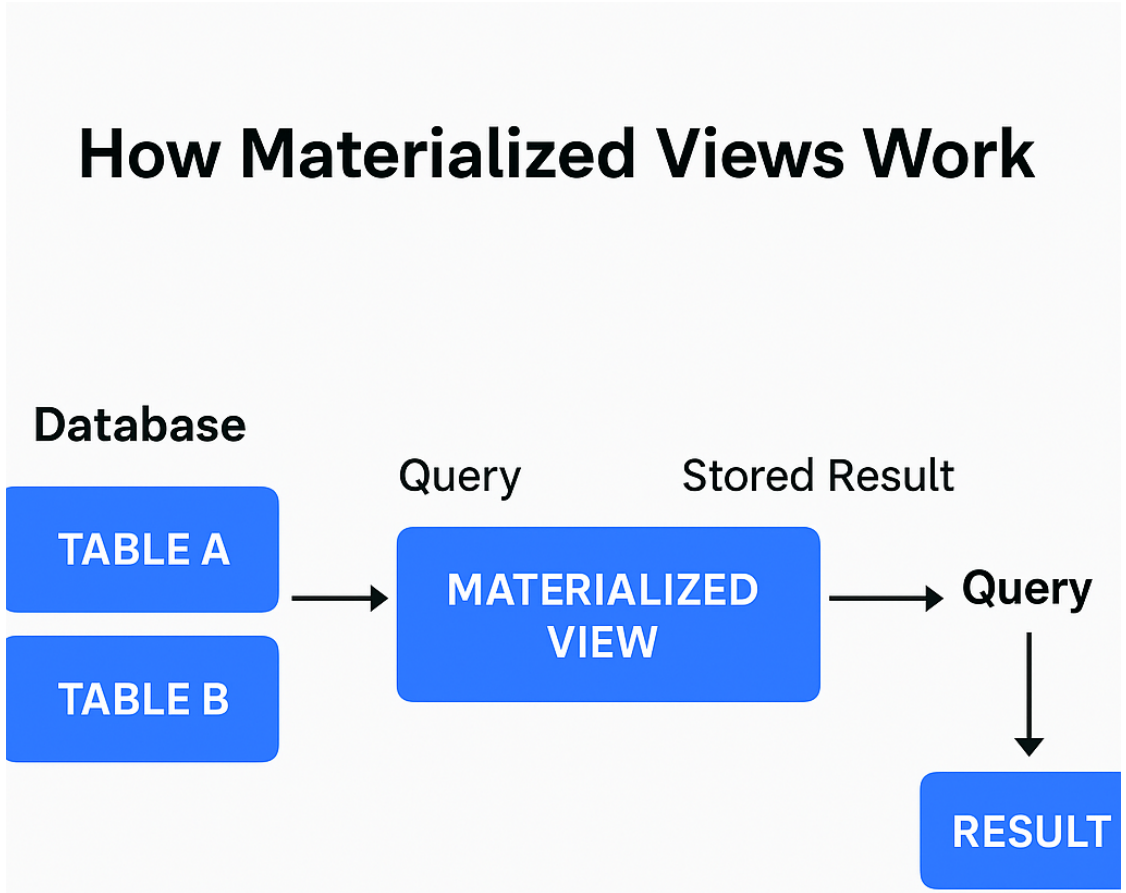
- User queries the view
- Database replaces view reference with the underlying query
- Database executes the combined query against base tables
- Results are returned to the user

Key Point:

Every query against a view re-executes the underlying query

Materialized Views

```
CREATE MATERIALIZED VIEW transaction_daily_summary AS
SELECT
```



- When created/refreshed:
  - Database executes the view query
  - Results are stored on disk
  - Indexes can be created on these results
- When queried:
  - Database reads directly from stored results
  - No re-execution of underlying query

Key Point:

Query performance is dramatically improved, at the cost of data freshness

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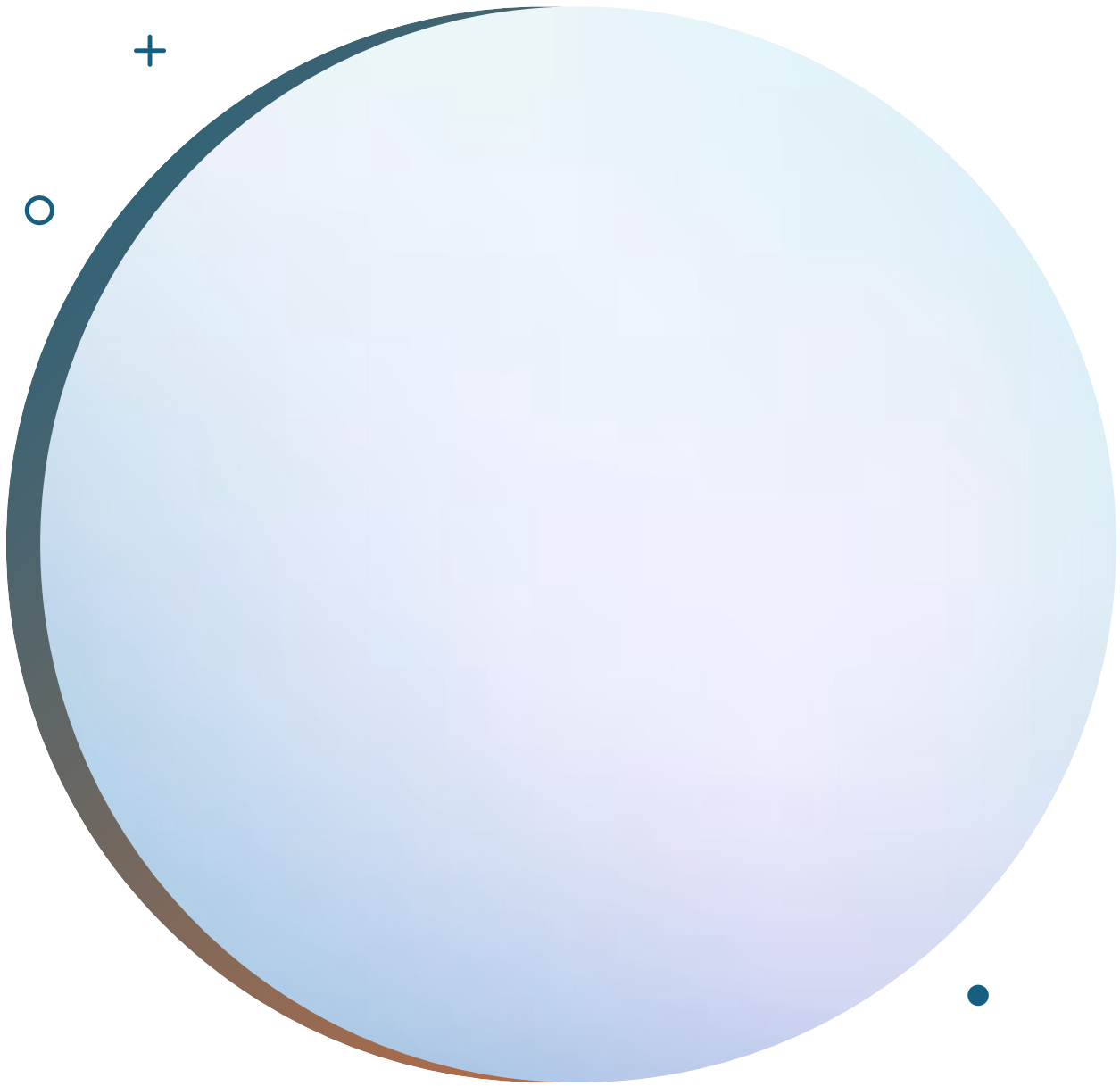
Regular Views vs. Materialized Views

Aspect	Regular Views	Materialized Views
Storage	Virtual (no storage)	Physical (stored on disk)
Data Freshness	Real-time	Point-in-time snapshot
Query Performance	Computed each time	Pre-computed
Maintenance	None required	Refresh operations needed
Use Case	Up-to-date data access	Performance-critical reporting



Title

- Some text

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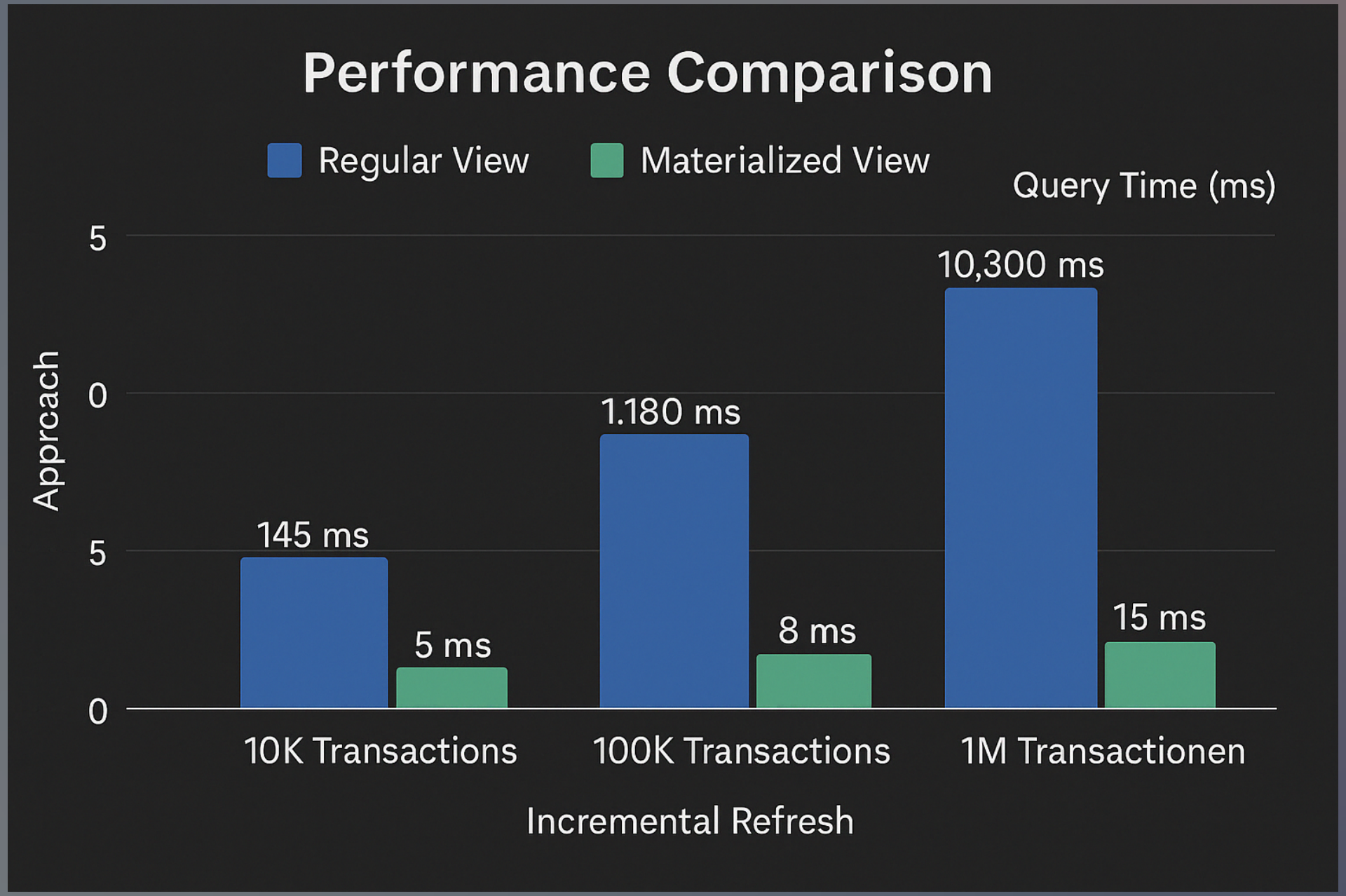
Performance Comparison
Regular View
Materialized View
Query Time (ms)
Apprcach
5
0
5
0
145 ms
5 ms
1.180 ms
8 ms
10,300 ms
15 ms
10K Transactions
100K Transactions
1M Transactionen
Incremental Refresh

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Factor	Regular View	Materialized View
Query Complexity	Simple	Complex
Data Freshness	Critical	Flexible
Query Frequency	Low	High
Source Data Change Rate	High	Low
Resource Constraint	CPU	Disk

Thank you

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