

Overview

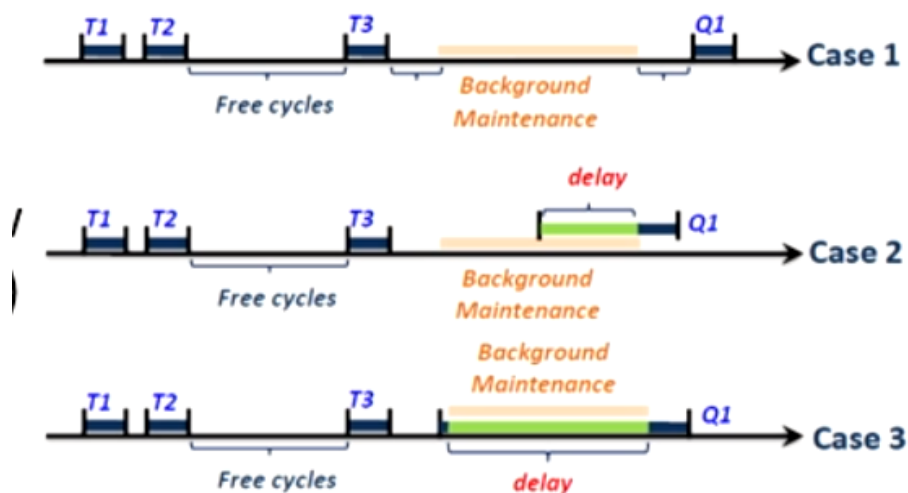
- precompute often used queries, store and reuse them multiple times
- frequently re-occurring queries (views) need to be identified

Lifecycle

- select view
 - NP-hard
 - heuristic, greedy and approximate algorithms exist
- use view within other queries
 - use some parts of the view and use more operators on top of it
- maintain view whenever data is added/removed

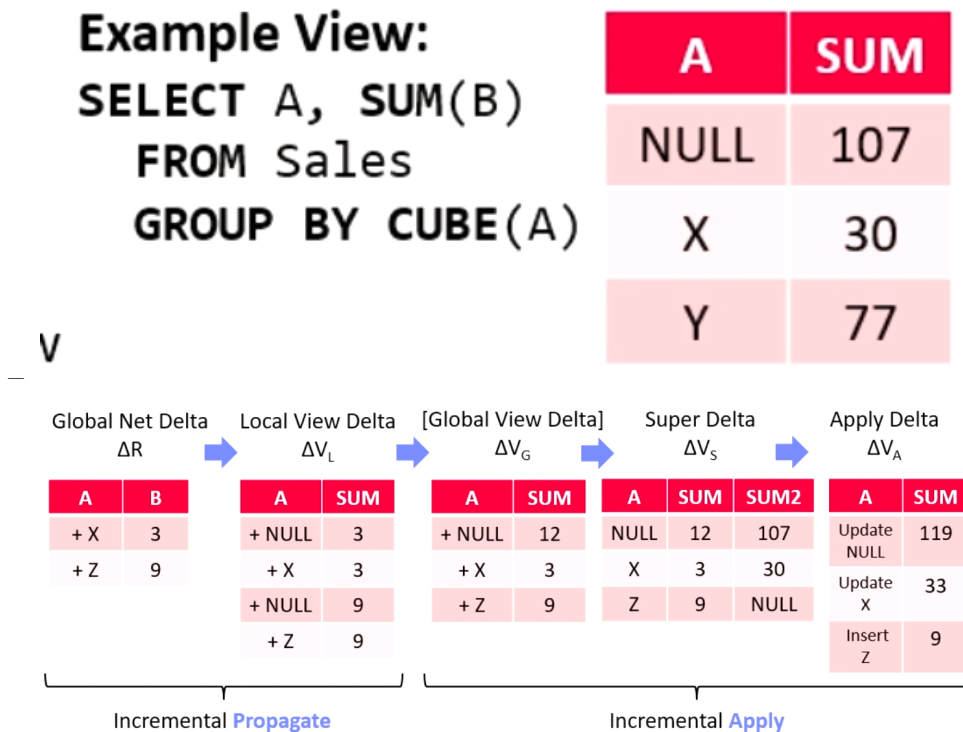
View Maintenance

- eager maintenance
 - writer pays
 - update view whenever underlying data is changed
 - Immediate refresh: updates are directly handled (consistent view)
 - On Commit refresh: updates are forwarded at end of successful TXs
- deferred maintenance
 - reader pays
 - update view on explicit user request
 - potentially inconsistent base tables and views
- lazy maintenance
 - asynd/reader pays
 - same guarantess as eager maintenance
 - defer maintenance until free cycles or view required



How View Maintenance is done

- incremental maintenance
 - track changes in separate table - propagate
 - apply collected changes to view - apply



Materialized Views in PostgreSQL

▪ **View Selection**

- **Manual definition** of materialized view only
- With or without data

```
CREATE MATERIALIZED VIEW TopScorer AS
SELECT P.Name, Count(*)
FROM Players P, Goals G
WHERE P.Pid=G.Pid AND G.GOwn=FALSE
GROUP BY P.Name
ORDER BY Count(*) DESC
WITH DATA;
```

▪ **View Usage**

- **Manual use** of view
- No automatic query rewriting

```
REFRESH MATERIALIZED VIEW TopScorer;
```

▪ **View Maintenance**

- **Manual (deferred) refresh**
- Complete, no incremental maintenance
- Note: Community work on IVM

Name	Count
James Rodríguez	6
Thomas Müller	5
Robin van Persie	4
Neymar	4
Lionel Messi	4
Arjen Robben	3

[Yugo Nagata: Implementing Incremental View Maintenance on PostgreSQL, **PGConf 2018**], patch in 2019

[[Database Performance Tuning]]