Overview on BigQuery Views

- *A view in BigQuery is a **virtual table defined by a SQL query**.*
- *Views provide an easily reusable name for a complex query or a limited set of data.*
- *You can authorize other users to access views, and users can query them as they would a regular table.*
- *Here are some key points about BigQuery views*

1. ***Query Execution***
    - *When you query a view, the underlying SQL query that defines the view is executed.*
    - *The query results contain only the data from the tables and fields specified in the view's definition.*
2. ***Virtual and Reusable***
    - *Views are virtual—they do not physically store any data. Instead, they act as a reusable reference to a set of data.*
3. ***Comparison to Materialized Views***
    - ***Views**: Virtual, reusable, and do not store data.*
    - ***Materialized Views**: Physically store data to improve performance.*

Limitations

- *Views are read-only; you can't insert, update, or delete data through them.*

- *The dataset containing the view and the referenced tables must be in the same location.*
- *You cannot mix GoogleSQL and legacy SQL queries when using views.*
- *Schemas of underlying tables are stored with the view; schema inaccuracies may occur if columns are modified after view creation.*
- *You cannot reference query parameters in views.*

BigQuery views are commonly used to

- *Abstract and store calculation and join logic in a common object to simplify query use*
- *Provide access to a subset of data and calculation logic without accessing to the base tables*
- *Views can also serve as data sources for visualization tools like Looker Studio.*

Materialized Views in BigQuery

- *In BigQuery, materialized views are **precomputed views** that periodically cache the results of a query for increased performance and efficiency.*
- *Queries that use materialized views are generally faster and consume fewer resources than queries that retrieve the same data only from the base tables.*

- *Materialized Views are used when data is to be accessed frequently and data in tables do not get updated on a frequent basis.*

Here are the key characteristics of materialized views:

- ***Zero Maintenance***
  - *Materialized views are precomputed in the background when the base tables change.*
  - *Incremental data changes from the base tables are automatically added to the materialized views without any user action required.*
- ***Fresh Data***
  - *Materialized views return fresh data.*
  - *If changes to base tables might invalidate the materialized view, data is read directly from the base tables.*
  - *Otherwise, the rest of the data is read from the materialized view, and only the changes are read from the base tables.*
- ***Smart Tuning***
  - *If any part of a query against the base table can be resolved by querying the materialized view, BigQuery reroutes the query to use the materialized view for better performance and efficiency.*

Use Cases for Materialized Views

- ***Pre-aggregate data*** *- Aggregation of streaming data.*
- ***Pre-filter data*** *- Run queries that only read a particular subset of the table.*

- ***Pre-join data*** *- Query joins, especially between large and small tables.*
- ***Reclusters data*** *- Run queries that would benefit from a clustering scheme that differs from the base tables.*

Differences between View and Materialized View

FEATURES	VIEW	MATERIALIZED VIEW
Basic	*A View is never stored it is only displayed.*	*A Materialized View is stored on the disk.*
Define	*View is the virtual table formed from one or more base tables or views.*	*Materialized view is a physical copy of the base table.*
Update	*View is updated each time the virtual table (View) is used.*	*Materialized View has to be updated manually or using triggers.*
Speed	*Slow processing.*	*Fast processing.*
Memory usage	*View do not require memory space.*	*Materialized View utilizes memory space.*