Universitat Oberta de Catalunya

Análisis de Big Data usando SQL

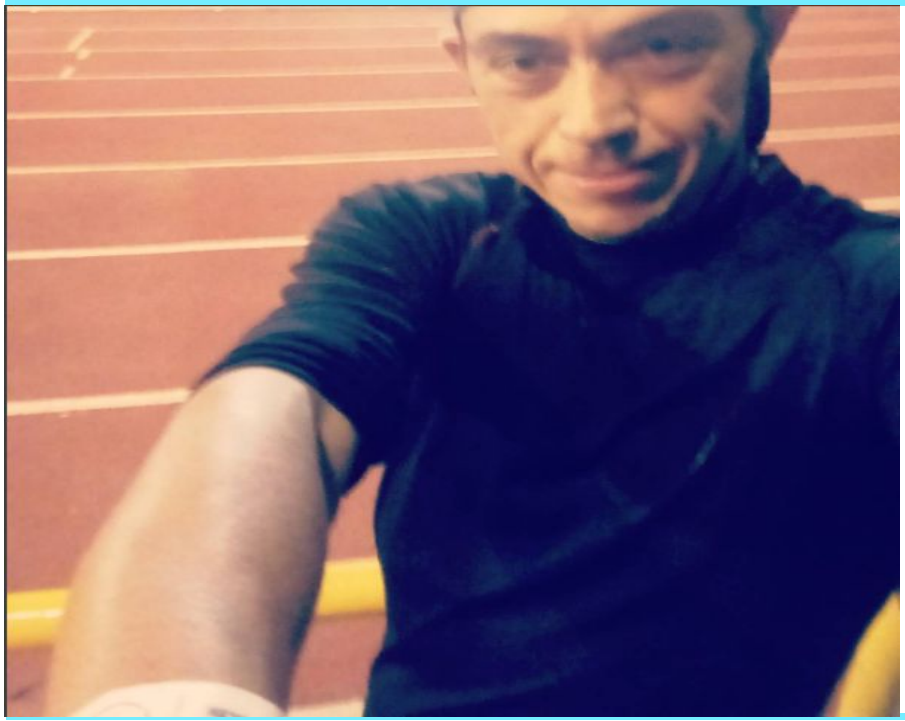
uoc.edu

UOC Data Day

14 de Junio Barcelona

#DataScienceUOC

Bio



Data Scientist en Edreams
PhD. Inteligencia Artificial
Apasionado del lenguaje R

Cuando no estoy analizando datos estoy corriendo, nadando o sobre una bicicleta. 🏃🏊🚴

Indice

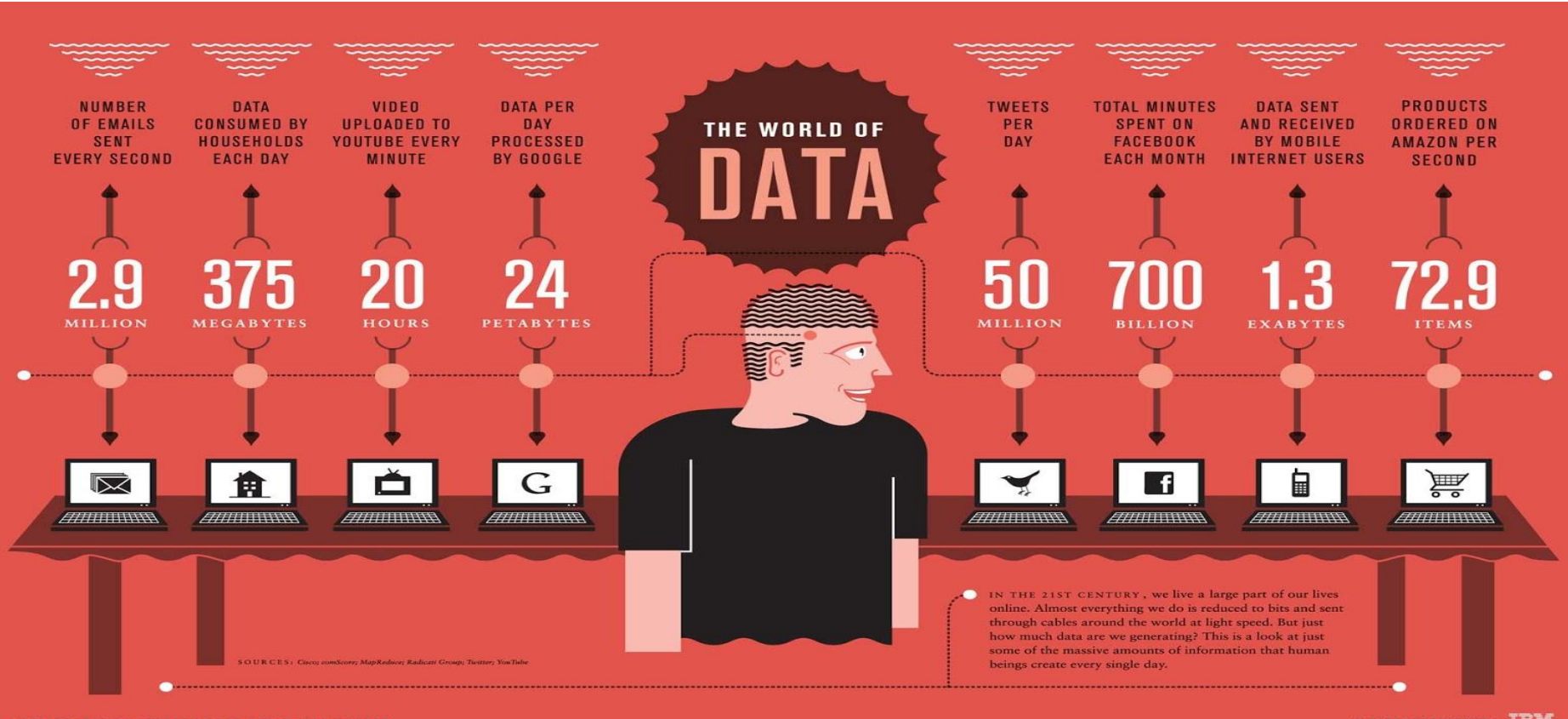
Big Query

- Un mundo repleto de datos
- Solución de Google
- ¿Que es BigQuery?
- ¿Cuando es útil BigQuery y cuando no?
- Una posible configuración con BigQuery
- ETL's y visualización con BigQuery
- Costes

Demo

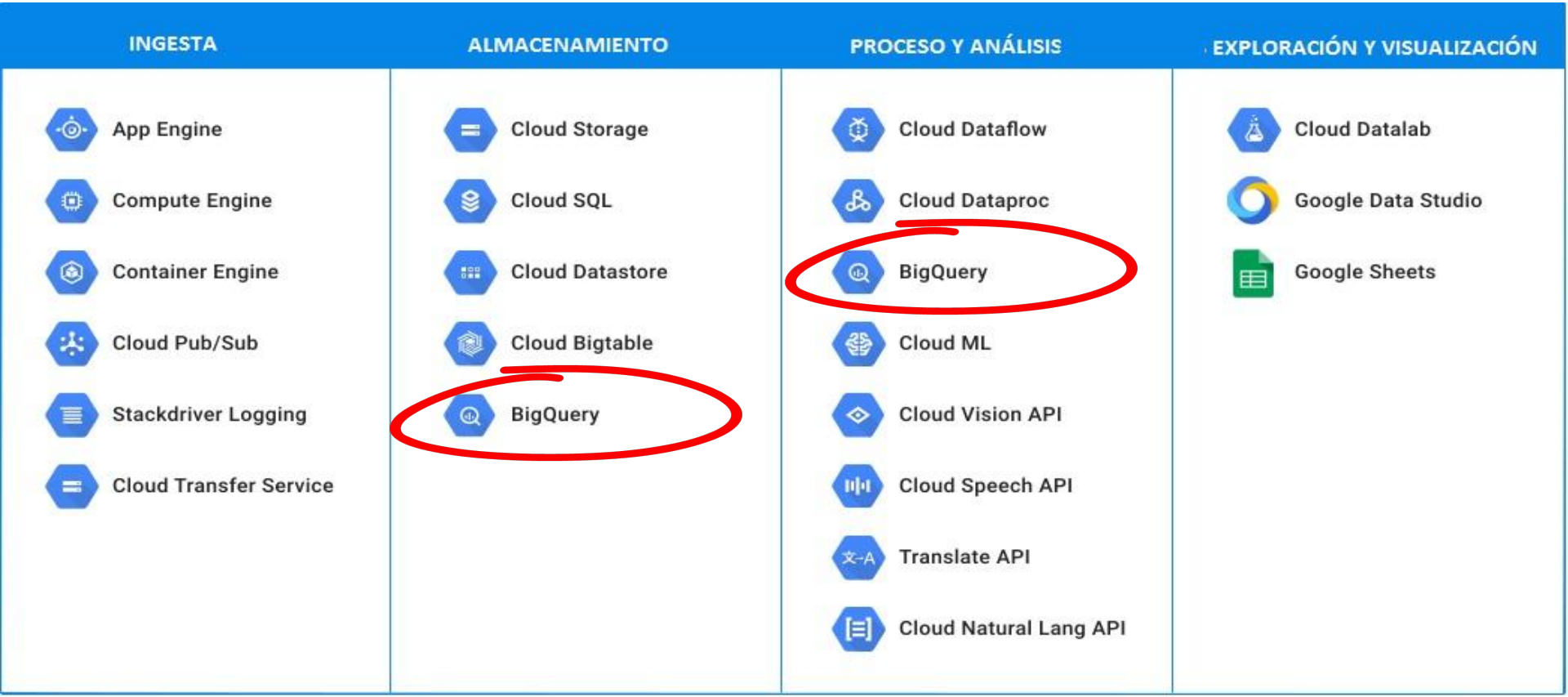
- Arquitectura BigQuery
- Estructura de Proyectos
- Sintaxis
- Demo

Un mundo repleto de datos



Source: The World of Data We're Creating on the Internet by Oliver

Solución de Google



¿Que es BigQuery?

Es un servicio web que permite realizar consultas **SQL** de un conjunto de datos a gran escala que funciona de forma **super rápida** con Google Storage mientras explotan la potente infraestructura de Google.

Tiene el objetivo de facilitar el análisis de datos y permitir a las empresas adoptar decisiones de negocio de una forma más **rápida y precisa**, ya que se ejecuta en la nube y permite análisis en tiempo real.

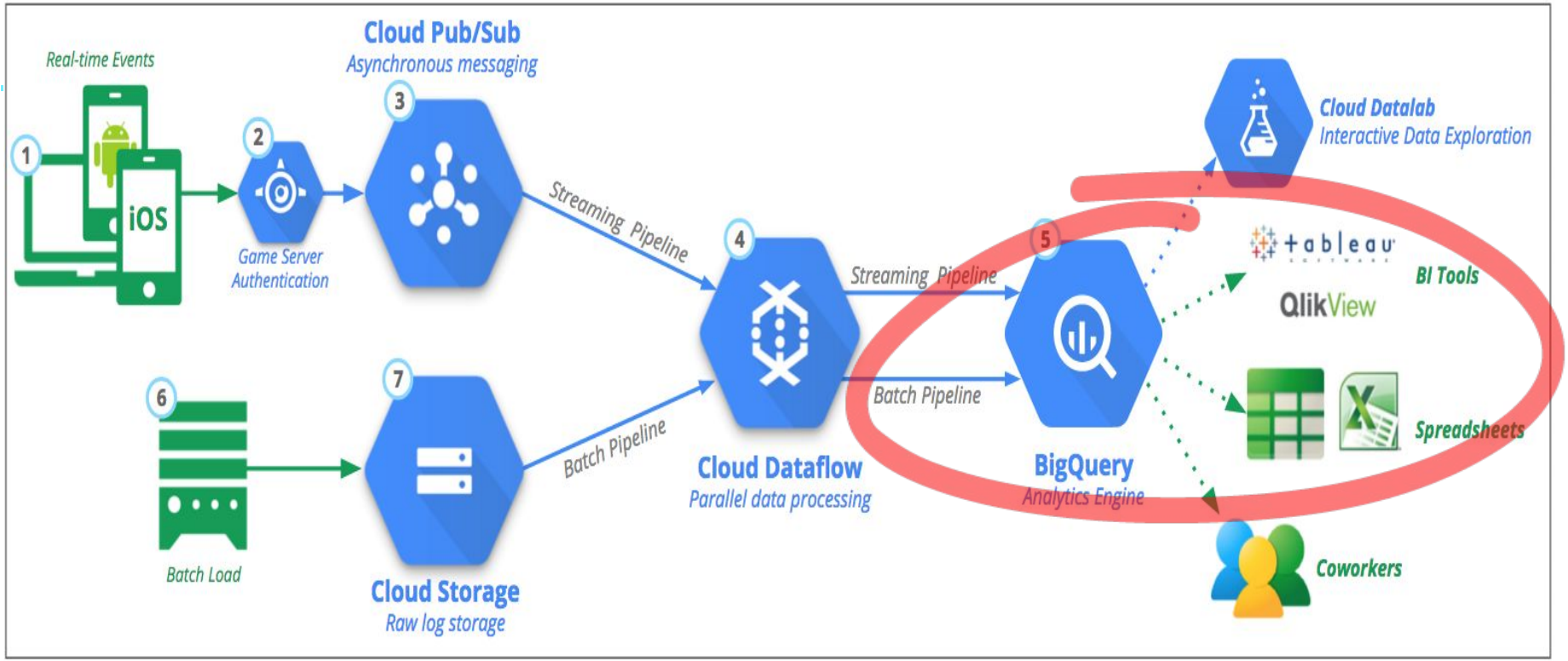
¿Cuando es útil BigQuery y cuando no?

¿Como podemos acceder a los datos en BigQuery?

- BigQuery Web
- BQ línea de comandos
- Servicio API

C#, Go, Java, Node.js, PHP, Python, Ruby

Una posible configuración con BigQuery



ETL's y visualización con BigQuery

Herramientas ETL's

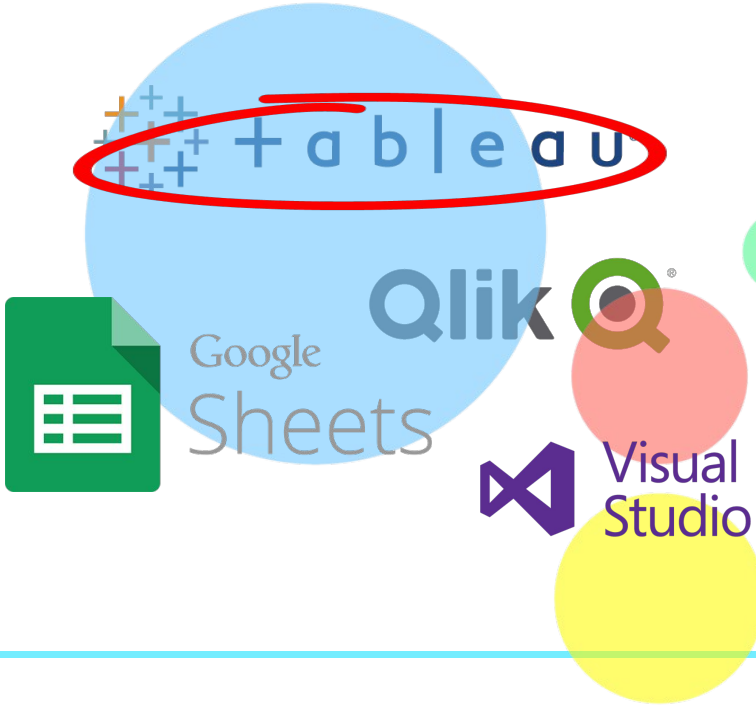
sqlstream

talend

TRIFACTA

informatica

Visualización y BI



Costes

BIGQUERY PRICING

BigQuery charges for data storage, streaming inserts, and for querying data, but loading and exporting data are free of charge. For detailed pricing information, please view the pricing guide.

ITEM	PRICE
Storage	$0.02 per GB, per month $0.01 per GB, per month for long term storage
Streaming Inserts	$0.01 per 200 MB
Loading, Copying, or Exporting Data Metadata Operations	Free

When querying data you can choose from two different pricing options:

FEATURE	PRICE
Pay-as-you-go	$5 per TB First terabyte (1 TB) per month is free*
Flat-rate pricing	Starting at $40,000/month for a dedicated reservation of 2,000 slots. For more information, see Flat-rate pricing.

* The first terabyte (1 TB) of data processed with Google BigQuery each month is free.

Note: BigQuery's quota policy applies for these operations.

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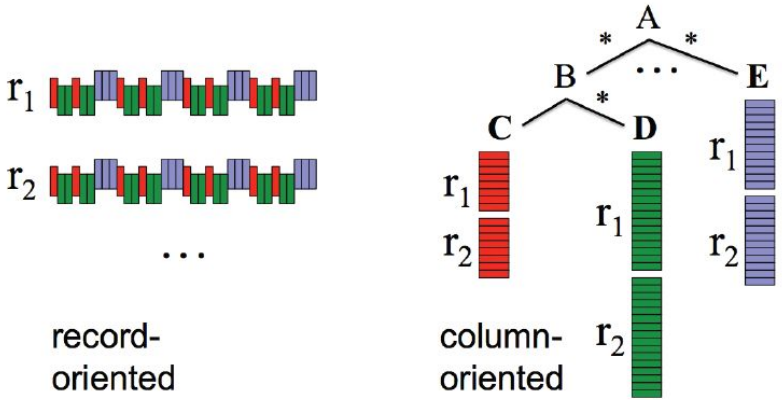
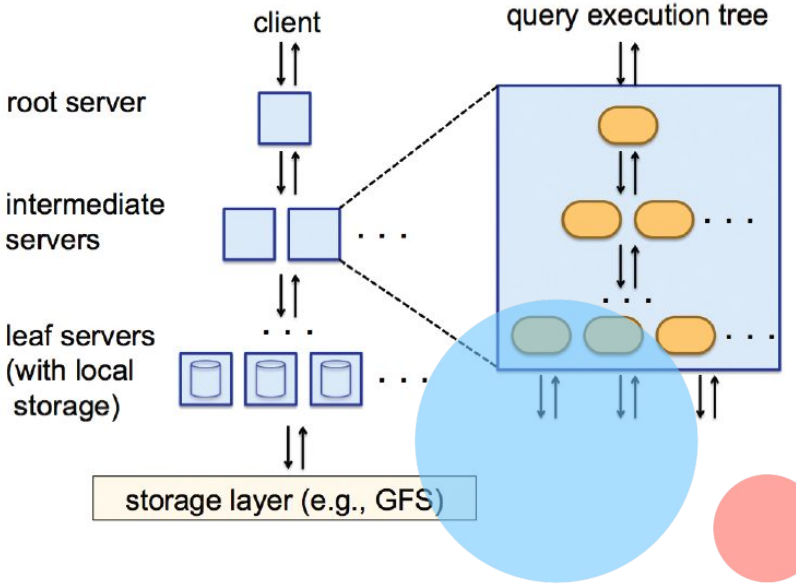
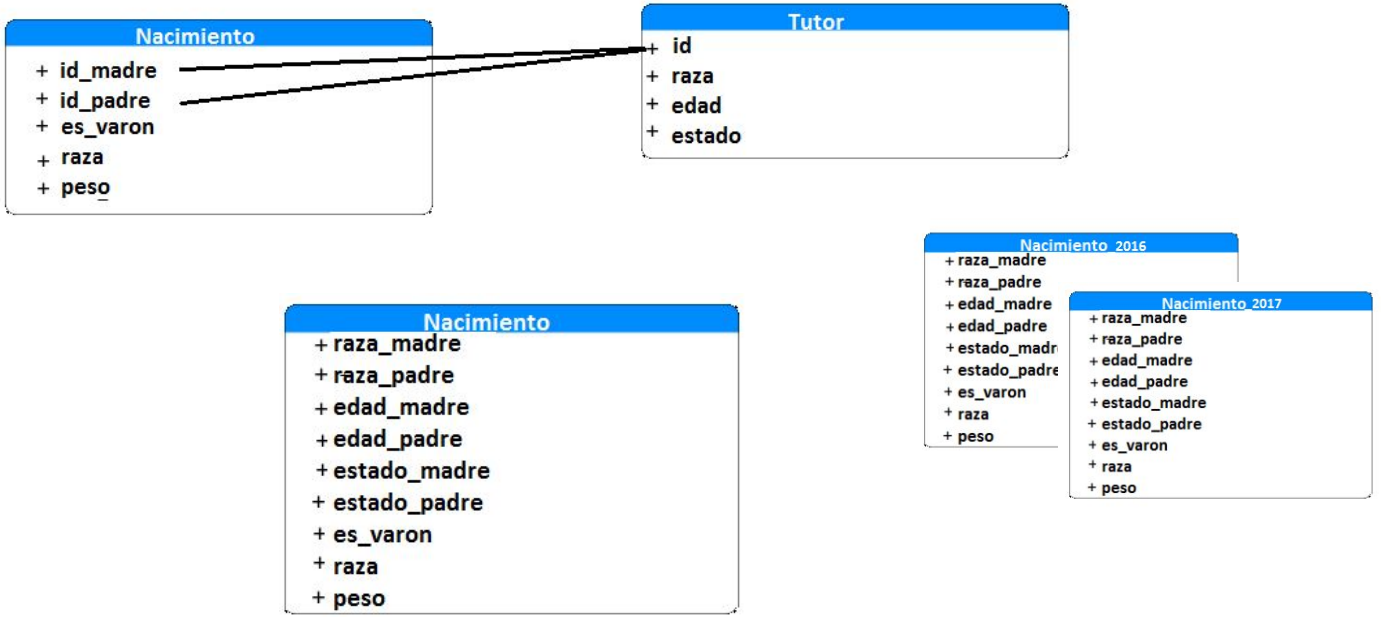
Arquitectura BigQuery





Denormalización



Estructura de Proyectos

Proyectos
Datasets
Tablas

Jobs (Trabajos)

Sintaxis

```
query_statement:
    [ WITH with_query_name AS ( query_expr ) [, ...] ]
    query_expr

query_expr:
    { select | ( query_expr ) | query_expr set_op query_expr }
    [ ORDER BY expression [{ ASC | DESC }] [, ...] ]
    [ LIMIT count [ OFFSET skip_rows ] ]

select:
    SELECT  [{ ALL | DISTINCT }]
        { [ expression. ]* [ EXCEPT ( column_name [, ...] ) ]
            [ REPLACE ( expression [ AS ] column_name [, ...] ) ]
        | expression [ [ AS ] alias ] } [, ...]
    [ FROM from_item  [, ...] ]
    [ WHERE bool_expression ]
    [ GROUP BY expression [, ...] ]
    [ HAVING bool_expression ]
    [ WINDOW window_name AS ( window_definition ) [, ...] ]

set_op:
    UNION { ALL | DISTINCT }

from_item: {
    table_name [ [ AS ] alias ] |
    join |
    ( query_expr ) [ [ AS ] alias ] |
    field_path |
    { UNNEST( array_expression ) | UNNEST( array_path ) | array_path }
        [ [ AS ] alias ] [ WITH OFFSET [ [ AS ] alias ] ] |
    with_query_name [ [ AS ] alias ]
}

join:
    from_item join_type JOIN from_item
    [ { ON bool_expression | USING ( join_column [, ...] ) } ]

join_type:
    { [INNER] | CROSS | FULL [OUTER] | LEFT [OUTER] | RIGHT [OUTER] }
```

Sintaxis

Agregados simples

SELECT COUNT(foo), MAX(foo), STDDEV(foo) FROM …

Consultas más complejas

SELECT ... FROM … WHERE REGEXP_MATCH(ulr,”\.com$”) AND user CONTAINS ‘test’

JOINS

SELECT COUNT(*) FROM foo1 (JOIN foo2) ON foo1.id = foo2.id...

Demo

Proyecto Stackoverflow

Contar usuarios

SELECT count(*) FROM [bigquery-public-data:stackoverflow.users] LIMIT 1000

Contar usuarios con filtros

SELECT display_name,location FROM [bigquery-public-data:stackoverflow.users] where reputation>100 and REGEXP_MATCH(location,"London") LIMIT 1000

Diferentes tablas mediante JOINs

```
SELECT
  u.id, u.display_name
FROM
  [bigquery-public-data:stackoverflow.users] as u
JOIN
  (SELECT * FROM [bigquery-public-data:stackoverflow.stackoverflow_posts] )
AS
  s
ON
  u.id = s.owner_user_id limit 1000
```

Demo

Diferentes tablas mediante JOINs GROUP_BY

```
SELECT
  u.id, u.display_name
FROM
  [bigquery-public-data:stackoverflow.users] as u
JOIN
  (SELECT * FROM [bigquery-public-data:stackoverflow.stackoverflow_posts] )
AS
  s
ON
  u.id = s.owner_user_id GROUP BY u.id, u.display_name  limit 1000
```

Diferentes tablas mediante JOINs GROUP_BY + filtros

```
SELECT
  u.id, u.display_name
FROM
  [bigquery-public-data:stackoverflow.users] as u
JOIN
  (SELECT * FROM [bigquery-public-data:stackoverflow.stackoverflow_posts] )
AS
  s
ON
  u.id = s.owner_user_id where  u.reputation>100 and  REGEXP_MATCH(u.location,"London") GROUP BY u.id, u.display_name  limit 1000
```

Demo

Proyecto noaa_gsod

Múltiples tablas

```
#standardSQL
SELECT
  max,
  mo,
  da,
  year
FROM
  `bigquery-public-data.noaa_gsod.gsod19*`
WHERE
   _TABLE_SUFFIX BETWEEN '29'
  AND '40'
```

Proyecto github_timeline versus github_nested - Flat vs JSON

SELECT repository.url, actor_attributes.blog FROM [bigquery-public-data:samples.github_nested] limit 30000

Demo

Diferentes tablas mediante JOINs GROUP_BY

```
SELECT
  u.id, u.display_name
FROM
  [bigquery-public-data:stackoverflow.users] as u
JOIN
  (SELECT * FROM [bigquery-public-data:stackoverflow.stackoverflow_posts] )
AS
  s
ON
  u.id = s.owner_user_id GROUP BY u.id, u.display_name  limit 1000
```

Demo

INTEGRACIÓN
GOOGLE SPREADSHEET LINK
GOOGLE STUDIO LINK

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de Catalunya

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https://bigquery.cloud.google.com