

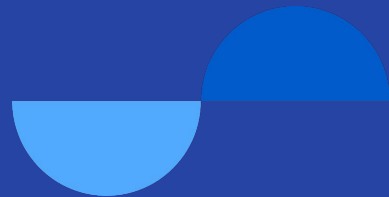


Databend

Rebuilding a Data Warehouse for Everyone

bohutang@datafuselabs.com

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Bohu TANG (张雁飞)

Co-founder of Datafuse Labs

A startup that focuses on building the world's best data cloud on top of the open-source project [Databend](#).

MySQL Kernel | Distributed Database | Data Warehouse

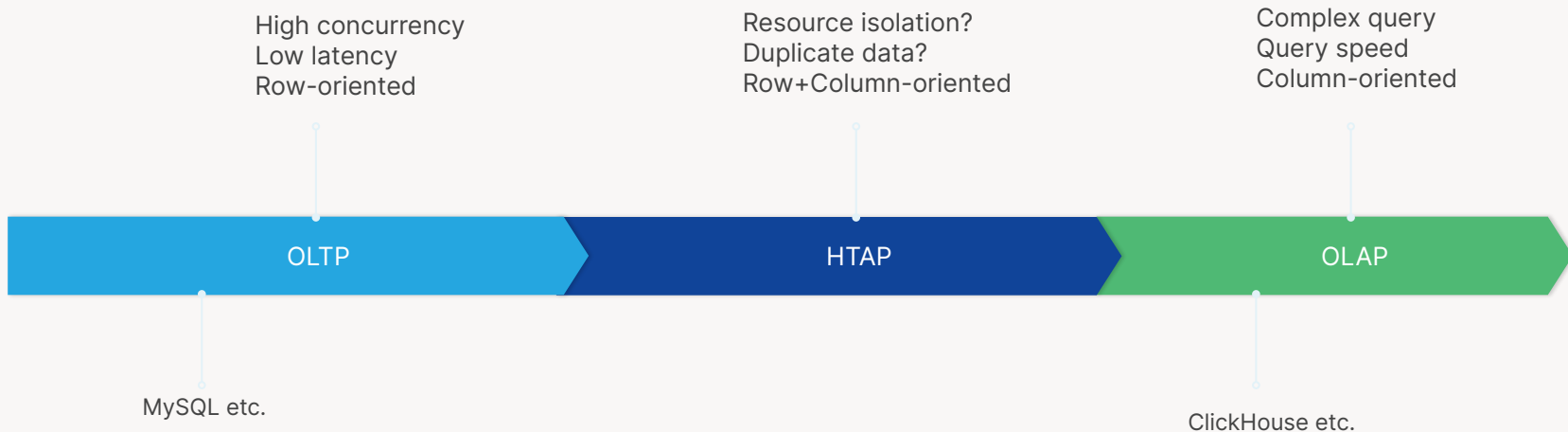
<https://bohutang.me/>



Agenda

- 01 Dream Data Warehouse
- 02 Traditional Data Warehouse
- 03 Modern Data Warehouse
- 04 Rebuilding a Data Warehouse
- 05 Hello, Cloud Data Warehouse!

Database and Data Warehouse













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01

A Dream Data Warehouse

Users' Perspectives

- L1: No hardware to install or maintain 
Easy
- L2: No software to install, configure, or manage 
Easy
- L3: No management, upgrades, or tuning required 
Normal
- L4: Elasticity: Instant scaling up and down 
Hard
- L5: Pay-as-you-use: Low cost 
Harder
- L6: Life getting easier: Everyone can handle   
Harder Harder Harder

Providers' Perspectives

- Instant elasticity: Completely separate storage from computing
- Blazing fast: On-demand performance and concurrency
- All data stored: Structured and unstructured
- No data silo: Data shared between everyone
- Easy to use: no indexing, no tuning, no pre-sharding any data
- Time travel, zero copy cloning table



Technology Perspectives

- More than a database ...
- A very complex system!
- Many complex technologies involved!





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02

Traditional Data Warehouse

Table Partitioning

Table Partitioning (Shared-nothing) is to distribute the table rows across multiple storage devices:

- Spreading I/O load
- Parallel execution
- With hash or range expression

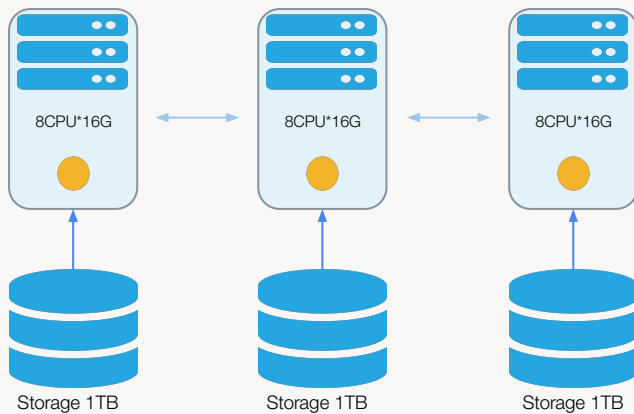
```
CREATE TABLE visits
(
  VisitDate Date,
  Hour UInt8,
  ClientID UUID
)
ENGINE = MergeTree()
PARTITION BY toYYYYMM(VisitDate)
ORDER BY Hour;
```

partition	name	active
201901	201901_1_3_1	0
201901	201901_1_9_2_11	1
201901	201901_8_8_0	0
201901	201901_9_9_0	0
201902	201902_4_6_1_11	1
201902	201902_10_10_0_11	1
201902	201902_11_11_0_11	1

ClickHouse Custom Partitioning Key

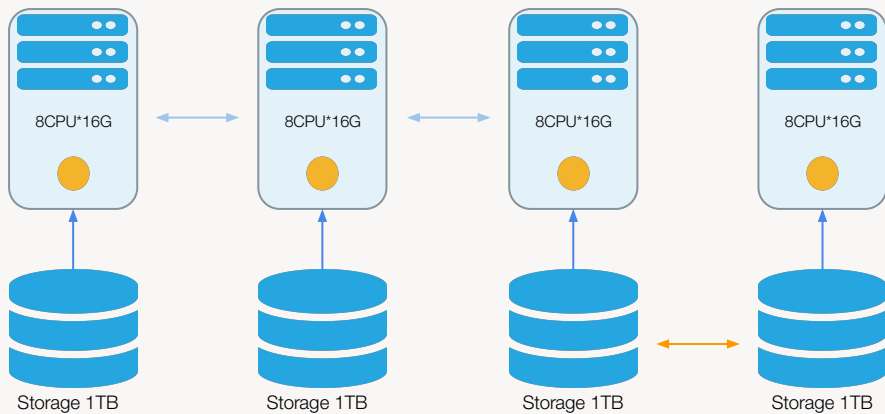
Traditional Architecture

- Shared-nothing
- Computing (CPU/Memory) and storage locked together
- Resource allocation coarse-grained



Traditional Architecture

- Shared-nothing
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Traditional Architecture

- Shared-nothing - No elasticity
- Computing (CPU/Memory) and storage locked together - No elasticity
- Resource allocation coarse-grained - No elasticity





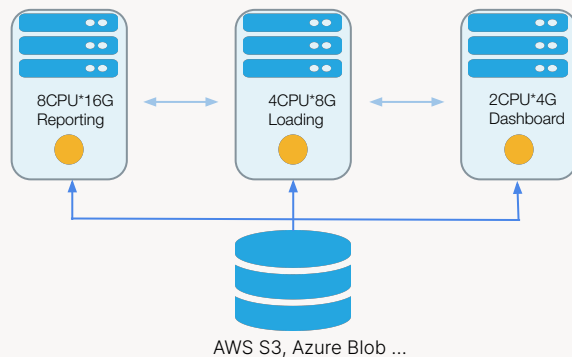
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03

Modern Data Warehouse

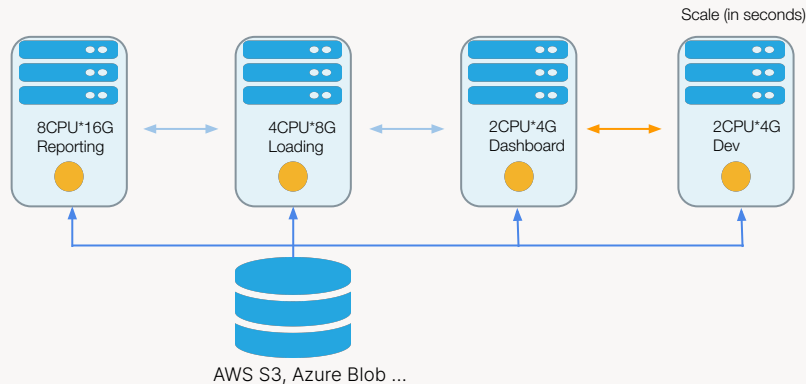
Modern Architecture

- Shared-storage (Amazon S3, Azure Blob ...)
- Computing resources (CPU/Memory) and storage disaggregated
- Resource allocation fine-grained
- Instant scaling up or down



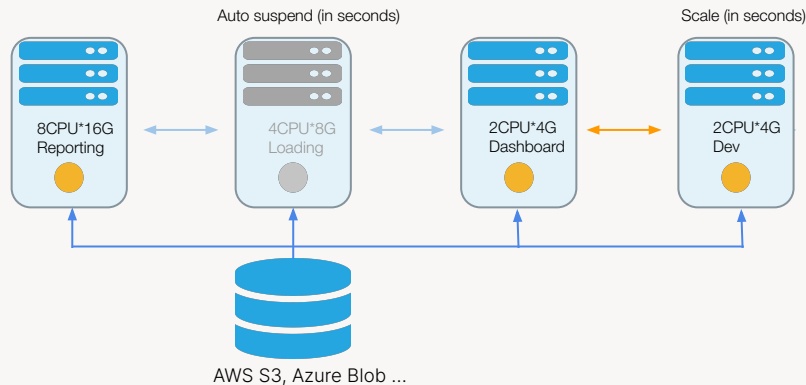
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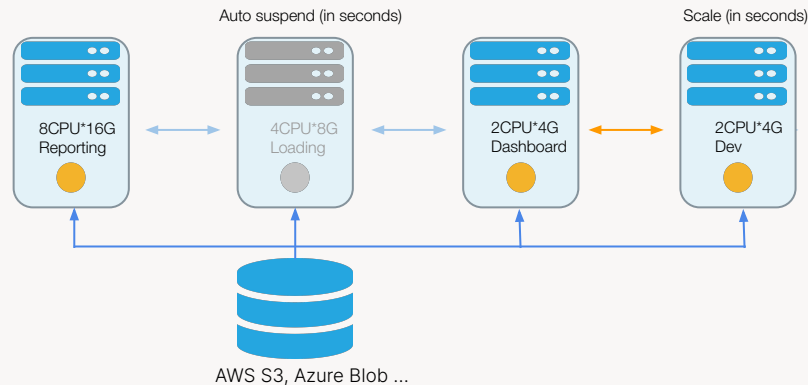
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Modern Architecture

- Shared-storage (Amazon S3, Azure Blob ...) - [Instant elasticity](#)
- Computing resources and storage disaggregated - [Instant elasticity](#)
- Resource allocation fine-grained
- Instant scaling up or down



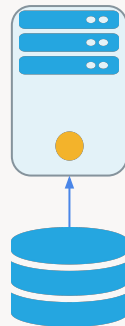
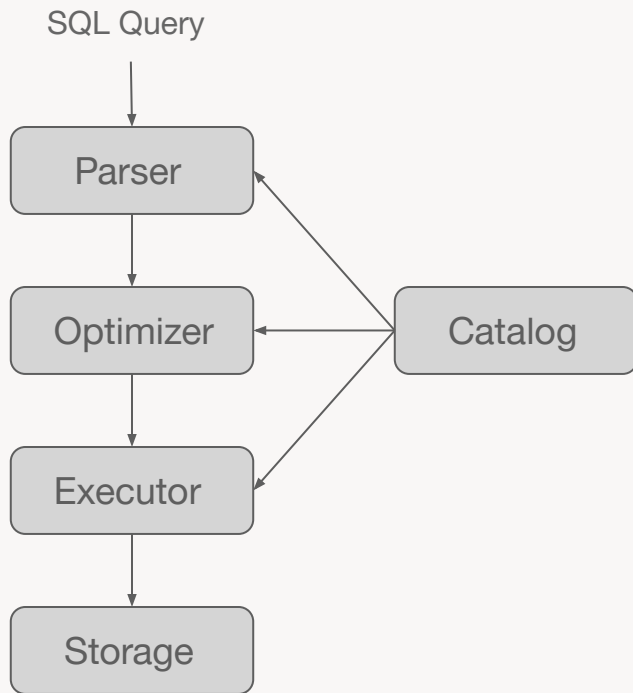


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04

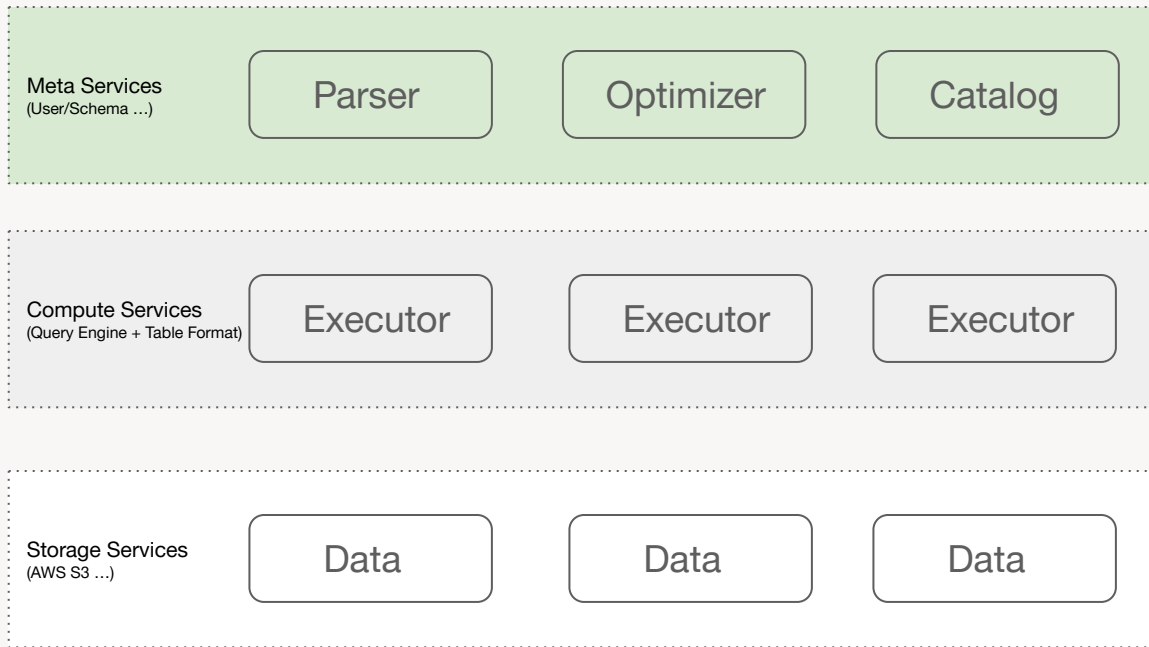
Rebuilding a Data Warehouse

Data Warehouse Components

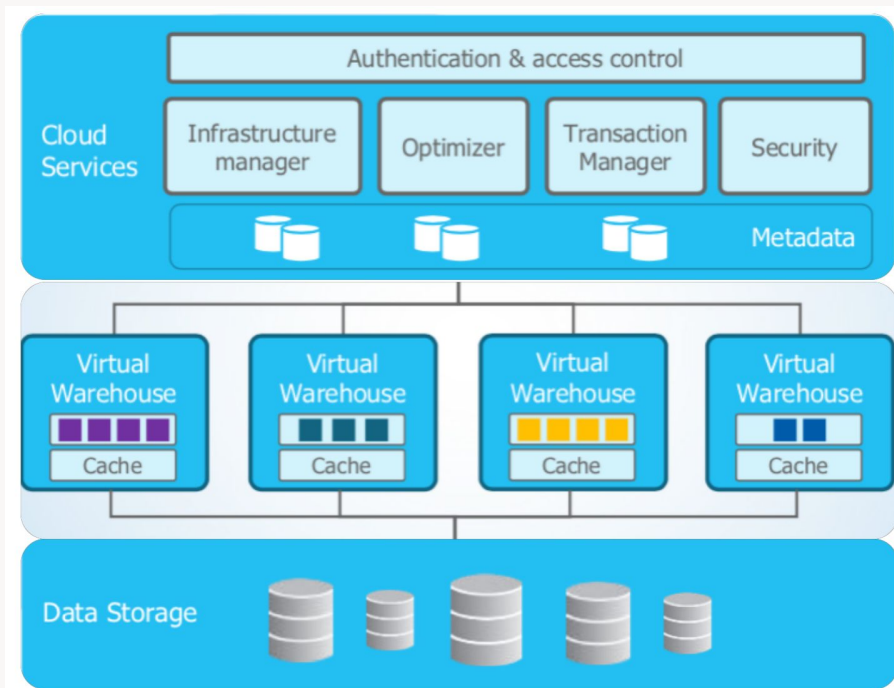


Data Warehouse Microservices

SQL Query

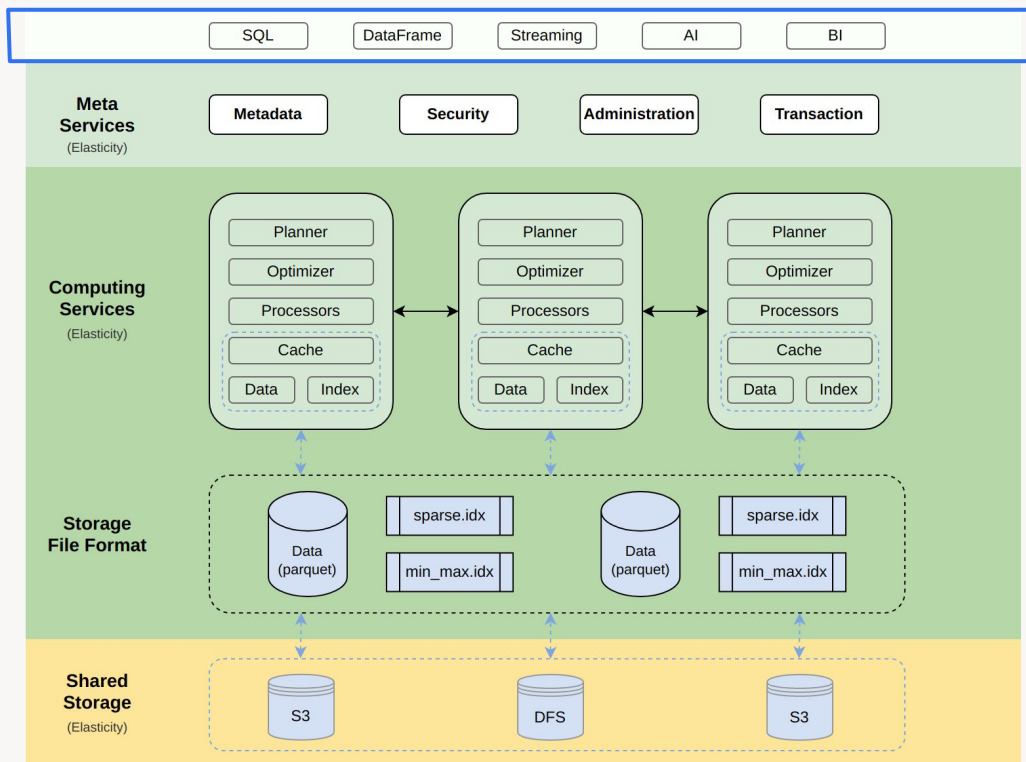


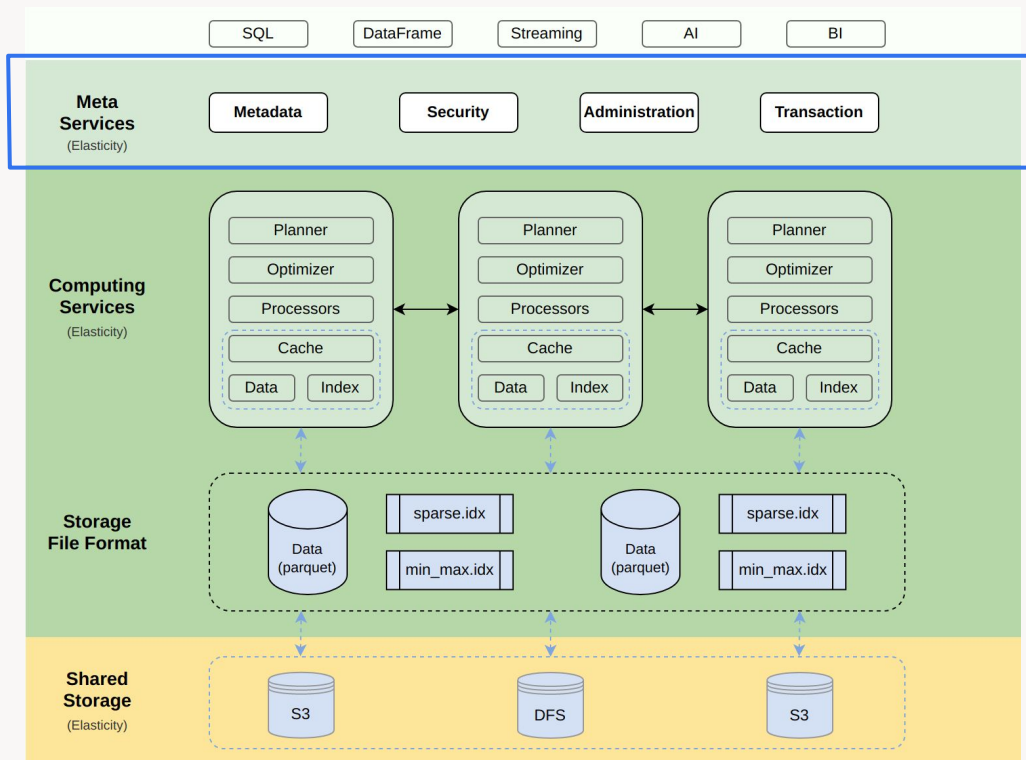
Snowflake

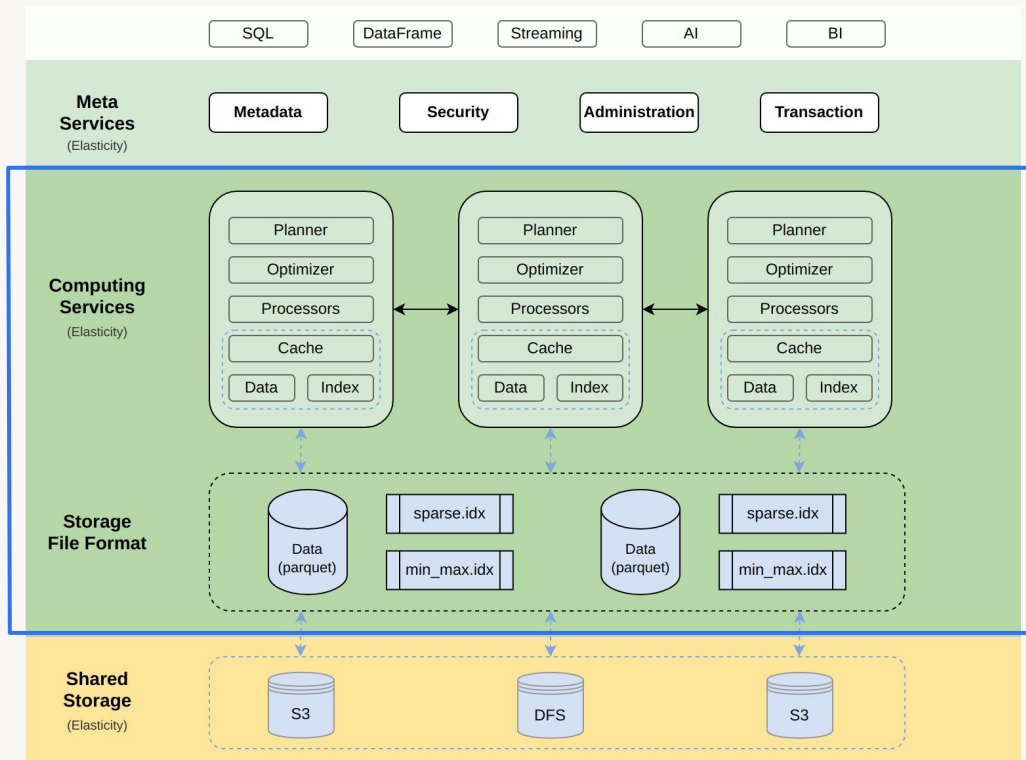


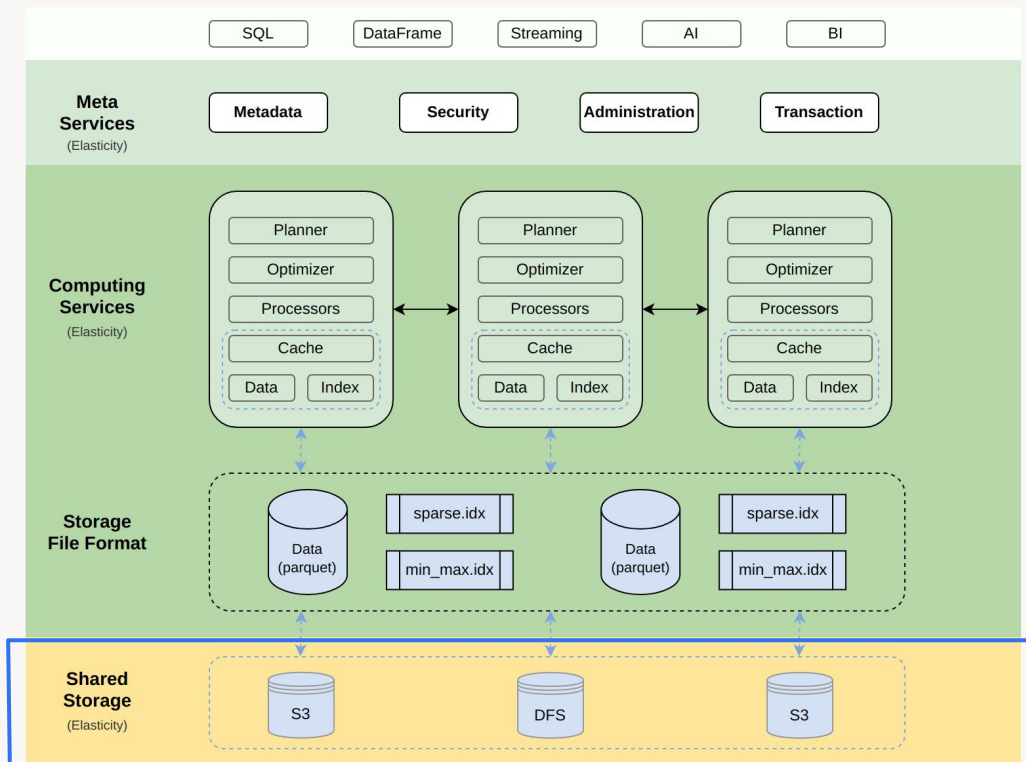
From snowflake slides





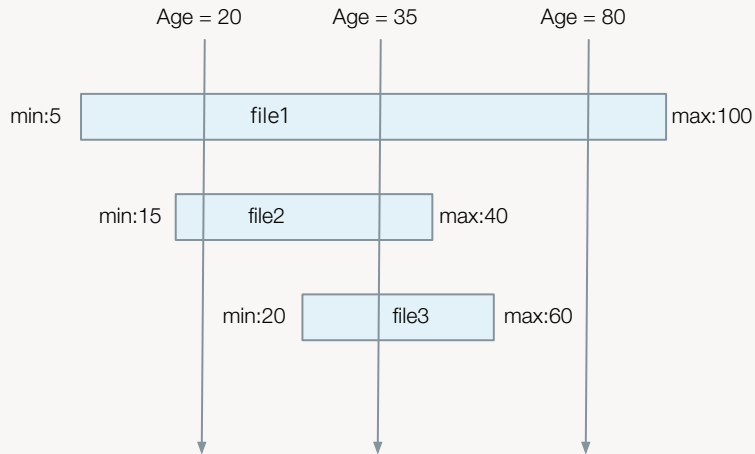




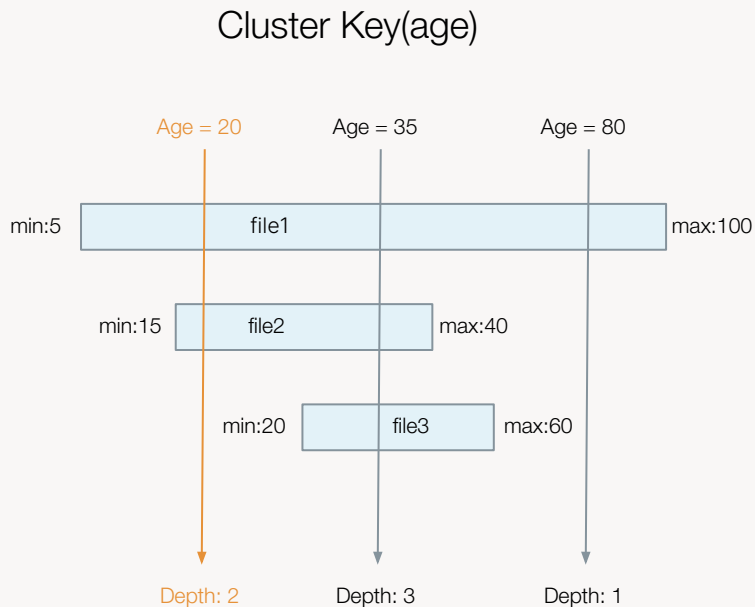


Automatic Tuning Services

Cluster Key(age)

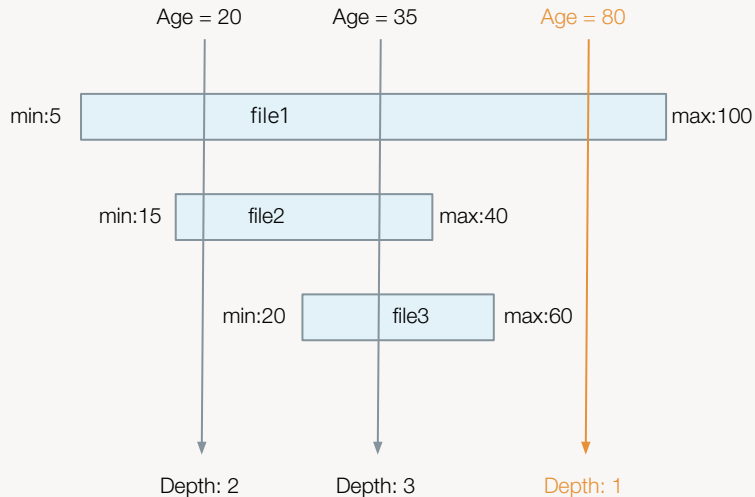


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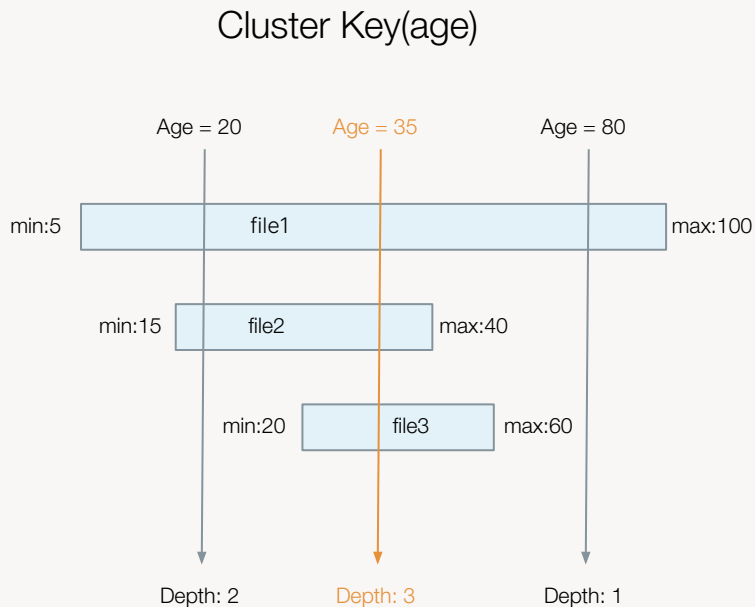


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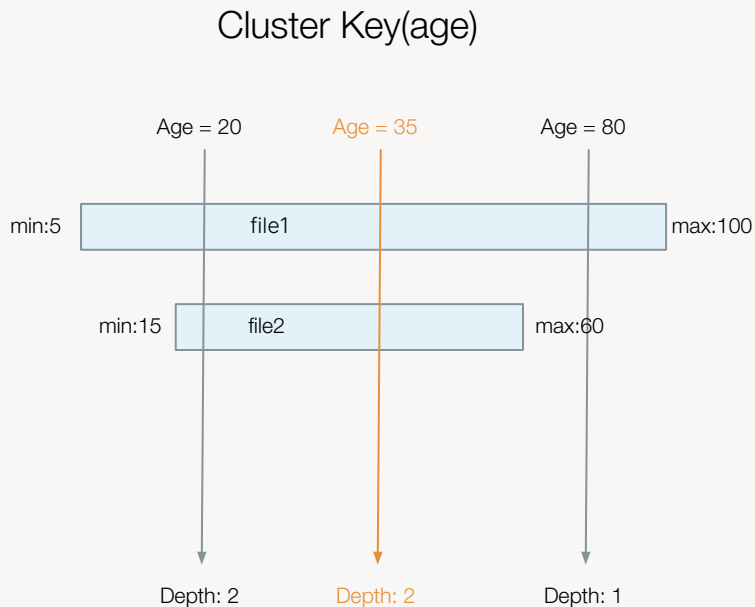
Cluster Key(age)



Automatic Tuning Services



Automatic Tuning Services





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05

Hello, Cloud Data Warehouse!

- Unlimited computing and storage
- Deploy compute engine on EC2 warm pool
- Store data on AWS S3

Provides 99.999999999% durability and 99.99% availability



Cloud Data Warehouse

- Database as a service
- Easy to upload and unload data
 - copy into table_1 from s3://file
 - copy into s3://file from <select * from table_1 where ...>
- Support for structured and unstructured data
- Powerful data visualization
- One account for everything
- Data analytics: As simple as using a mobile App
- Designed for everyone



Pay for use | Ease of use | Powerful



<https://app.databend.com>

The screenshot displays the Databend web application interface. At the top, there's a navigation bar with a back arrow, a dropdown menu set to "Query all user", and a status indicator "My worksheet | Updates 49 minutes". A "Share" button is located on the right. Below the navigation bar, the main workspace is divided into three sections:

- SQL Editor:** Contains a SQL query:

```
1 SELECT
2 id, user_name, age, professional, city
3 FROM
4 database.order
5 where
6 order age < '30'
7 order by id DESC;
```
- Data Preview:** A table showing the results of the query. The first four rows are visible:

ID	USER_NAME
1 ORD-1562792777582	tsingtsing
2 ORD-1562792781478	lisadeer
3 ORD-1562792776427	chunlee193
4 ORD-1562792773536	kara
- Visualizations:** A donut chart titled "Data preview" showing "Multidimensional data statistics". The chart is divided into five segments of different colors (blue, dark blue, purple, pink, orange). A callout box indicates a total of 1,271, with a specific segment representing 763.

At the bottom of the interface, there's a "Run script" button and a status bar showing "Comput_WH ACCOUNTADMIN", "Rows: 2319", and "Times: 12ms".



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Thanks

