

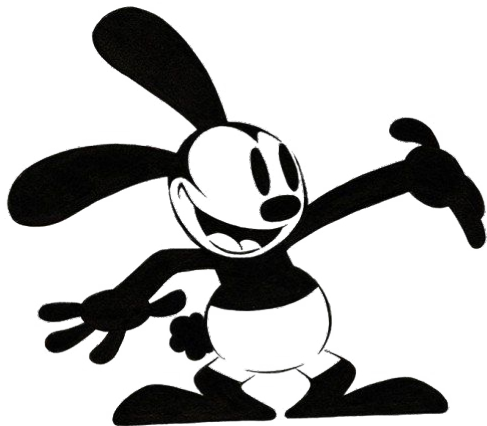
Disney+ClickHouse

ClickHouse Meetup @ Rakt Offices
December 6th, 2022

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Software Engineer @ Disney+

Who we are

Disney+ Observability



What we do

Collect all logs and metrics for
the Disney+ on-prem
infrastructure

Products

Metrics & Logs



How It Started

Disney
STREAMING

hulu

Disney+

ESPN+

STAR+

CDN Access Logs



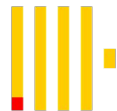
Different Log
Structure



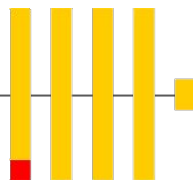
Massive Amounts of Logs

- Collected by 3rd Parties
- Millions of Disney+ users
- One user can create multiple rows per second

Different File
Formats
(gz,lz4)



What we looked into



ClickHouse

- pros:
 - column oriented C++ (fast)
 - simple configuration
 - single binary
 - no rebalancing
- cons:
 - no rebalancing



Flink

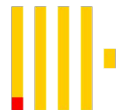
similar to hadoop
(JVM)



- pros: resilient/HA
- cons:
 - rebalancing
 - JVM



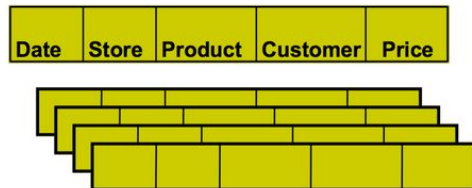
- pros: standard for big data
- cons:
 - JVM
 - many moving parts (HDFS, Hive, Pig, ect..)
 - good for batching



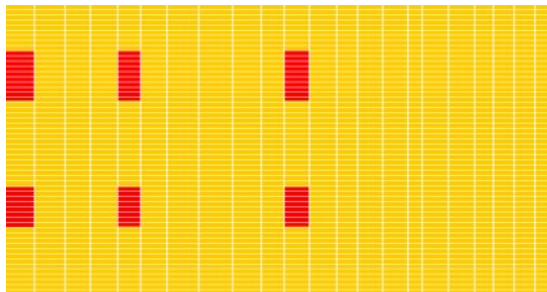
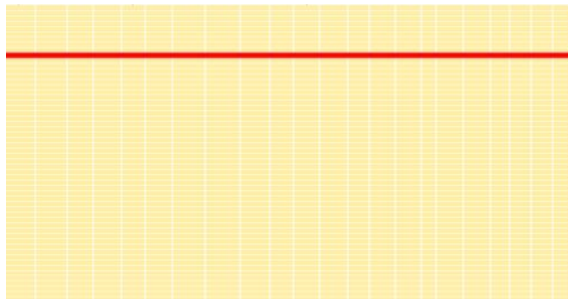
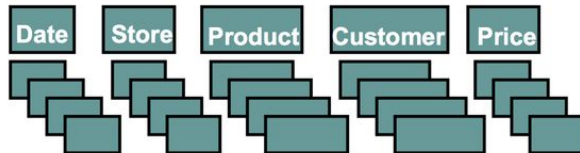
Column Oriented 🤝 Access Logs

```
SELECT  
    Date, Store, Customer  
FROM  
    db.table  
WHERE  
    [condition];
```

row-store



column-store



How It's Going

Disney
STREAMING

hulu

Disney+

ESPN+

STAR+

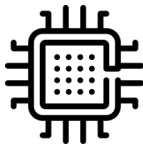
CDN Log Statistics



Compressed:	105 TiB
Uncompressed:	395 TiB
Raw:	~1PB
Time Span:	7 days



Write Performance: 3 million rows/sec



Query Performance: 2 billion rows/sec

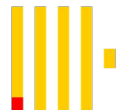
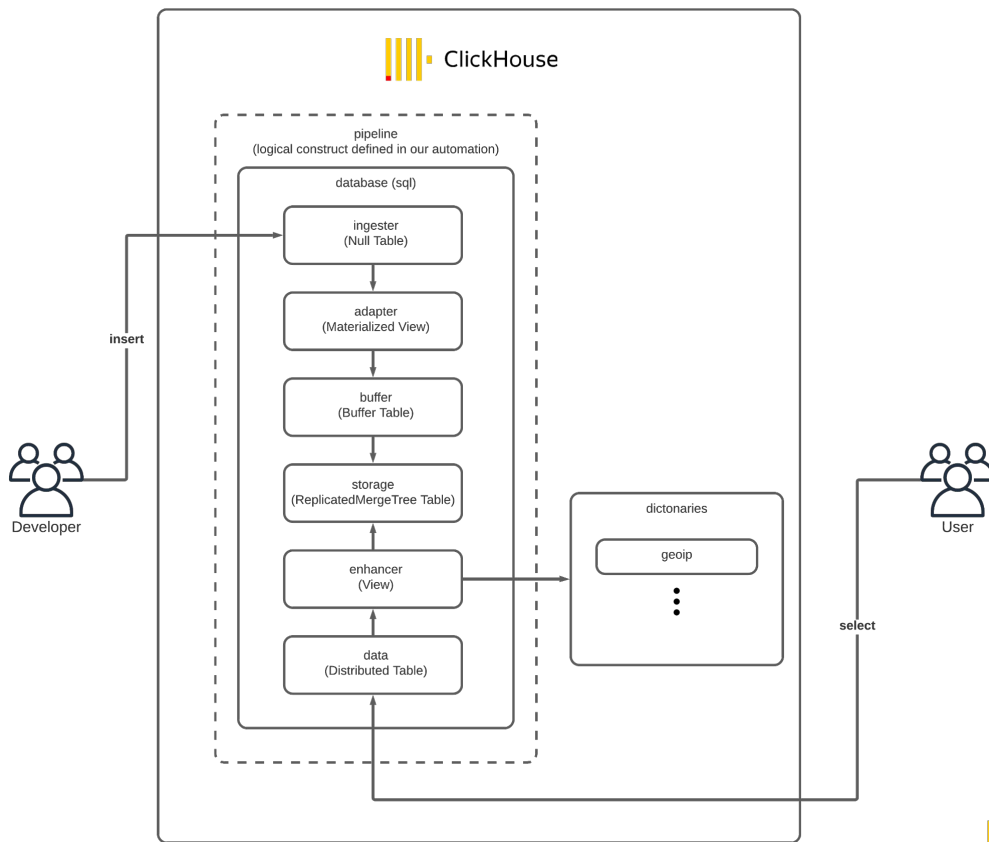


20 node cluster
2x replication
160 TiB Disk total
2.5 TiB RAM total



Deployment

- Various "Table Engines" enable effective **ELT** pipelines
- HTTPS server + flexible input formats effectively makes tables into HTTPS Endpoints
- Separation of storage and query tables enables "constant time" changes through automation



Ingest Any Kind of Structured Log

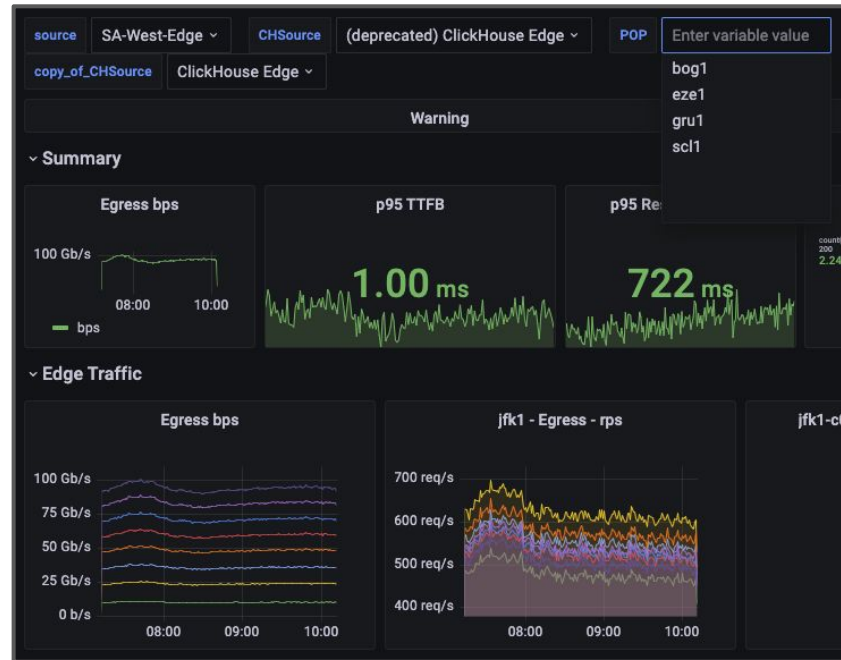
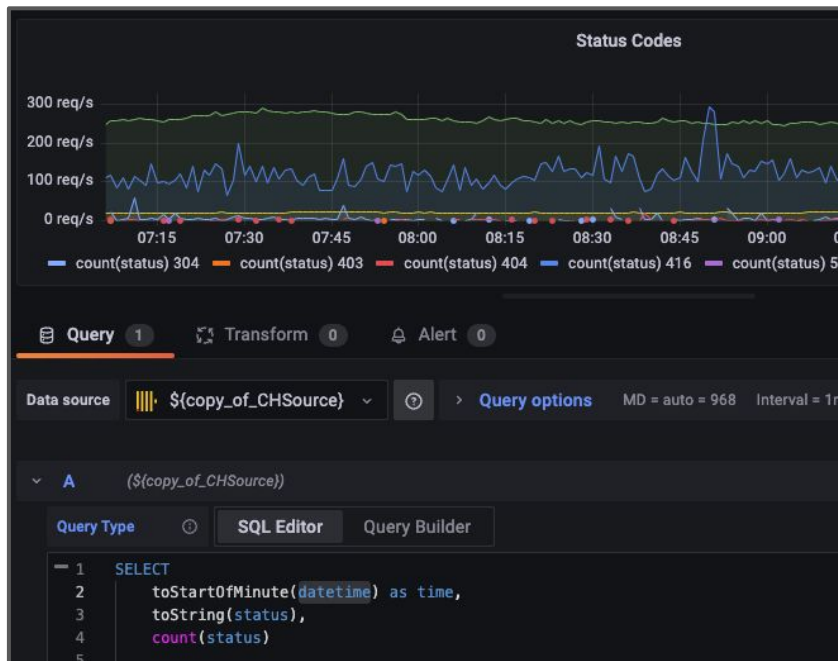
CustomSeparated	✓	✓
CSV	✓	✓
CSVWithNames	✓	✓
CSVWithNamesAndTypes	✓	✓
CustomSeparated	✓	✓
CustomSeparatedWithNames	✓	✓
CustomSeparatedWithNamesAndTypes	✓	✓
SQLInsert	x	✓
Values	✓	✓
Vertical	x	✓
JSON	✓	✓
JSONAsString	✓	x

- ClickHouse supports ingest of data of various formats
- Each comes with its own benefits and drawbacks
- We recommend our customers to send us JSON (or generally unordered formats like k=v)



Grafana ClickHouse Plugin

Data Visualization



Grafana ClickHouse Plugin

Ad-Hoc HTTPS Queries

The screenshot shows the Grafana ClickHouse plugin interface. At the top, there's a header with "Explore" and a dropdown menu set to "ClickHouse Main". Below this, a panel titled "A (ClickHouse Main)" contains a "Query Type" dropdown set to "SQL Editor". The SQL editor shows a query:

```
1 SELECT
2   formatReadableQuantity(countDistinct(client_ipv6)) as number_of_agents
3 FROM
4   cdn.data
5 WHERE
6   datetime >= now()-toIntervalMinute(30)
```

Below the query editor are three buttons: "+ Add query", "Query history", and "Inspector". At the bottom, a "Table" section displays the result:

number_of_agents
4.19 million

Alerting

The screenshot shows the Grafana ClickHouse plugin interface for alerting. At the top, there's a header with "A" and a dropdown menu set to "ClickHouse Edge". Below this, a panel titled "A" contains a "Query Type" dropdown set to "SQL Editor". The SQL editor shows a query:

```
1 WITH
2   countDistinct(log_source_datacenter) as num_datacenters_past_minute,
3   (
4     SELECT countDistinct(assumeNotNull(log_source_datacenter))
5     FROM edge.data
6     WHERE datetime > (now() - toIntervalDay(1))
7   ) as num_datacenters_expected
8 SELECT
9   now(),
10  num_datacenters_past_minute >= num_datacenters_expected
11 FROM edge.data
12 WHERE toStartOfMinute(datetime) = toStartOfMinute(now())
```

Below the query editor is a "Query Builder" section. It shows a "Condition" table with the following data:

Operation	Classic condition
WHEN	sum()
OF	A
IS BELOW	1
OR	last()
OF	A
HAS NO VALUE	



Q&A

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