What's new with ClickHouse: Updates, Integrations & Acquisitions

August 27, 2024

ClickHouse

What is ClickHouse?

Your (soon-to-be) favorite database!

Open source **column-oriented** **distributed** **OLAP** **database**

Since 2009	Best for aggregations	Replication	Analytics use cases
31,000+ GitHub stars	Files per column	Sharding	Aggregations
1300+ contributors	Sorting and indexing	Multi-master	Visualization
500+ releases	Background merges	Cross-region	Mostly immutable data

ClickHouse Release 24.8 LTS

YouTube https://www.youtube.com/watch?v=AeLmp2jc51k

https://presentations.clickhouse.com/release_24.8/index.html#cover

What's new in ClickHouse

19 new features

- ★ Multiquery Mode By Default
- ★ Vitual Column_etag
- ★ Hive-Style Partitioning
- ★ printf function
- ★ Tagged Query Cache
- ★ Control Of Projections During Merges

8 performance opimisations

- ★ Optimisations for Subcolumns
- ★ OPTIMIZE Query For Join Tables
- ★ Faster Merges
- ★ Faster Drop Database

65 bug fixes

Interesting new features

- ★ Analyzer In Production
- ★ New Kafka Engine
- ★ TimeSeries Engine
- ★ JSON Data Type

The New Kafka Engine 🧪

The Kafka engine exists in ClickHouse since 2017
— it implements streaming consumption and data pipelines from Kafka.

Its downside: non-atomic commit to Kafka and to ClickHouse, leading to the possibility of duplicates in the case of retries.

Now there is an option to manage the offsets in Keeper:

```
SET allow_experimental_kafka_offsets_storage_in_keeper = 1;

CREATE TABLE ... ENGINE = Kafka(
    'localhost:19092', 'topic', 'consumer', 'JSONEachRow')
SETTINGS
    kafka_keeper_path = '/clickhouse/{database}/kafka',
    kafka_replica_name = 'r1';
```

Developer: János Benjamin Antal.

The New Kafka Engine 🧪

```
CREATE TABLE ... ENGINE = Kafka(
    'localhost:19092', 'topic', 'consumer', 'JSONEachRow')
SETTINGS
    kafka_keeper_path = '/clickhouse/{database}/kafka',
    kafka_replica_name = 'r1';
```

With the new option it does not rely on Kafka to track the offsets,
and does it by itself with ClickHouse Keeper.

If an insertion attempt fails, it will take exactly the same chunk of data and repeat the insertion, regardless of network or server failures.

This enables deduplication and makes the consumption exactly-once.

Developer: János Benjamin Antal.

TimeSeries Engine 🧪

Now ClickHouse supports Prometheus protocols for remote write and read.

The new, TimeSeries Engine implements storage for metrics.

```
SET allow_experimental_time_series_table = 1;

CREATE TABLE tbl ENGINE = TimeSeries; -- the default options.

CREATE TABLE tbl ENGINE = TimeSeries
    DATA ENGINE = MergeTree
    TAGS ENGINE = ReplacingMergeTree
    METRICS ENGINE = ReplacingMergeTree;
```

Developer: Vitaly Baranov.

TimeSeries Engine 🧪

```
$ cat /etc/clickhouse-server/config.d/prometheus.yaml
prometheus:
    port: 8053
    handlers:
        my_rule_1:
            url: '/write'
            handler:
                type: remote_write
                database: default
                table: tbl
        my_rule_2:
            url: '/read'
            handler:
                type: remote_read
                database: default
                table: tbl
        my_rule_3:
            url: '/metrics'
            handler:
                type: expose_metrics
```

TimeSeries Engine 🧪

ClickHouse is listening the Prometheus protocol
and ready to receive metrics.

TimeSeries engine is simple to use, but allows many customizations:
— put some tags (e.g., hostname) into separate columns;
— adjust table's primary key;
— adjust column types;
— ...

But there is more work to do:
— support for PromQL;

Developer: Vitaly Baranov.

JSON Data Type 🧪

```
SET allow_experimental_json_type = 1;

CREATE TABLE test (time DateTime, data JSON) ORDER BY time;

-- or with parameters:
data JSON(
    max_dynamic_paths = N,
    max_dynamic_types = M,
    some.path TypeName,          -- a type hint
    SKIP path.to.skip,           -- ignore some paths
    SKIP REGEXP 'paths_regexp')
```

Developer: Pavel Kruglov.

JSON Data Type 🧪

How it works:

— Analyzes the JSON and infers data types for every path.

— Stores every path and every distinct type as a subcolumn.

— Up to the maximum number, when it will fallback
to storing the rest of the paths together.

It enables fast column-oriented storage and queries
on arbitrary semistructured data!

Developer: Pavel Kruglov.

JSON Data Type 🧪

How to insert:
— insert with the JSONEachRow format;
— insert a string containing JSON to the column of JSON type;
— insert with the JSONAsObject format
to put the whole object into the JSON column;
— cast from String to JSON;

```
CREATE TABLE test (data JSON) ENGINE = Memory;

INSERT INTO test VALUES ('{"a" : {"b" : 42}, "c" : [1, 2, 3]}');

INSERT INTO test FORMAT JSONEachRow
{"data": {"a" : {"b" : 42}, "c" : [1, 2, 3]}};

SELECT data FROM test;
```

Developer: Pavel Kruglov.

JSON Data Type 🧪

How to select:
— read a certain path as a Dynamic column:

```
SELECT data.a AS x, toTypeName(x) FROM test;
```

— read a certain path and cast to the desired data type:

```
SELECT data.a.b::UInt32 AS x, toTypeName(x) FROM test;
```

— read a certain path and assume its data type:

```
SELECT data.a.b.:Int64 AS x, toTypeName(x) FROM test;
```

— read a subobject as JSON:

```
SELECT data.^a AS x, toTypeName(x) FROM test;
```

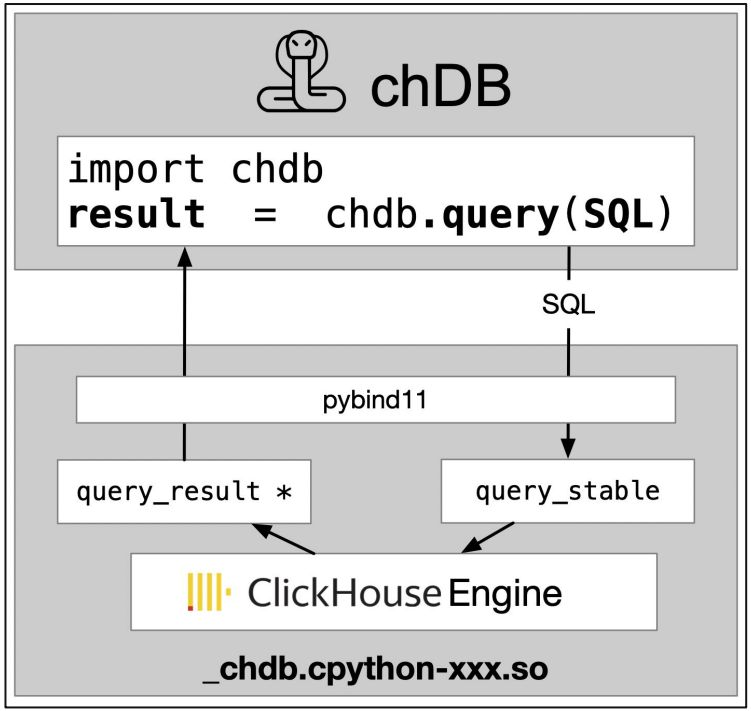
Developer: Pavel Kruglov.

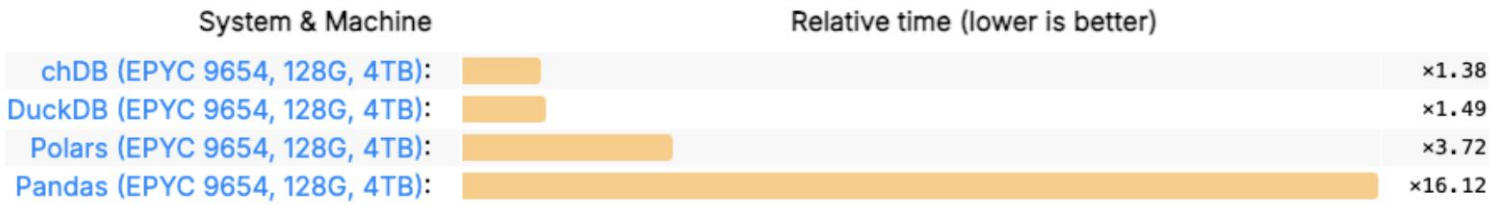
Other Updates

chDB Acquisition

What is chDB?
chDB is an in-process OLAP SQL engine.

The creator of chDB's initial goal was to make ClickHouse available as an "out-of-the-box" Python module. Now, it also supports other programming languages including C/C++, Golang, Rust, NodeJS, Bun, and .NET





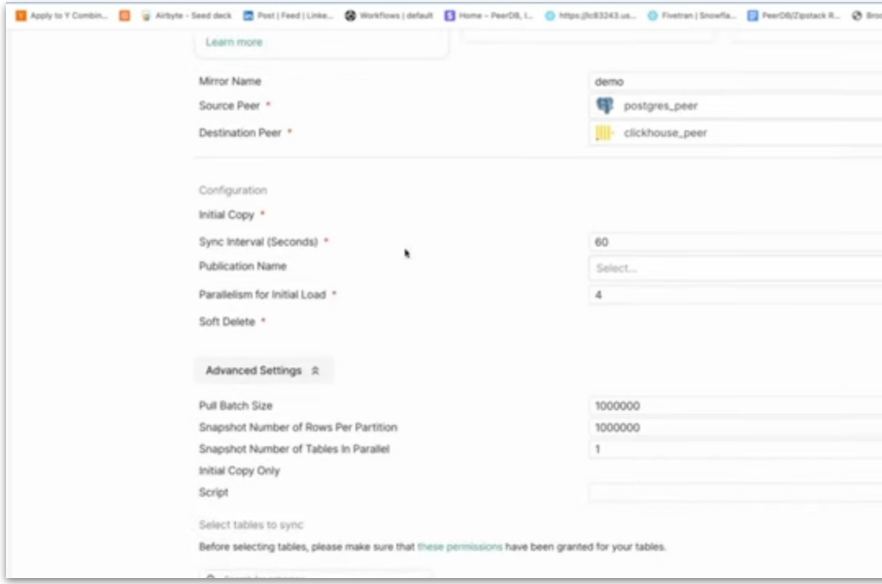
Detailed Comparison

	chDB (EPYC 9654, 128G, 4TB)	DuckDB (EPYC 9654, 128G, 4TB)	Polars (EPYC 9654, 128G, 4TB)	Pandas (EPYC 9654, 128G, 4TB)
Load time:	0	0	**23s (×1.00)**	0
Data size:	**0.86 GiB (×1.00)**	**0.86 GiB (×1.00)**	**0.86 GiB (×1.00)**	**0.86 GiB (×1.00)**
Q0.	0.065s (×7.50)	0.034s (×4.43)	**0.000s (×1.00)**	8.789s (×878.50)
Q1.	0.027s (×1.13)	0.027s (×1.10)	**0.023s (×1.00)**	0.162s (×5.19)
Q2.	0.024s (×1.92)	0.025s (×1.99)	0.038s (×2.70)	**0.008s (×1.00)**
Q3.	0.027s (×2.58)	0.022s (×2.25)	**0.004s (×1.00)**	0.008s (×1.24)
Q4.	0.183s (×2.19)	**0.078s (×1.00)**	0.133s (×1.63)	0.211s (×2.51)
Q5.	0.149s (×1.70)	**0.084s (×1.00)**	0.304s (×3.36)	0.669s (×7.25)
Q6.	0.026s (×2.22)	0.025s (×2.14)	**0.006s (×1.00)**	0.020s (×1.87)
Q7.	0.054s (×1.70)	0.046s (×1.48)	**0.028s (×1.00)**	0.071s (×2.13)
Q8.	**0.083s (×1.00)**	0.091s (×1.09)	0.261s (×2.91)	0.579s (×6.34)
Q9.	**0.092s (×1.00)**	0.127s (×1.34)	0.248s (×2.52)	0.682s (×6.76)
Q10.	0.094s (×1.66)	**0.053s (×1.00)**	0.129s (×2.21)	0.840s (×13.54)
Q11.	**0.058s (×1.00)**	0.059s (×1.01)	0.121s (×1.91)	0.870s (×12.84)
Q12.	0.123s (×1.22)	**0.099s (×1.00)**	0.200s (×1.92)	2.771s (×25.48)
Q13.	0.114s (×1.00)	0.159s (×1.36)	22.401s (×180.77)	2.760s (×22.35)

PeerDB Acquisition

What is PeerDB?
PeerDB is a Change Data Capture (CDC) provider focused on Postgres as a data source

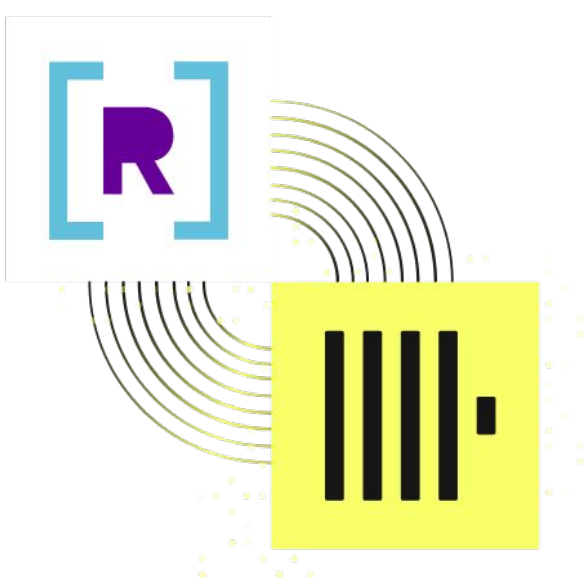
Why acquire PeerDB?
This will enable bridging the gap between transactional and analytical workloads and unlock more value for users and developers.



Rockset Migration Guide

Following Rockset's acquisition by OpenAI in June, users have until September 30 to off-board from the service. In comes, ClickHouse…

https://clickhouse.com/docs/en/migrations/rockset



BYOC on AWS

in private preview

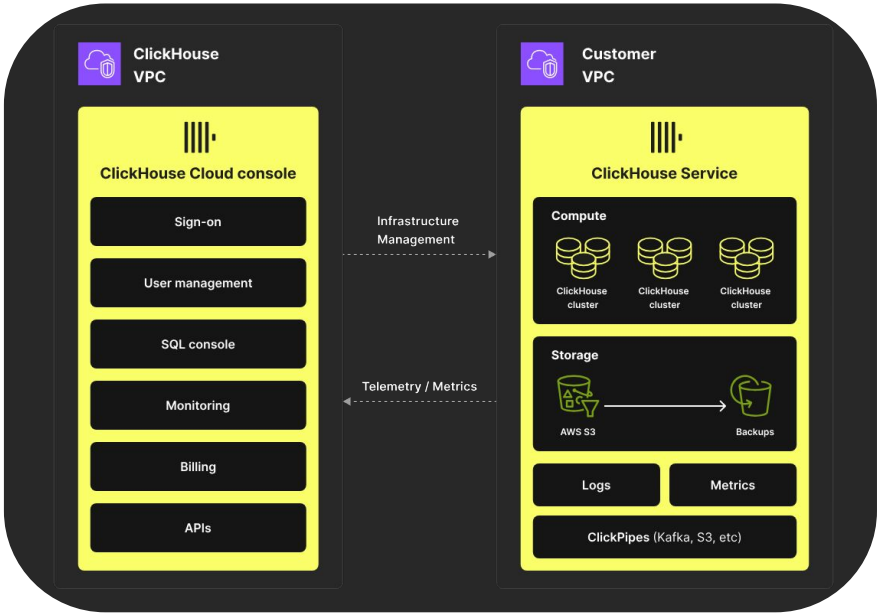
What is this?

Allows you to experience the advantages of ClickHouse Cloud within your own VPC.

Who is this for?

Organisations with strict data residency and compliance requirements.

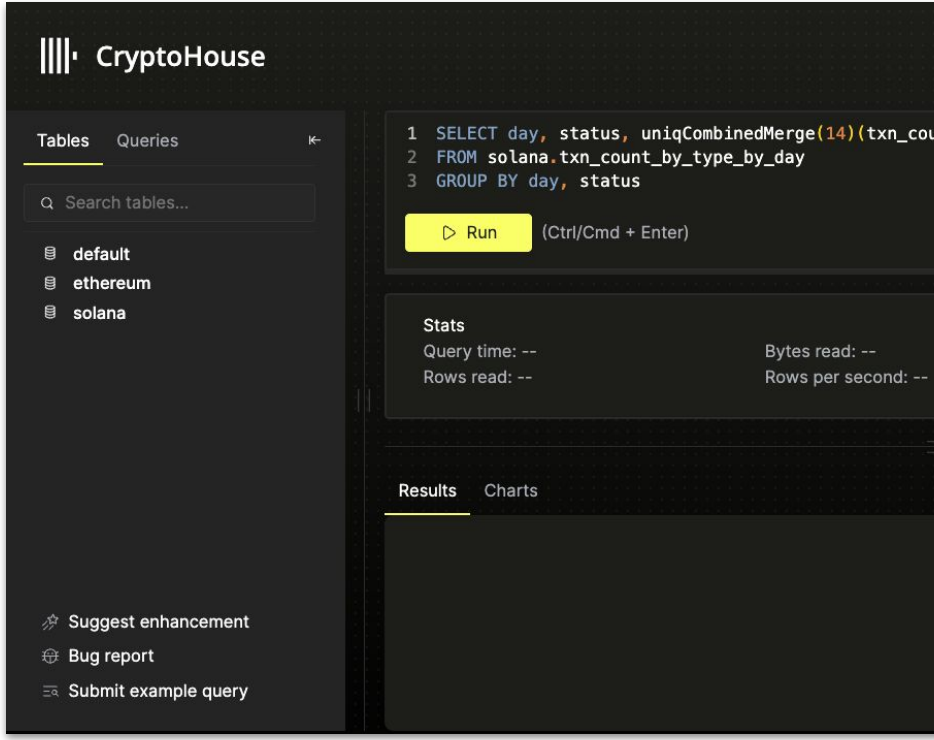
https://clickhouse.com/cloud/bring-your-own-cloud



New Demo: CryptoHouse

CryptoHouse is a free blockchain analytics service powered by ClickHouse with the aim of democratizing blockchain analytics.

https://crypto.clickhouse.com/



What's New with ClickHouse Academy

Existing Workshops:

Recently Added Workshops:

2-hour getting-started workshop
Level: Beginner

2-hour PostgreSQL to ClickHouse migration
Level: Intermediate

2-hour From BigQuery to ClickHouse migration
Level: Intermediate

Thank you!

Keep in touch!


clickhouse-australia-user-group


clickhouse.com/slack


#clickhouseDB @clickhouseinc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ClickHouse