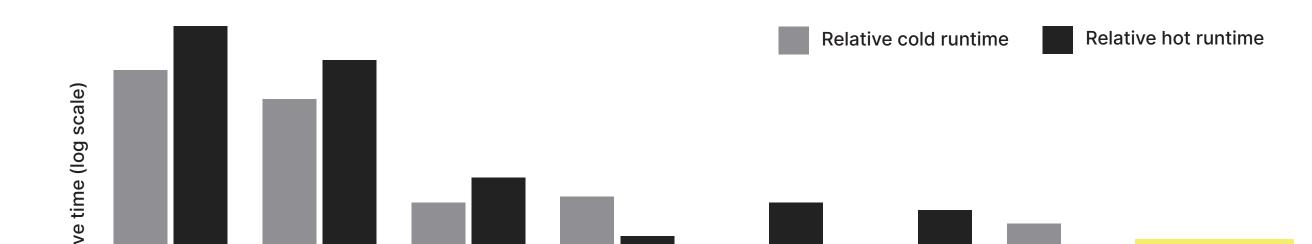
Lightning fast analytics for everyone.

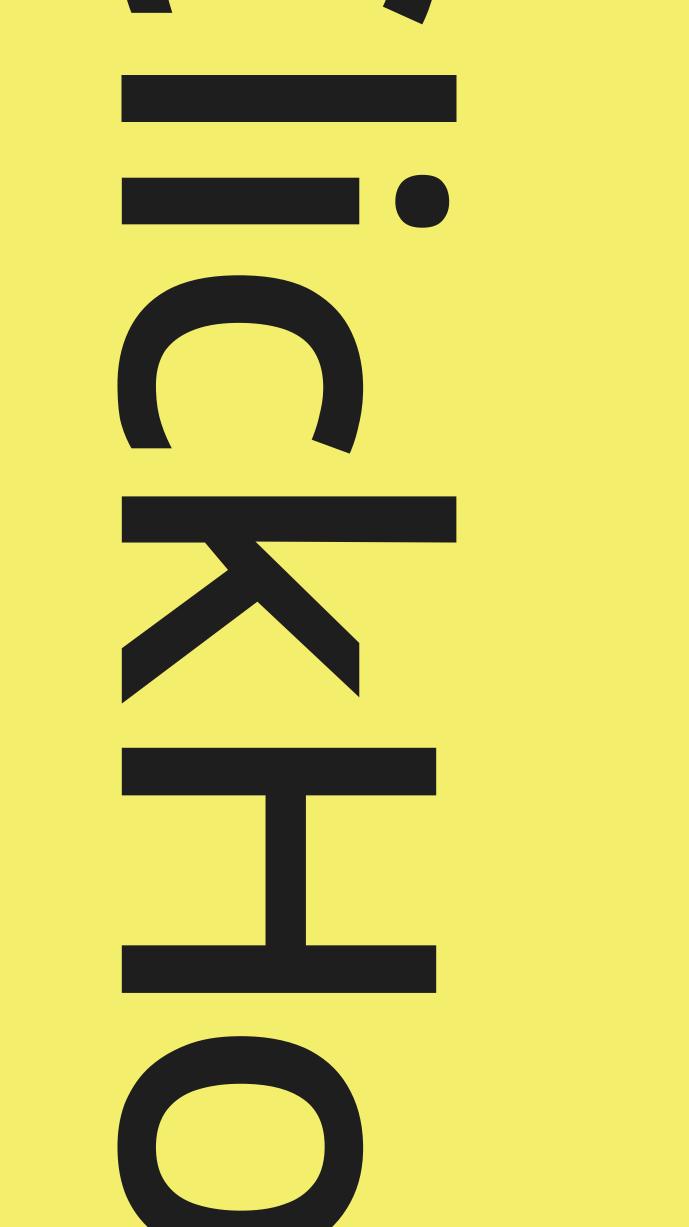
Fastest analytics database

۲



ClickHouse has the best query performance amongst production-grade

analytics databases. Performance is a top priority



Relati							_	
	MySQL	PostgreSQL	Druid	Redshift	Pinot	Snowflake	Umbra	ClickHouse

and continuously improved.

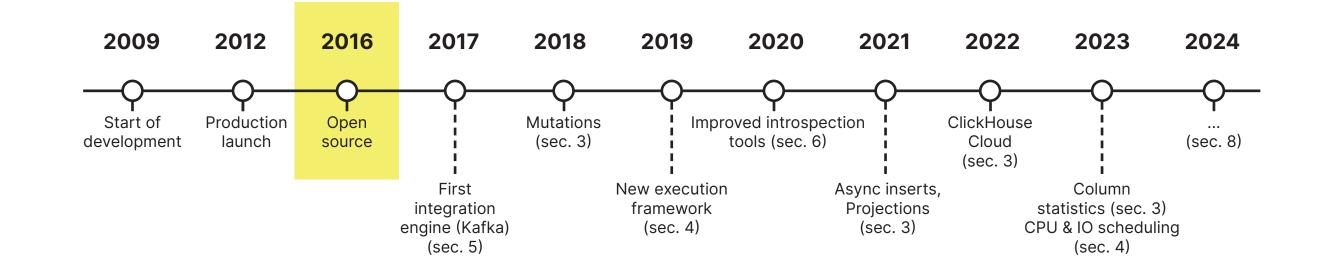
benchmark.clickhouse.com

For everyone

Trusted by **50%+ of Fortunes Global Top 2000 companies**.

- The most popular OSS analytics database (Apache 2.0 license)
- $36k \neq$ and 2k+ contributors
- Runs on anything

github.com/ClickHouse/ClickHouse



An LSM-tree based storage layer

CREATE TABLE hits

Alexey Milovidov

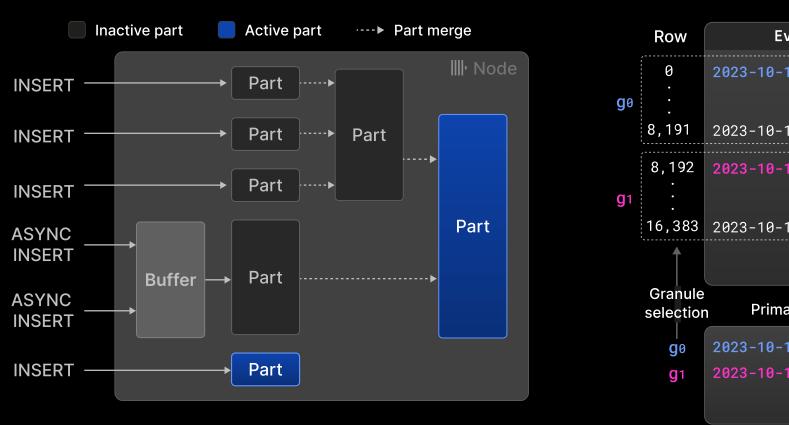
alexey@clickhouse.com

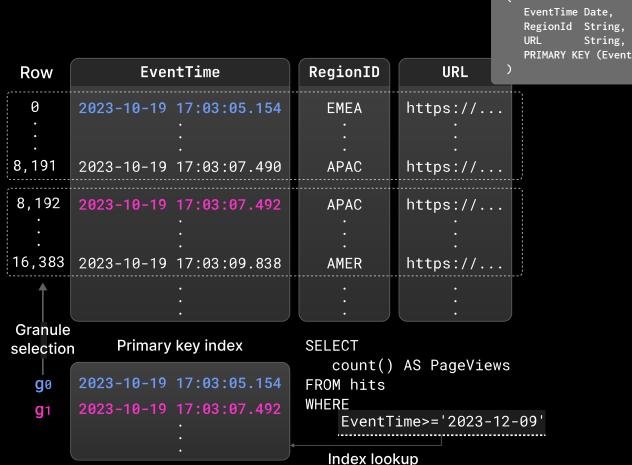
Robert Schulze

Ingestion rates

only limited by disk speed. Data transformations decoupled from INSERTs.

• Three effective data pruning techniques for quickly finding rows matching a predicate.





Advanced vectorized query execution engine

IIII [,] Node 1				IIII [,] Node 2				IIII [,] Node m				
	C2 : :	•••• Cn : : :		C1 	C2 		Cn	••••		C2		Cn
					· · · · ·		, , , , , , , , , , , , , , , , , , ,					
C1	C2	••••	Cn					ble shar parallel t				
	=== : ====		•	Data chunks are processed in parallel by a node's multiple CPU cores								

	SINK OPERATOR PrettyTableFormat Limit MergeSort		avg(FROM h WHERE URL GROUP	ionID, (Latency) AS nits = 'https:// BY RegionID BY AvgLaten	/clickho)	ouse.com'	filte aggre sort	r gation	
iort	StreamSort	StreamSort							
ort	ChunkSort	ChunkSort							
	Distribute								
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ate	Aggregate	Aggregate				Aggregate		Aggregate	
	 Repartition							 Repartition	
Scan	 MergeTreeScan	MergeTreeSca	an			MergeTreeSca	an	 MergeTreeScan	
RATOR	SOURCE		DR				DR	SOURCE	R
	_ANE 2	LAN	1E 3			ANE 1	L/	ANE 2	

- Query execution fully utilizes all server and cluster resources.
- Enables vertical and horizontal scaling by adding more CPU cores and more cluster nodes.

IIIŀ Node 2

Aggregate

MergeTreeScan source operator

III[,] Node N

robert@clickhouse.com

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Ryadh Dahimene ryadh@clickhouse.com

www.clickhouse.com



Node 1

What else to expect from the paper

• Storage layer:

updates and deletes, idempotent inserts, data replication, ACID compliance

• Query execution:

JIT query compilation, hash tables, parallel joins

• Integration layer:

native support for 90+ file formats and 50+ integrations with external systems

