Trino in 2024 by the numbers

- Trino releases 436-467

- 5,000+ additional commits, 40,000+ total

- 225+ unique contributors in 2024, 925+ total

- 10.5k+ stars on GitHub

- 13,500+ Slack members

- [Trino Community Broadcast](#) episodes 54-67

2024 has been a record year for Trino   Hosted by ⚙ Starburst

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What's happened in 2024?

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Major Updates in 2024

- Improved access control integrations
  - Open Policy Agent (OPA) access control
  - Apache Ranger access control
- Observability
  - Support for OpenTelemetry and OpenMetrics
  - Kafka query event listener
  - OpenLineage query event listener

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Major Updates in 2024

- Client protocol improvements

- Python user defined functions

- Software supply chain security

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Major Updates in 2024

- Major improvements for Trino Gateway

- New JavaScript client – trino-js-client

- New C# and ADO.net driver

- Numerous Helm chart improvements

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Client protocol improvements

- Challenges
    - Single stream, roundtrip latency
    - Slow clients tie up resources
- Parallel protocol
    - Stage data in object storage
    - Automatic fallback
    - JDBC driver and CLI ready, Python client in the works

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Python user-defined functions

```
WITH FUNCTION xor(a boolean, b boolean)
RETURNS boolean
LANGUAGE PYTHON
WITH (handler = 'bool_xor')
AS $$
import operator
def bool_xor(a, b):
    return operator.xor(a, b)
$$
SELECT xor(true, false), xor(false, true);
```

Note the use of $$ to enclose Python

Python user-defined functions

- CREATE/DROP/SHOW FUNCTION, WITH FUNCTION

- Execution inline with query processing

- Limitations

  - Experimental

  - Python language and core libraries only

  - Lots of room to improve performance

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One more

```
WITH FUNCTION reverse_words(s varchar)
RETURNS varchar
LANGUAGE PYTHON
WITH (handler = 'reverse_words')
AS $$
import re

def reverse(s):
    str = ""
    for i in s:
        str = i + str
    return str

pattern = re.compile(r"\w+[.,'!?\"]\w*")

def process_word(word):
    # Reverse only words without non-letter signs
    return word if pattern.match(word) else reverse(word)

def reverse_words(payload):
    text_words = payload.split(' ')
    return ' '.join([process_word(w) for w in text_words])
$$
SELECT comment, reverse_words(comment)
FROM nation
WHERE nationkey IN (5, 6, 12)
```

Connectors

- File system caching for Iceberg and Delta Lake

- Apache Polaris and Unity Catalog integration

- Lots of quality of life improvements

- New connectors: Exasol, Faker, OpenSearch, Snowflake, Vertica

- Removed legacy connectors: Accumulo, Atop, Localfile, Raptor

- Remove Kudu, Kinesis, and Phoenix connectors in 2025?

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Roadmap

- Secrets management and dynamic catalogs

- Client protocol improvements for all client drivers

- Packaging improvements

- More connectors such as DuckDB, LanceDB, HsqlDB, Loki, …

- Continued and even *increased work* on performance improvements

- Research and prototype next generation optimizer

- SQL language improvements such as PIVOT, ASOF joins, …

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Trino community

- Monthly maintainer and contributor calls

- Trino Fest in June in Boston

- Japanese edition of Trino: The Definitive Guide

- New SQL training material

- Improved website and contribution docs

分散 SQL クエリエンジン

Trino
徹 底 ガイド

Matt Fuller、Manfred Moser、Martin Traverso [著]
蛯原 裕弥、佐々木 海、鯵坂 明、西塚 要、高田 美紀 [訳・監訳]

「SQL-on-Anything」を
Trinoで実現する!

標準SQLに準拠し、Hadoopから従来のRDBMS、NoSQLまで、
さまざまなデータソースに対してクエリを実行できるTrinoの全てを、
主要開発者が解き明かす。

芳和システム

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Questions?

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