Trino Gateway

Trino Summit 2023

Agenda

Trino Gateway

- Mission statement
- Benefits
- History
- Use Cases
  - Naver (presenter: Jaeho)
  - Bloomberg (presenter: Andy)
- Demo (presenter: Will)
- Trino Gateway Project Future
- Contribute!
- Q&A (presenter: Will, Vishal, Andy, Jaeho)

Mission Statement

Trino Gateway

- Lightweight reverse proxy that **forwards requests** to distributed **Trino clusters**

Benefits to different stakeholders

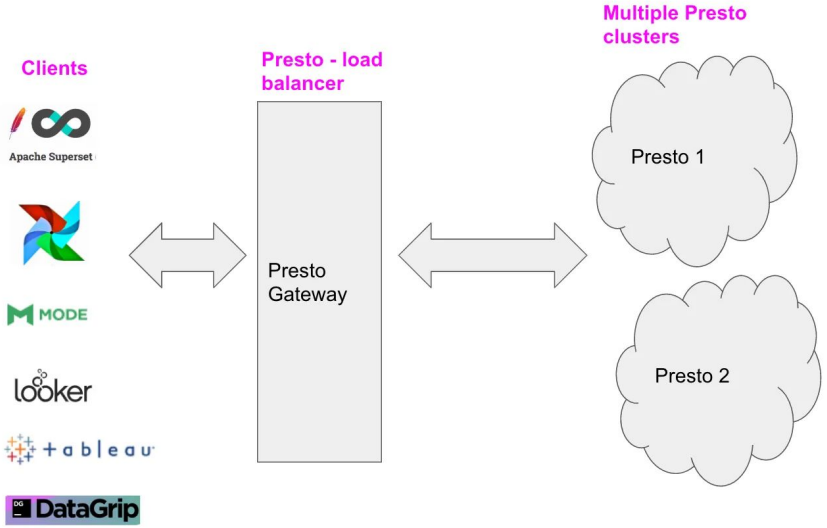
Trino Gateway

- Benefits to cluster admins: configure an efficient and reliable infrastructure
  - Query Load Distribution
  - Consistent Querying Results
  - High Availability (HA) Support
  - Maintain Service Level Agreements (SLAs) for ETL Schedule Operations
  - Graceful Shutdown Support

- Benefits to end users: provide a reliable and fast query experience
  - Maximize performance and Service quality
  - Resource Failure Mitigation
  - Reliable Service During Deployment and Failures
  - Minimized Query Latency

History

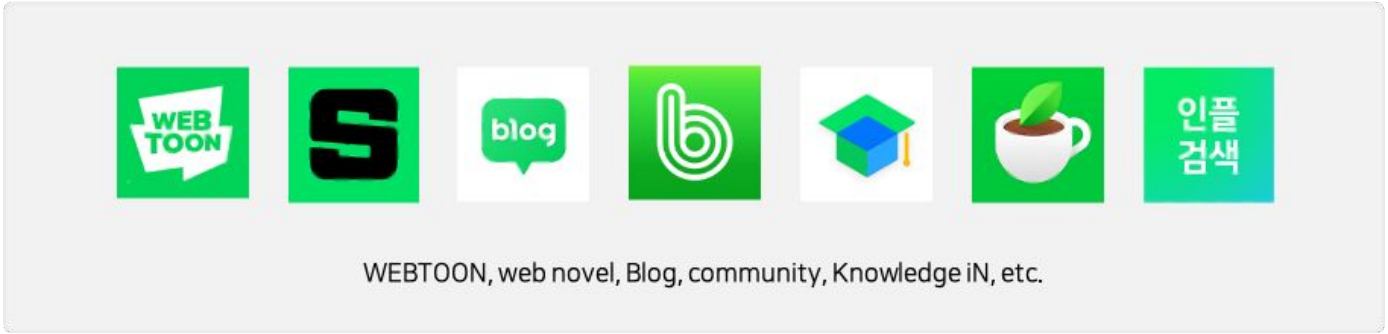
- Show some love to Lyft
  - Originally lyft/presto-gateway
  - First public release in Feb 16, 2019
  - Presto Infrastructure at Lyft blog post
- Starburst as new Maintainers
  - Special thanks to Manfred!
- Current contributors
  - Bloomberg
  - Naver
  - LinkedIn
  - Dune
  - Starburst



Naver Use Cases – Company

Trino Gateway

- Naver Corporation is a global ICT company, providing South Korea's number 1 search portal "NAVER".
- Offers various products, including a web search portal, a social media platform called LINE, webtoon platform called Line Webtoon and diverse internet services.



Naver Use Cases – Search Platform

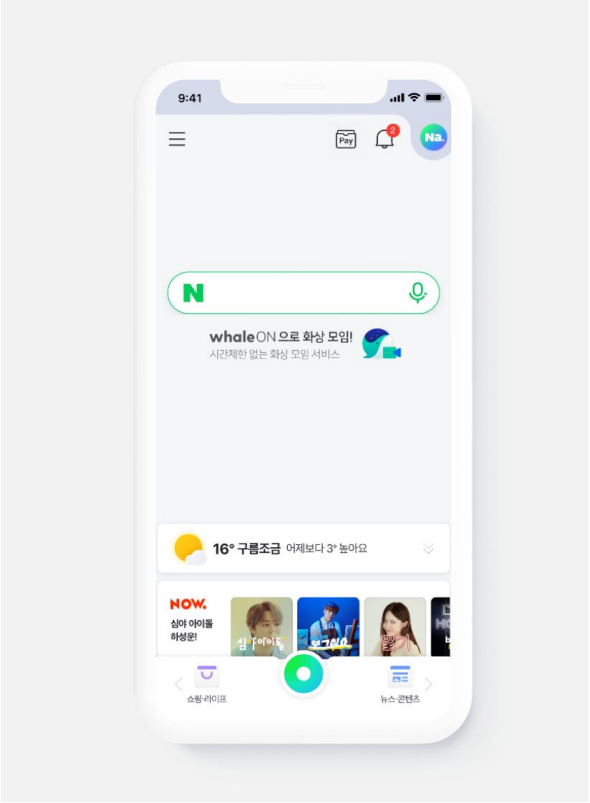
Trino Gateway

Search Platform Team

- Provide optimal search results for
  - News, maps, cafe, blogs, images, videos
- Multi-ranking and collection-ranking technology

Statistics for Trino used by Analysts

- 4K queries, 300 TB data, 10 Trillion rows per day.
- 10 PB business data stored in our data centers



Naver Use Cases

Trino Gateway

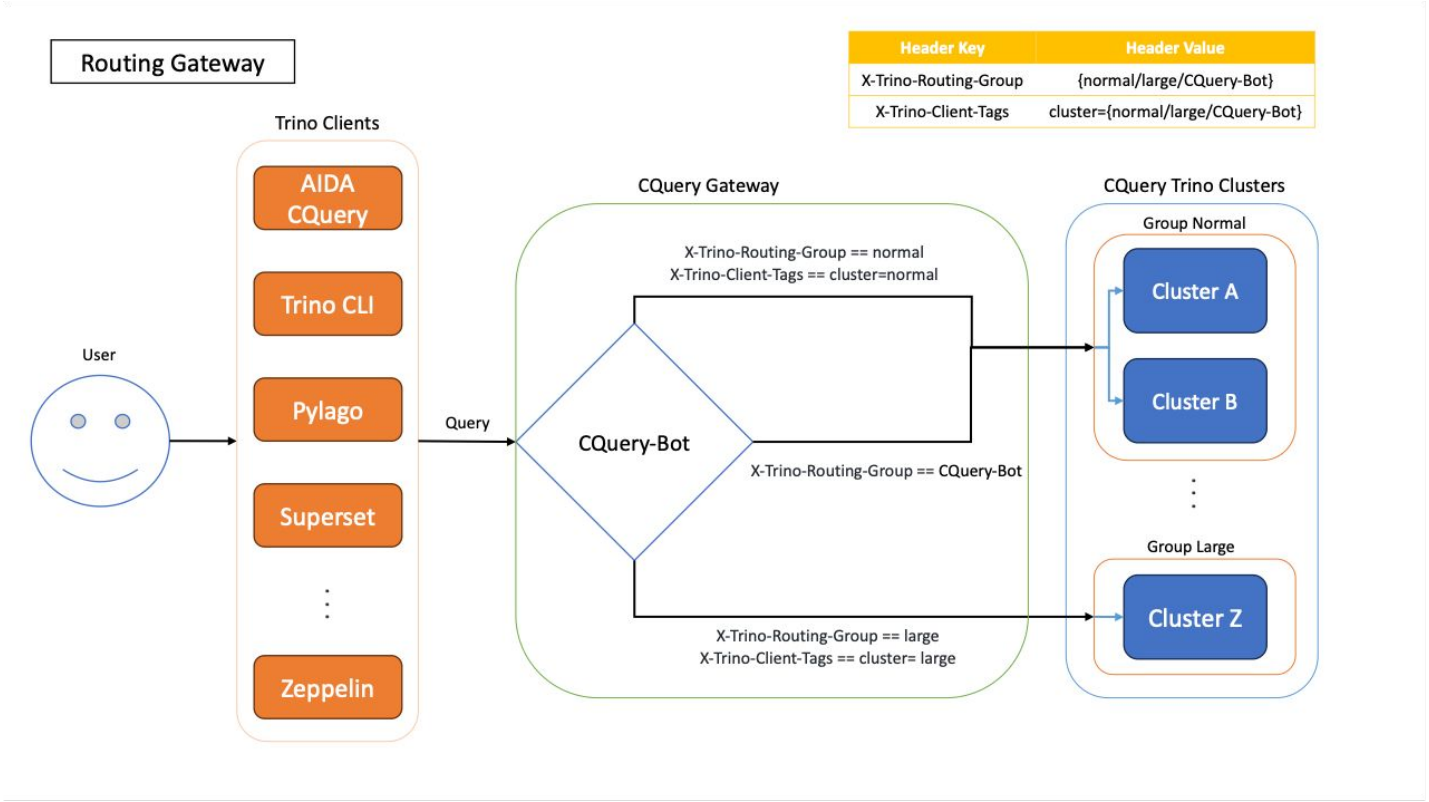
- Managing Trino Clusters with Various Purposes
  - Problem
    - We provide trino clusters for various purposes: fast querying vs large datasets
    - Each cluster has their own url for different purposes
    - Any server updates forces users to switch to other clusters or wait until server was back up
  - Solution
    - Long and complex Trino Cluster URLs are combined into a single one.
    - Users now can query through a unified URL, avoiding disruptions during system updates.
    - Able to shutdown gracefully and update clusters

Naver Use Cases

Trino Gateway

- Need for Dynamic Routing depending on Trino Cluster's Status
  - Problem
    - Too many queries are requested at once, leading poor performance due to resource starvations.
    - A query might need more memory than the query limit set for each worker node
    - A query might need more memory than the workers' physical memory.
    - Failing after running for certain period of time is a waste of resources
  - Solution
    - Before routing
      - Phase 1 - consider current cluster's queued status and use Resource Groups to force CPU/Memory/Concurrency limits
      - Phase 2 - (TBD) Calculate expected memory & cpu usage for each query and dynamically route to appropriate cluster

Naver Use Cases - Architecture



Bloomberg

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Why and How we use Trino and Trino Gateway at Bloomberg

- Query federation with custom access controls
  - Access different data sources such as Postgres or SQL
  - Access control via Trino OPA plugin
- Trino during ETL process
  - Create intermediate datasets or final products
- Store high volume data products
  - SQL on S3 via Apache Iceberg/Hive for data products
- Served **tens of millions** of Trino queries to date
- High availability is our priority

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Engineering

Bloomberg Use Cases

- App Security
  - Supports OAuth authentication
  - Supports Form authentication
    - Basic
    - LDAP

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Engineering

Bloomberg Use Cases

- Health checks
  - Problem
    - Clusters were inactivated programmatically without turning back on after they became healthy
  - Solution
    - Introduced Healthy, Pending, and Unhealthy states to prevent a cluster from automatically being turned off
    - Achieved high availability

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Bloomberg Use Cases

- Dependency modernization
  - Problems
    - Core dependencies were too old and no longer supported
    - Difficult to run integration tests because we could not use the DropwizardExtensionSupport extension support from the library
  - Solution
    - Upgraded dependency versions and dropped duplicate dependencies
      - Dropwizard v1.3.29 -> v4.0.2
      - Java 11 -> Java 17
      - Jetty v9.4.48 -> v11.0.15
      - Javax -> jakarta
      - TestNG/junit5 -> junit5

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Trino Gateway

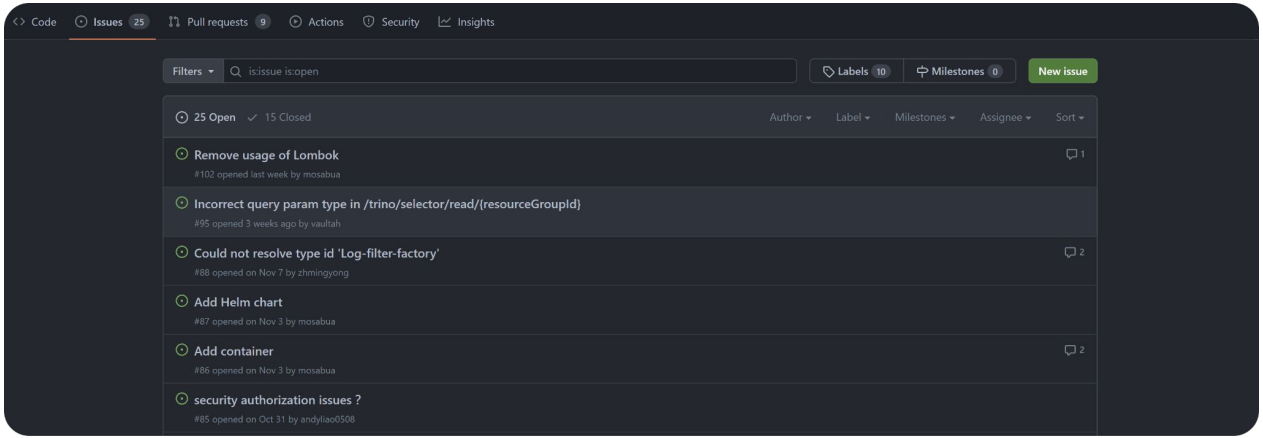
Demo

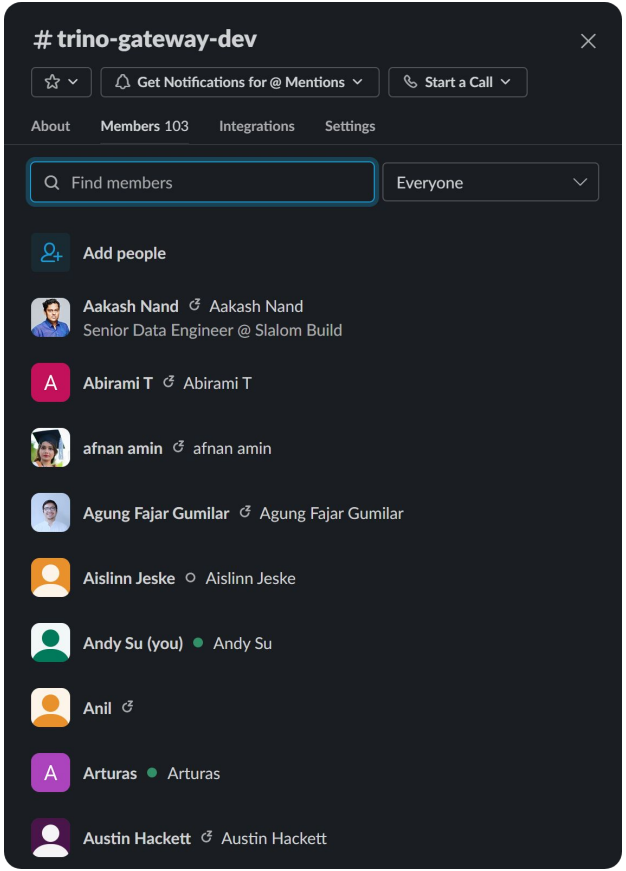
Trino Gateway Project Future

- Short-term goals
  - Modernizing dependencies continued
  - Improving test suite
  - Aligning code styles and patterns with Trino
  - Supporting modern deployment tools
  - Tracing
  - Containerization
- Medium-term and long-term goals for capabilities and improvements
  - Automatic query retry to other clusters if backend goes offline or due to lack of resources (memory)
  - Integration with group providers for routing
  - Supporting for parallel testing (e.g. duplicate a query to a second cluster and consume result)

Contributions

- Trino Gateway Homepage
  - trinodb/trino-gateway (github.com)
- Where to find us
  - https://trinodb.slack.com/archives/C059KUNPTSP





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