PERCONA

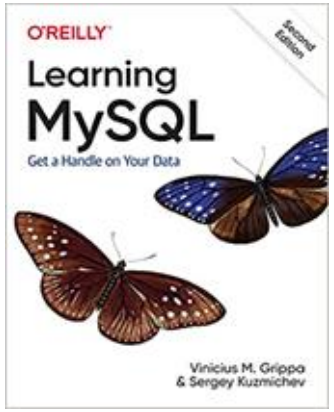
Bringing Flamegraphs to MySQL Query Optimization

Vini (Vinicius) Grippa

Lead Database Engineer at Percona

SELECT * FROM person where name like ‘Vini’;

- Database Engineer at Percona for 8 Years. Working mostly with MySQL and MongoDB
- Co-author of the Learning MySQL book
- Organizer of the Brazilian MySQL Community



COMUNIDADE MySQL BR

preFOSDEM MySQL Belgian Days 2026

©2026

PERCONA

Why I'm Here (Besides the Belgium Beers)

- What is a flamegraph
- Why flamegraphs are useful
- Traditional flamegraph use cases
- New MySQL explain features
- Myflames: concepts & examples
- Flamegraphs vs bar graphs

©2026

What is a flamegraph

What is a flamegraph

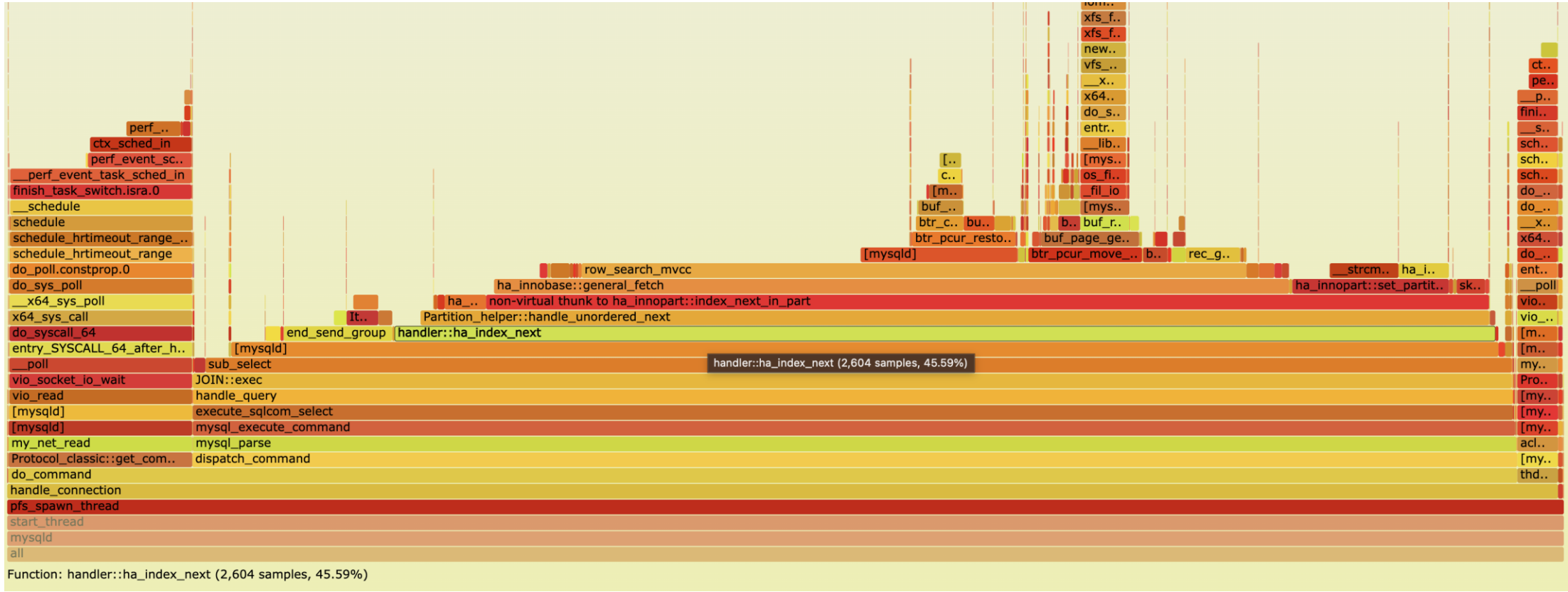
- Visualization technique for hierarchical performance data
- Created by Brendan Gregg to analyze system performance
- Represent stack traces aggregated over time
- X-axis: where time is spent (not time sequence)
- Y-axis: call stack depth / hierarchy
- Each box = function or operation
- Wider boxes = more time / higher cost
- Designed to quickly answer: “Where is the bottleneck?”

©2026

What is a flamegraph

Why flamegraphs are useful

Why flamegraphs are useful



©2026

Traditional Flamegraphs use cases

Traditional Flamegraphs use cases

- CPU profiling and hotspot analysis
- Identifying expensive function calls
- Application performance tuning
- Kernel and OS-level analysis
- I/O, memory, and scheduler behavior
- Comparing performance before vs after changes
- Regression detection in performance tuning

Mostly focused on code paths

©2026

New MySQL explain features

New MySQL explain features

- **We had until MySQL 8.4:**
- **EXPLAIN <query>;**
- **EXPLAIN FORMAT=JSON <query>**
- **EXPLAIN FORMAT=TREE <query>**
- **EXPLAIN ANALYZE <query>**

©2026

New MySQL explain features

- `mysql> EXPLAIN ANALYZE FORMAT=JSON SELECT * FROM employees.employees WHERE last_name = 'Facello' AND first_name = 'Georgi';`
- `ERROR 1235 (42000): This version of MySQL doesn't yet support 'EXPLAIN ANALYZE with JSON format`

©2026

New MySQL explain features

- https://dev.mysql.com/blog-archive/new-json-format-for-explain/
- `mysql> SET explain_json_format_version=2;`
- `mysql> EXPLAIN ANALYZE FORMAT=JSON SELECT * FROM employees.employees WHERE last_name = 'Facello' AND first_name = 'Georgi';`

©2026

New MySQL explain features

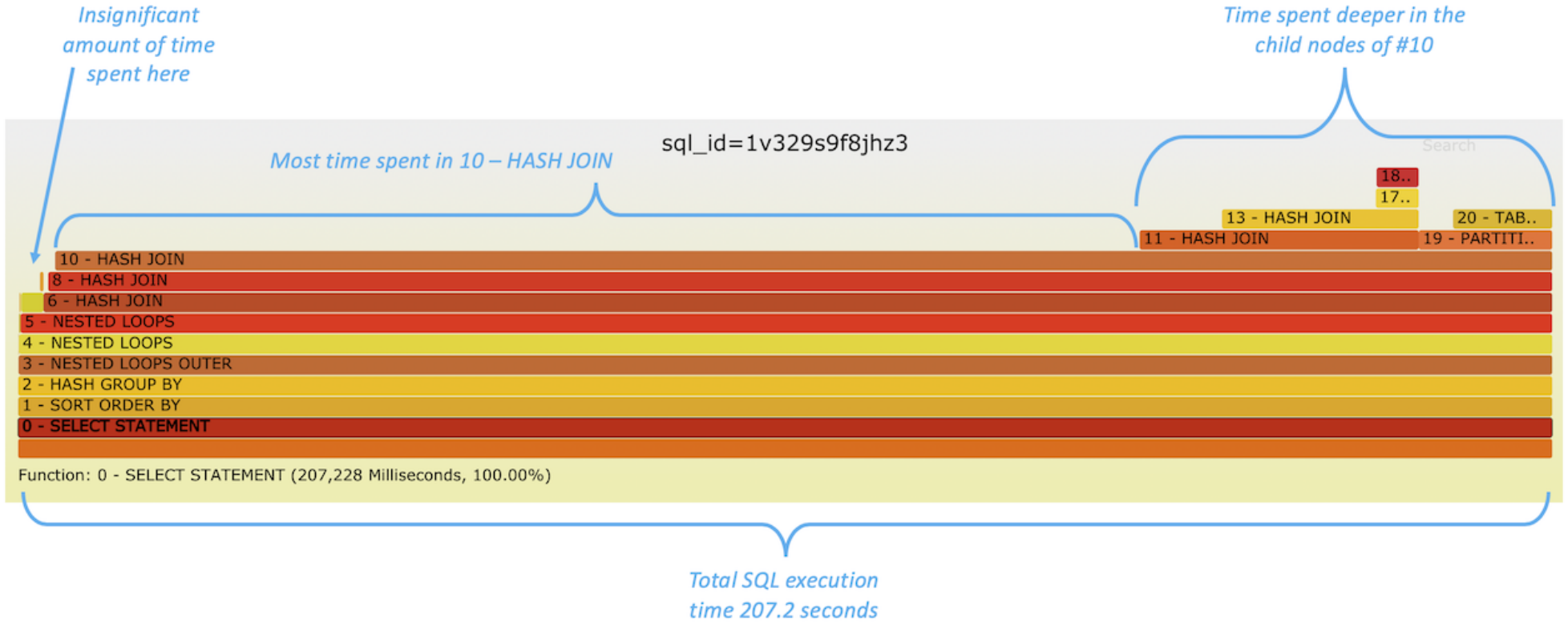
```
| "inputs": [
    {
      "inputs": [
        {
          "ranges": [
            "(last_name = 'Facello')"
          ],
          "covering": false,
          "operation": "Index range scan on employees using idx_last_name over (last_name = 'Facello')",
          "index_name": "idx_last_name",
          "table_name": "employees",
          "access_type": "index",
[...]
          "estimated_rows": 186.0,
          "index_access_type": "index_range_scan",
          "actual_last_row_ms": 0.510455,
          "actual_first_row_ms": 0.16916699999999998,
          "estimated_total_cost": 2.5677966101694913,
          "estimated_first_row_cost": 0.013805358119190814
        },
        {
          "ranges": [
[...]
    }
  ],
  "condition": "((employees.first_name = 'Georgi') and (employees.last_name = 'Facello'))",
  "operation": "Filter: ((employees.first_name = 'Georgi') and (employees.last_name = 'Facello'))",
  "query_type": "select",
[...]
  "actual_last_row_ms": 0.905292,
  "actual_first_row_ms": 0.22562400000000002,
  "estimated_total_cost": 5.562533452274755
} |
```


©2026

Tanel Poder

SQL Plan Execution FlameGraphs with Loop and Row Counts

SQL Flamegraph



©2026

Myflames

- Developed using Cursor AI
- Based on Tanel Poder flamegraph

©2026

Myflames

- DEMO
- `EXPLAIN ANALYZE FORMAT=JSON SELECT * FROM employees.employees WHERE last_name = 'Facello' AND first_name = 'Georgi';`

©2026

Myflames

- DEMO
- EXPLAIN ANALYZE FORMAT=JSON /* Employees with more than one title historically */ SELECT e.emp_no, e.first_name, e.last_name, COUNT(t.title) AS total_titles FROM employees e JOIN titles t ON e.emp_no = t.emp_no GROUP BY e.emp_no, e.first_name, e.last_name HAVING total_titles > 1 ORDER BY total_titles DESC LIMIT 10;

©2026

Myflames

- It supports all flamegraphs commands
- Published on GitHub

©2026

Flame graphs vs Bar graphs

Bonus – Bargraph

- DEMO
- `EXPLAIN ANALYZE FORMAT=JSON /* Employees with more than one title historically */ SELECT e.emp_no, e.first_name, e.last_name, COUNT(t.title) AS total_titles FROM employees e JOIN titles t ON e.emp_no = t.emp_no GROUP BY e.emp_no, e.first_name, e.last_name HAVING total_titles > 1 ORDER BY total_titles DESC LIMIT 10;`

©2026

Questions?

PERCONA Live 26
BAY AREA

May 27-29, 2026
Computer History Museum,
Mountain View, California

perconalive.com

preFOSDEM MySQL Belgian Days 2026

©2026

PERCONA

Thank You!