Debugging Log Files and PgBadger

Oz · Following

3 min read · Mar 20, 2024

Debugging PostgreSQL performance issues often involves sifting through extensive log files to identify bottlenecks and errors. PgBadger, a powerful log analyzer for PostgreSQL, simplifies this process by providing insightful reports and metrics. In this guide, we'll explore how to use PgBadger to analyze PostgreSQL log files effectively.

logging_collector

- Description: When enabled, a background process captures messages sent to stderr and redirects them to log files.
- Default: Off.
- Importance: Enabling this parameter ensures comprehensive logging without loss of messages, especially critical under high workloads.

log_destination

- Description: Determines where log output is directed.
- Default: stderr (text format).
- Other Options: csvlog (comma-separated format).
- Importance: Choosing the appropriate destination facilitates compatibility with external analyzers or applications.

log_directory

- Description: Specifies the directory for storing log files.
- Dependent: Requires logging_collector to be enabled.
- Recommendation: Use separate storage to prevent disk congestion, particularly under heavy workloads.

log_filename

- Description: Defines the naming convention for log files.
- Dependent: Requires logging_collector to be enabled.
- Example: postgresql-%Y-%m-%d_%H%M%S.log.
- Importance: Establishes a consistent naming scheme for organized log management.

log_rotation_age

- Description: Controls time-based log rotation.
- Default: 24 hours (1440 minutes).
- Flexibility: Can be set to 0 to deactivate time-based rotation.
- Recommendation: Adjust based on workload; daily rotation is typical but weekly rotation may suffice for lighter usage.

log_rotation_size

- Description: Manages size-based log rotation.
- Default: 10MB.
- Zero Option: Setting to 0 disables size-based rotation.
- Importance: Prevents log files from growing excessively, ensuring efficient disk usage.

log_truncate_on_rotation

- Description: Determines whether existing log files are appended or overwritten upon rotation.
- Dependent: Requires logging_collector to be enabled.
- Functionality: Enables control over the number of log files stored.

- Example: If log_filename is configured with hourly rotation, PostgreSQL retains a limited number of files based on this parameter.

log_line_prefix

- Description: Prefix added to each log line.
- Example: '%t [%p]: [%l-1] user=%u,db=%d,host=%h,app=%a,cilent=%h '
- Importance: Formats log lines for better readability and understanding of information.

log_connections / log_disconnections

- Description: Determines whether connection establishment and disconnection operations are logged.
- Importance: Useful for tracking database connection and disconnection events.

log_min_duration_statement

- Description: Controls logging of SQL statements that take longer than a specified duration.
- Importance: Helps identify long-running queries to diagnose performance issues.

log_lock_waits

- Description: Determines whether lock wait situations are logged.
- Importance: Lock wait situations provide important clues for identifying causes of performance issues.

log_autovacuum_min_duration

- Description: Controls logging of autovacuum operations that take longer than a specified duration.
- Importance: Useful for monitoring and adjusting autovacuum operation performance.

These parameters make PostgreSQL log content more meaningful, facilitating easier monitoring of database operations and debugging.

```
log_autovacuum_min_duration: 5000
log_checkpoints: true
log_connections: true
log_directory: /pg_log/log
log_disconnections: true
log_filename: postgresql-%Y-%m-%d_%H%M%S.log
log_line_prefix: '%t [%p]: [%l-1] user=%u,db=%d,host=%h,app=%a,cilent=%h '
log_lock_waits: true
log_min_duration_statement: 5000
log_statement: ddl
log_temp_files: 0
```

Installing and Using PgBadger

Once PostgreSQL logging is configured, install PgBadger to streamline log analysis:

```
dnf install pgbadger
```

PgBadger can parse PostgreSQL logs and generate HTML reports with valuable insights. Let's create a report using PgBadger:

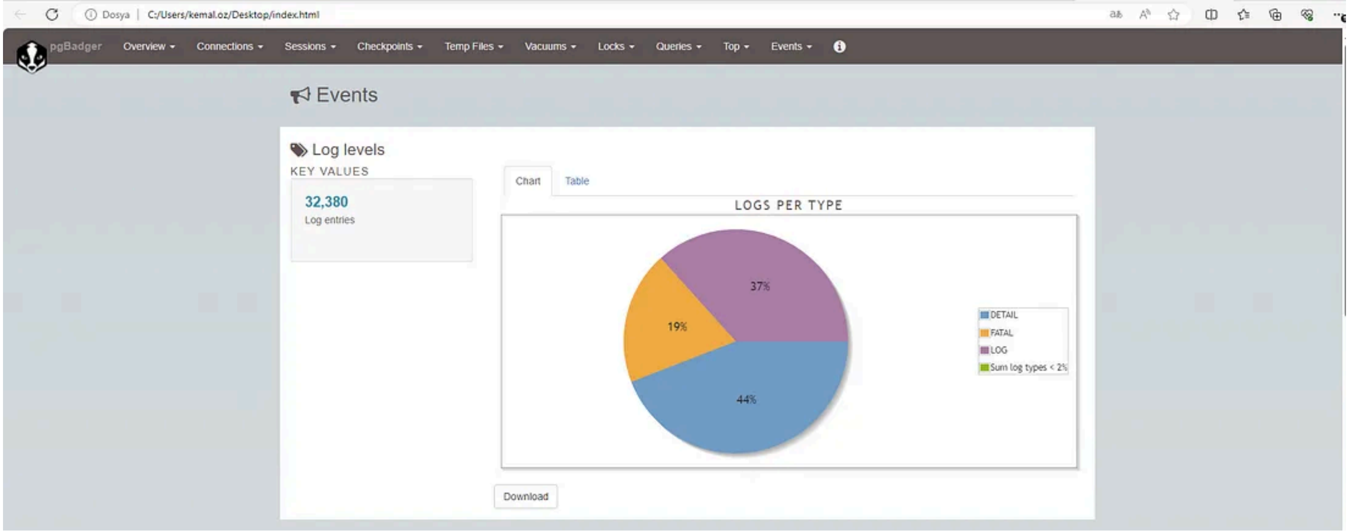
```
pgbadger /pg_log/log/postgresql-2024-03-* -o /tmp/index.html
```

Analyzing PgBadger Reports

PgBadger reports provide a wealth of information, including:

- Overview: Summarizes key metrics like total requests, errors, and slow queries.
- Timeline: Visualizes database activity over time, highlighting peaks and troughs.
- Top Queries: Identifies the most time-consuming queries and their execution frequencies.
- Error Analysis: Pinpoints errors and exceptions encountered during database operations.

- Performance Optimization Suggestions: Offers recommendations for improving database performance based on observed patterns.



PgBadger Report Example

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Database Administrator 🐘

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Gvadakte

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Queries

time	Service	username	Query	Execution_time
2024-09-26 13:15:00	pmm-server-postgresql	pmm-ma…	SELECT /* agent='pgstatstatements' */ "pg_stat_statements"."userid", "pg_stat_statements"."dbid", "pg_stat_statements"."queryi…	0.0242
2024-09-26 13:19:00	pmm-server-postgresql	pmm-ma…	SELECT current_database() datname, schemaname, relname, heap_blks_read, heap_blks_hit, idx_blks_read, idx_blks_hit, toast_b…	0.0165
2024-09-26 13:10:48	pmm-server-postgresql	pmm-ma…	SELECT * FROM pg_stat_database_conflicts	0.0159
2024-09-26 13:18:00	pmm-server-postgresql	pmm-ma…	SELECT /* agent='pgstatstatements' */ "pg_stat_statements"."userid", "pg_stat_statements"."dbid", "pg_stat_statements"."queryi…	0.0131
2024-09-26 13:19:00	pmm-server-postgresql	pmm-ma…	SELECT /* agent='pgstatstatements' */ "pg_stat_statements"."userid", "pg_stat_statements"."dbid", "pg_stat_statements"."queryi…	0.0131
2024-09-26 13:12:00	pmm-server-postgresql	pmm-ma…	SELECT /* agent='pgstatstatements' */ "pg_stat_statements"."userid", "pg_stat_statements"."dbid", "pg_stat_statements"."queryi…	0.0126
2024-09-26 13:15:00	pmm-server-postgresql	pmm-ma…	SELECT current_database() datname, schemaname, relname, heap_blks_read, heap_blks_hit, idx_blks_read, idx_blks_hit, toast_b…	0.0113

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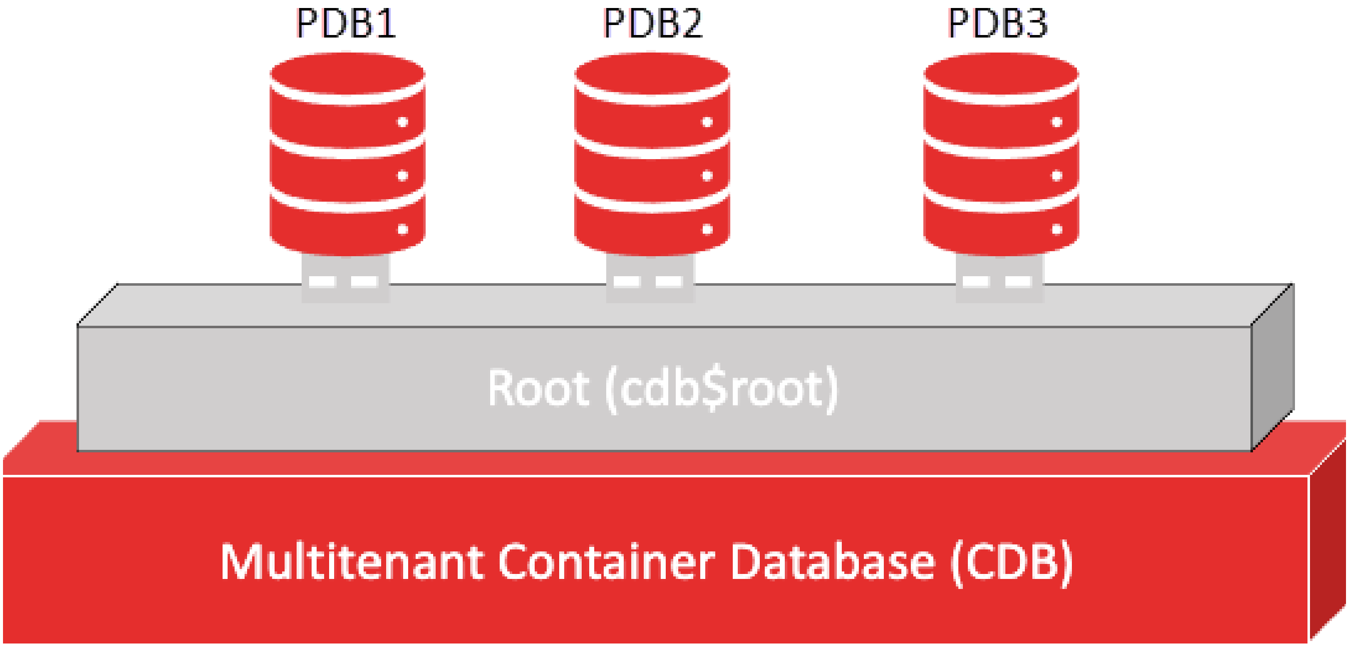

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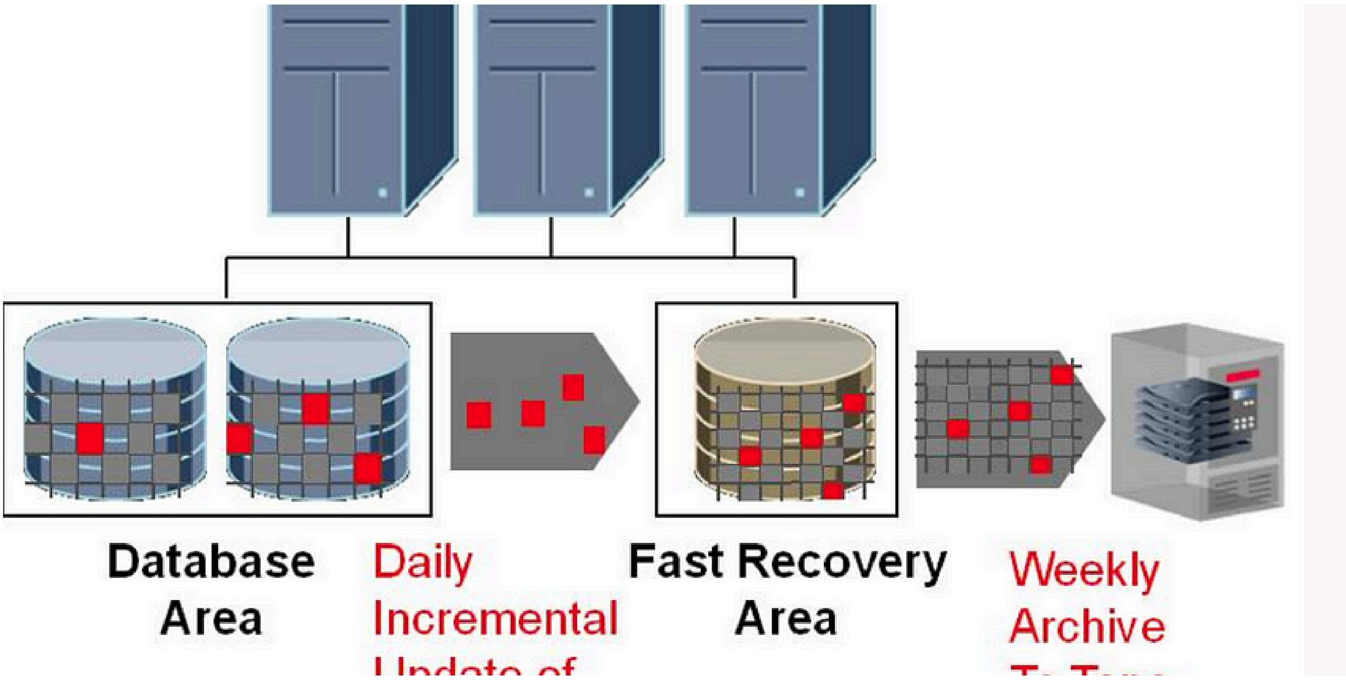
Pluggable Database Command

—————————— -————————————— - create pluggable database pdb1 admin user root identified by test123; alter pluggable database…

May 12, 2023



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RMAN Backup Basic Commands

rman target / rman target sys/password@YDKTST; backup database; backup database format ‘/backup/path/%d_%t_%s.rman’; backup tablespace…

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delete jobs

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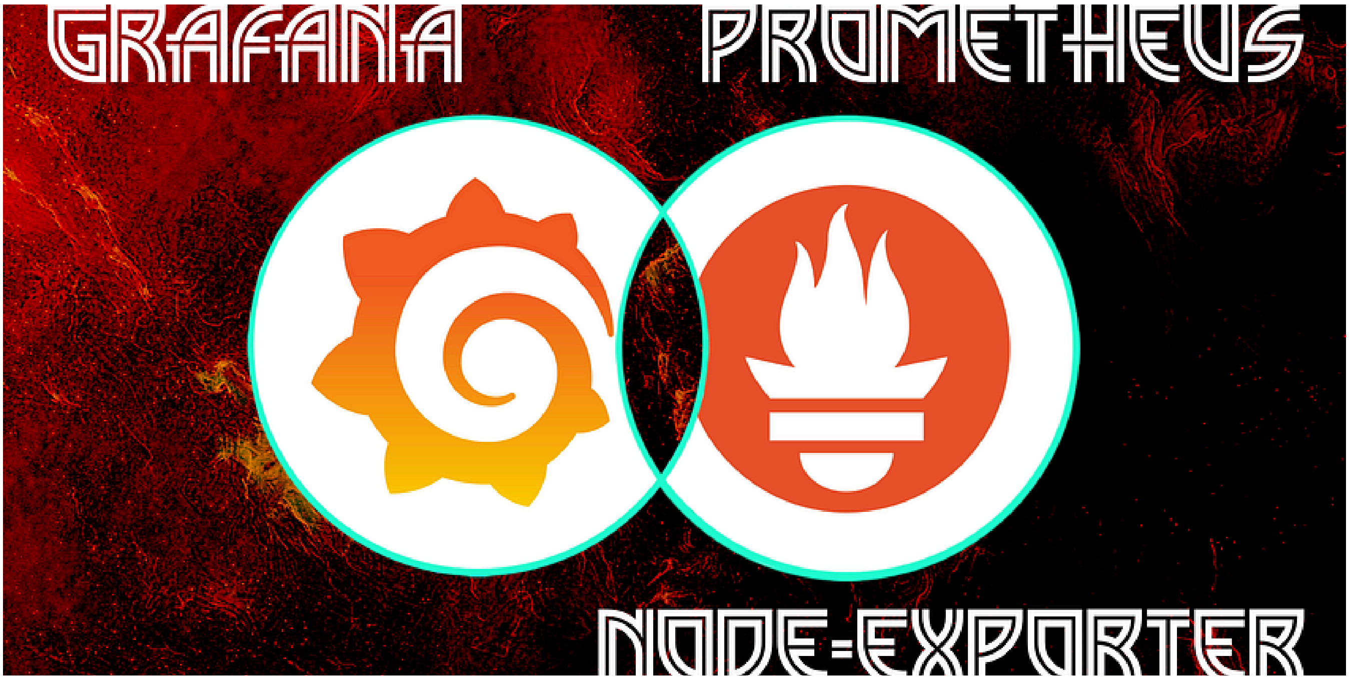

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Instead of running PostgresSQL locally, we can easily run with Podman. Here are the basic steps you should follow.

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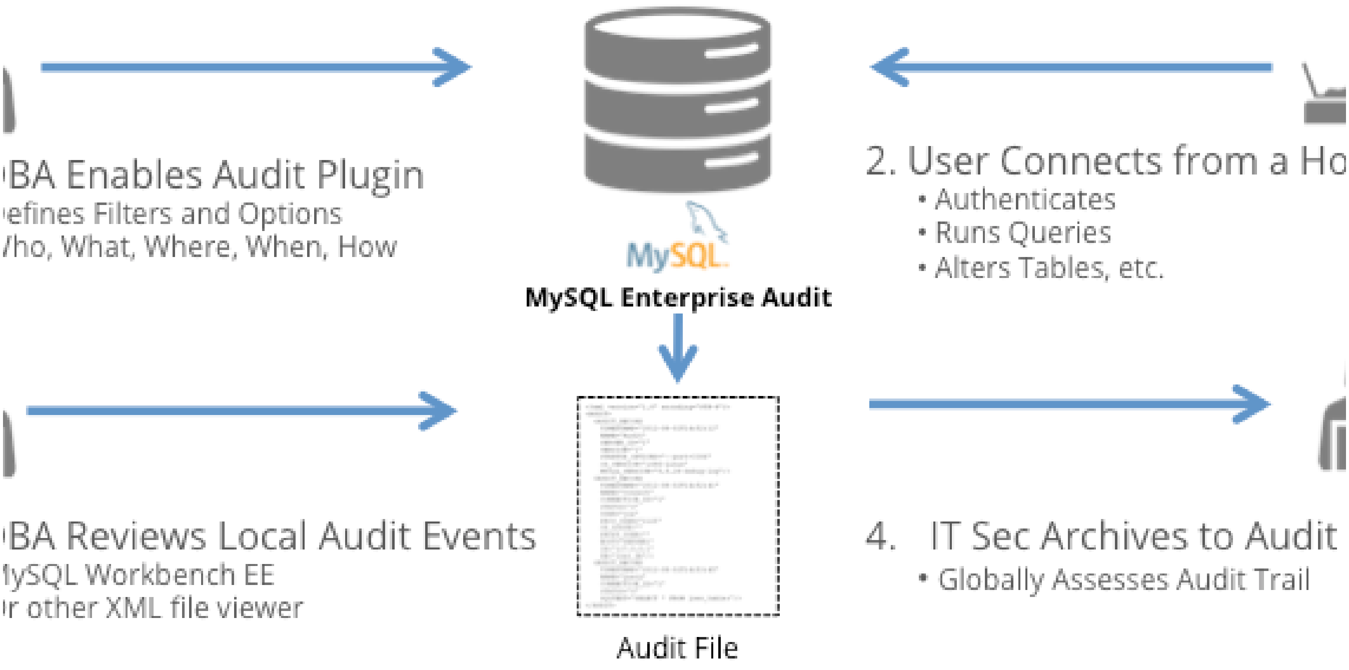
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efines Filters and Options
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