MySQL Server Performance Monitoring Basics

Why do MySQL Performance Monitoring ?

- Database forms a critical layer in the application stack.
- Everything in your app or website that’s built on top of that layer will depend on how well the database performs.
- Monitoring database performance helps us preemptively handle possible problems in our application before they affect end users.
- But aside from helping you prevent and fix issues, data monitoring also lets you:
- Identify opportunities for database optimization (such as rewriting sub-optimal queries)
- Determine the impact of changes (such as data migrations, changing schema definitions, modifying the configuration, shipping new features, etc.)Provision server and compute resources according to actual requirements (horizontal scaling)
- Pinpoint potential security vulnerabilities and apply adequate security measures
- Discover areas for growth and improvement in user experience

Categories of MySQL Performance Monitoring

- We can broadly categorize Metrics for MySQL Performance monitoring into :
- Infrastructure.
- Availability.
- Throughput.
- Performance.

Infrastructure

- Infrastructure should be part of any database monitoring. The metrics should include:
- Percent CPU time used by the database process
- Available memory
- Available disk space
- Disk queue for waiting IO
- Percent virtual memory use
- Network bandwidth for inbound and outbound traffic
- If the metrics are above or below the acceptable threshold, Its recommend relating the figures to database metrics as well.
- That’s because hardware or network-related events like a full disk or a saturated network can reflect in poor query performance.
- Similarly, a database specific issue like a blocked database query can show up as a high CPU use.

Availability

- The next thing to monitor is database availability. That’s because you want to ensure the database is available and accessible before looking at any other counters. It also saves you from customers complaining before you find out an outage. Metrics can include:
- Accessibility of the database node(s) using common protocols like Ping or Telnet
- Accessibility of the database endpoint and port (e.g. 3306 for MySQL, 5432 for PostgreSQL, etc.)
- Failover events for master nodes or upgrade events for slave/peer nodes in multi-node clusters

Throughput

- Throughput should be measured to create normal production performance baselines.
- Some common metrics are :
- Connection wait time for database endpoints
- Number of active database connections
- Number of read queries received or in progress
- Number of insert, update, or delete commands received or in progress
- Average time to complete a read query
- Average time to complete insert, update or delete commands
- Replication lag between primary and secondary nodes
- Number of completed transactions
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Throughput (Contd…)

- To create performance baselines, throughput metrics should be collected during different workload periods and reported in specific time scale (e.g, per minute).
- The collection process should repeat a number of times.
- For example, collecting metrics during month-end batch processing or Black Friday sale events over three to four cycles can provide insight into a system’s health during those periods.
- These may be different from after-hours operations or weekday sales events.
- As baselines are built over time, they can be used to create acceptable thresholds for alarms.
- Any large deviation from usual values would then need investigation.

Performance

- Like throughput, performance counters will vary between different databases and should be reported in a specific time scale.
- These metrics can indicate potential bottlenecks and we recommend creating baselines for these as well. The common ones include:
- Number of read or write queries currently waiting or blocked
- Percent of times disk-based virtual memory is accessed
- Number of database lock timeouts
- Number of deadlocks
- Queries running slower than a set threshold
- Warnings raised for out-of-date statistics or unusable indexes