

Tips for MySQL 5.7 Database Tuning and Performance

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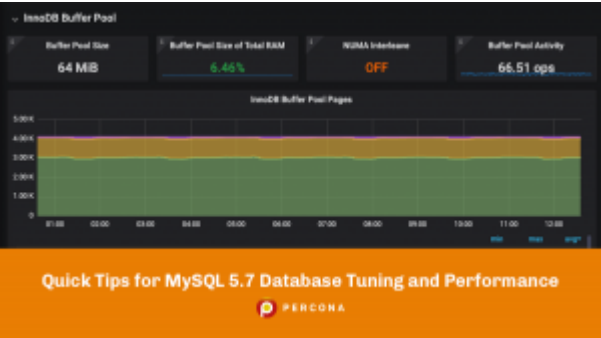
2020

While there is no magic bullet for MySQL 5.7 database tuning, there are a few areas that can be focused on upfront that can dramatically improve the performance of your MySQL installation. While much information has been published on this topic over the years, I wanted to break down some of the more critical settings that anyone can implement – with no guesswork required.

Depending on the version of MySQL you are running, some of the default values used in this post may differ from your install, but the premise is still largely the same. We will focus on MySQL 5.7 for the purposes of this article.

Initial MySQL performance tuning can be broken down to the following categories:

- Tuning for your hardware
- Tuning for best performance/best practices
- Tuning for your workload



MySQL 5.7 Database Tuning

Tuning For Your Hardware

Depending on the hardware you have installed MySQL on, some variables need to be set based on the machine (or VM) specifications. The following variables are largely dependent on your hardware:

[innodb buffer pool size](#)

- Generally, set to 50% – 70% of your total RAM as a starting point.
- It does not need to be set any larger than the total database size.

[innodb log file size](#)

- This is generally set between 128M – 2G.
- It does not need to be any larger than the buffer pool.

[innodb flush log at trx commit](#)

- Setting to “1” (default in 5.7) gives the most durability.
- Setting to “0” or “2” will give more performance, but less durability.

[innodb flush method](#)

- Setting this to O_DIRECT will avoid the performance penalty from double buffering.

Tuning For Best Performance / Best Practices

[innodb file per table](#)

- Setting this to “ON” will generate an independent InnoDB table space for every table in the database.

[innodb stats on metadata](#)

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- Setting this to “OFF” avoids unnecessary updating of InnoDB statistics and can greatly improve read speeds.

[innodb buffer pool instances](#)

- A best practice is to set this to “8” unless the buffer pool size is < 1G, in which case set to “1”.

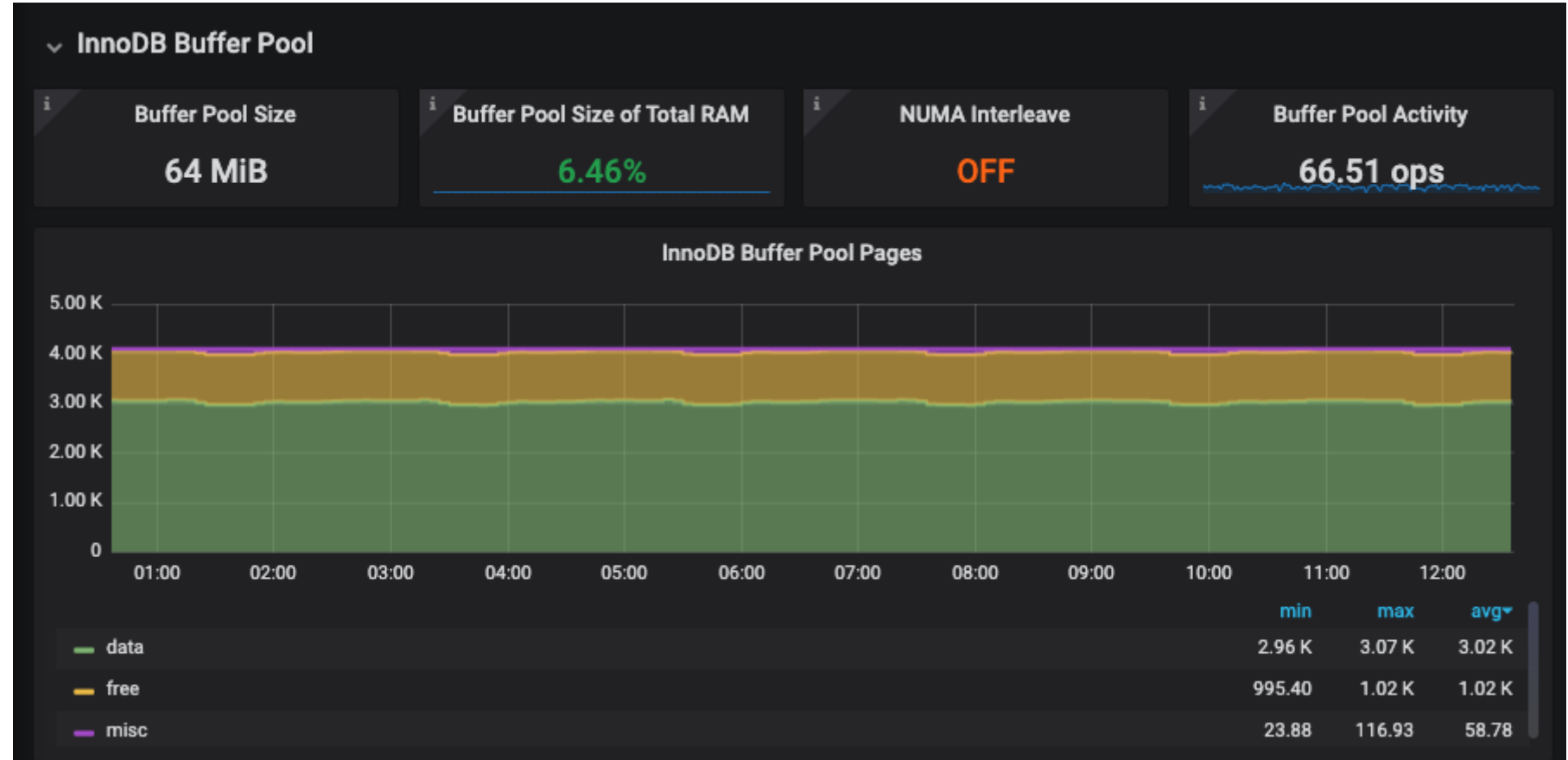
[query_cache_type](#) & [query_cache_size](#)

- Setting both of these to “0” will entirely disable the query cache.

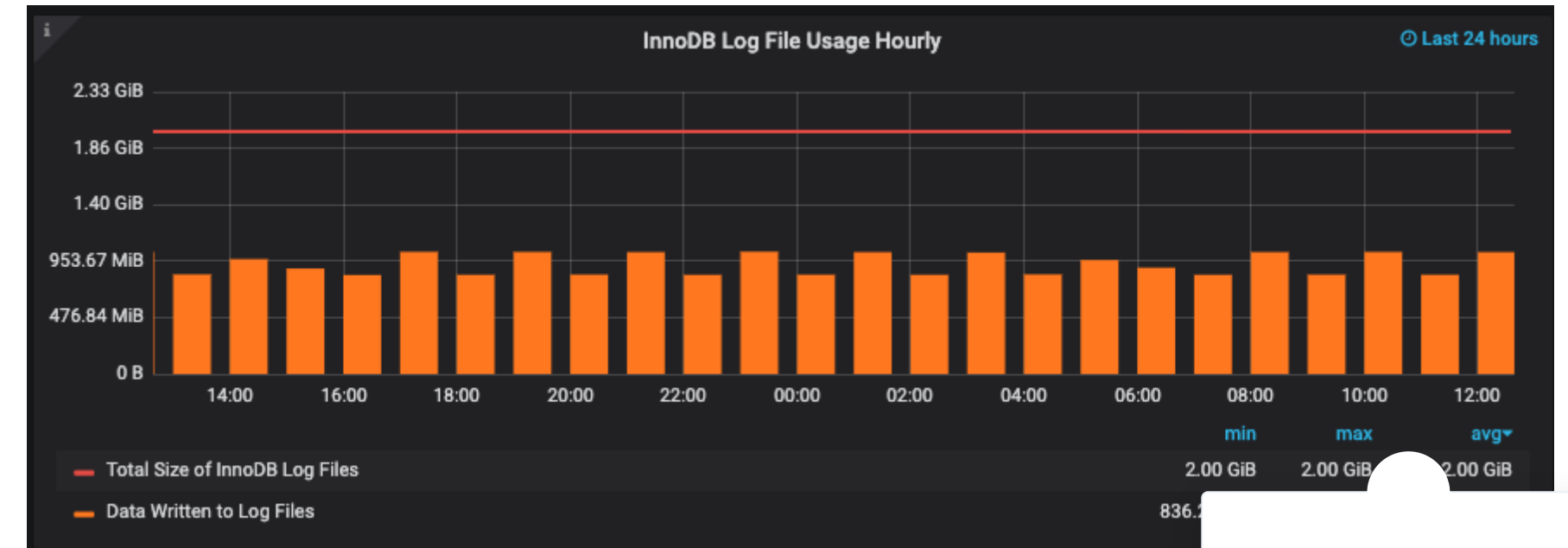
Tuning For Your Workload

To tune further, more information will be required. The best way to gather this information is to install a MySQL monitoring/graphing tool like [Percona Monitoring and Management](#) (PMM). Once you have a tool installed, we can dive into the individual metrics and start customizing based on the data.

I would recommend starting with one of the most impactful variables – the [innodb buffer pool size](#). Compare the RAM and number of free pages on your instance to the total buffer pool size. Based on these metrics, you can determine if you need to increase or decrease your overall buffer pool size setting.



Next, take a look at your metrics for the InnoDB Log File usage. The rule of thumb is that your log files should hold approximately one hour of data. If you see that the data written to the log files hourly exceeds the total size of the log files, you would want to increase the [innodb log file size](#) variable and restart MySQL. You could also verify with “SHOW ENGINE INNODB STATUS;” via the MySQL CLI to assist in calculating a good InnoDB log file size.



In Summary

While this is by no means a comprehensive article on MySQL 5.7 database tuning, the suggestions above should be helping fruit and get your system closer to an ideal setup. As with all database tuning, your process should be an ongoing one based on current information.

- Examine the settings proposed above, and implement if they make sense for your environment/workload.

- Install a good monitoring tool to give insight into the database (Percona Monitoring and Management is our suggestion).
- Stay current on your monitoring graphs to determine other areas where you may need to tune.

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