

# Chapter 5

## Transaction Monitoring System : Performance Monitoring System

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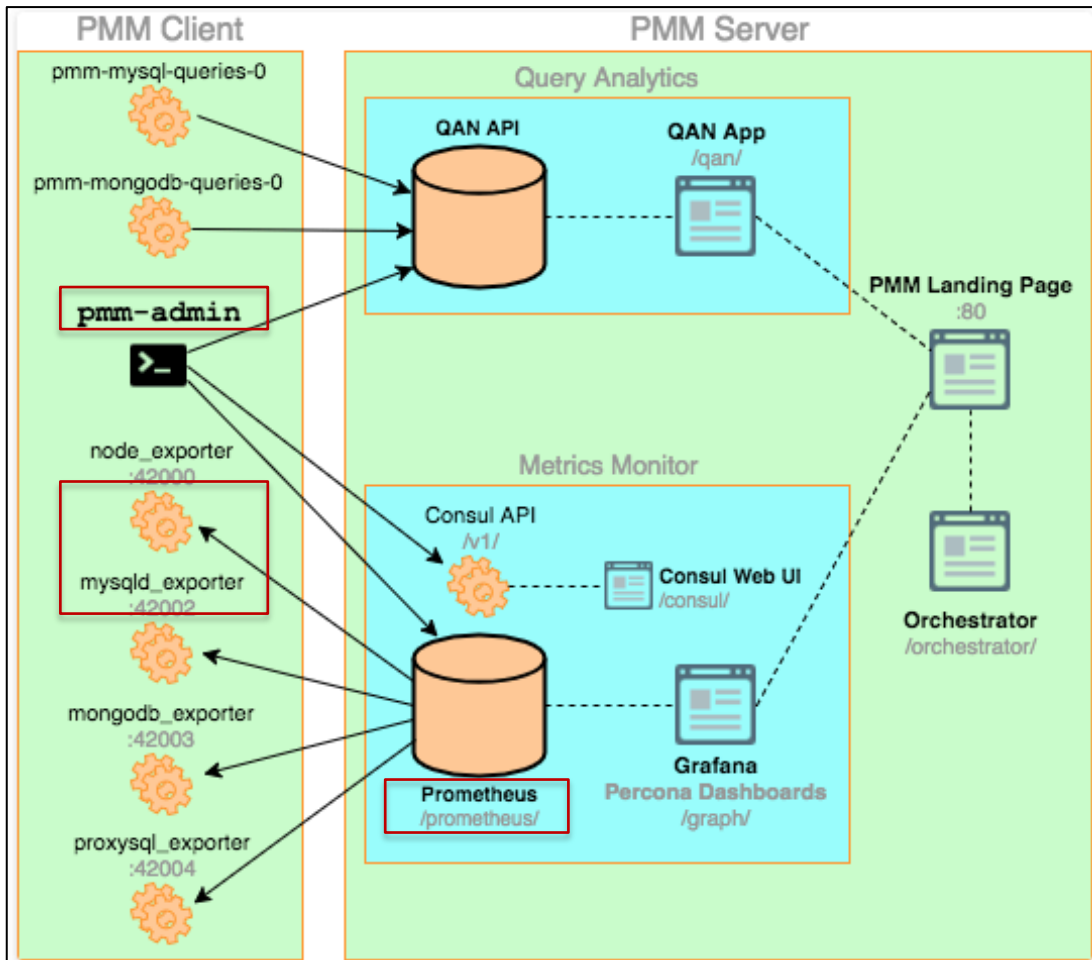


# Performance Monitoring System

- Percona PMM
- Intel PCM

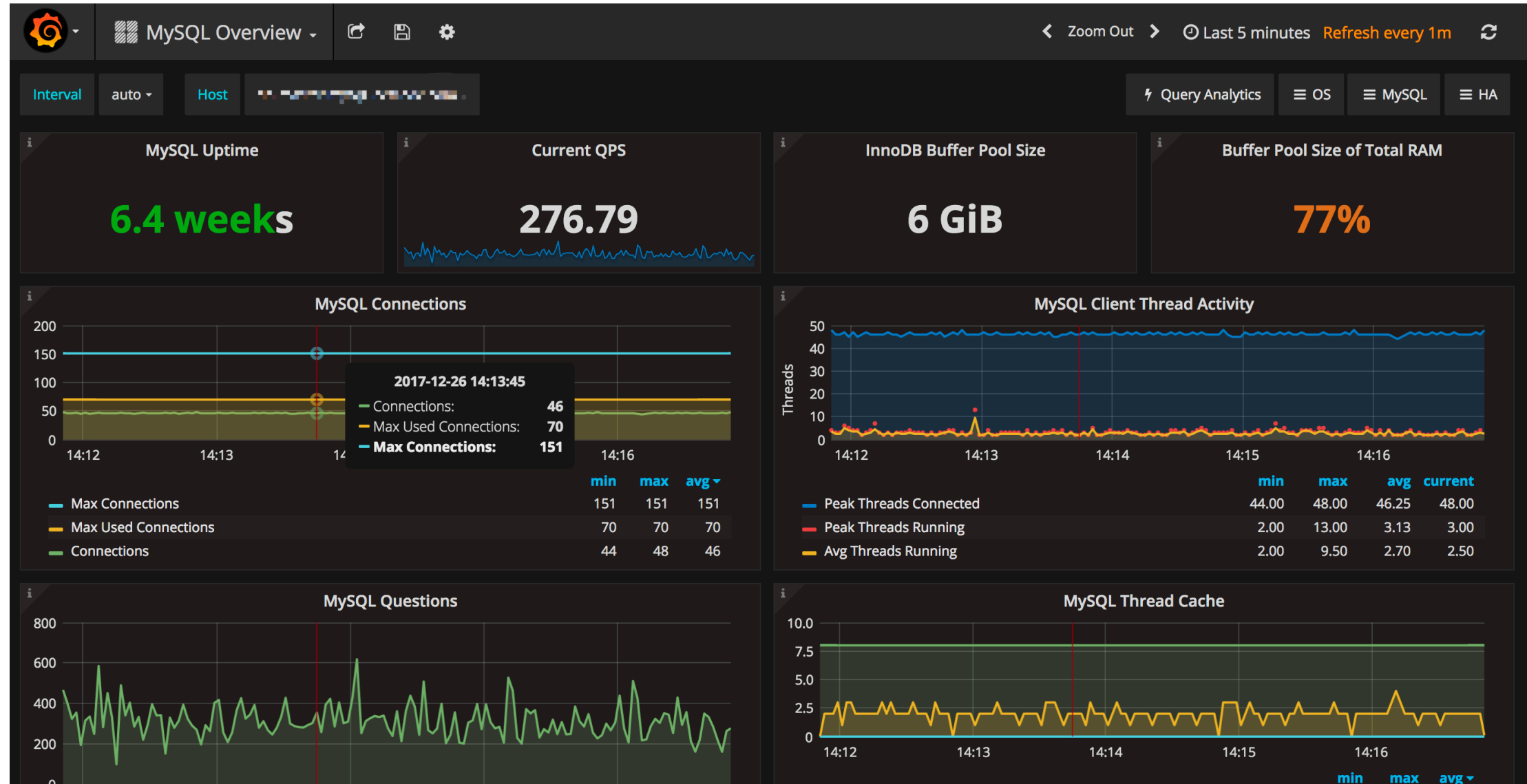
# Percona PMM

- Percona Monitoring & Management



- pmm-admin**: command-line tool for administering PMM communication with PMM server & client
- mysqld\_exporter** : Prometheus exporter for MySQL server
  - High-res metrics (1s) : Global status, InnoDB metrics
  - Medium-res metrics (5s) : Slave status, InnoDB engine
  - Low-res metrics (1m) : Global variable, Schema, Bin log
- Prometheus** : collect / monitoring / alert toolkit

# Percona PMM



# InnoDB Metrics

- InnoDB Log Buffer Performance
  - If the Used graph is too high and gets close to Size, additional log writes will be required.
- InnoDB Locking
- InnoDB Transactions Information
- InnoDB Undo Space Usage
  - If the amount of space grows too much, look for **long running transactions** holding read views opened in the InnoDB status.
- InnoDB Page Reorgs
- InnoDB Page Splits
- InnoDB Purge Performance
- [...](#)

# Intel PCM

- Monitor performance hardware counters on Intel<sup>®</sup> processors
- Performance Monitoring Unit
- pcm-memory
  - monitor memory bandwidth (per-channel and per-DRAM DIMM rank)
- pcm-latency :
  - monitor L1 cache miss and DDR/PMM memory latency
- pcm :
  - basic processor monitoring utility (instructions per cycle, core frequency, etc.)

# Intel PCM

sudo pcm-memory.x

```
Detected Intel(R) Xeon(R) Gold 6252 CPU @ 2.10GHz "Intel(r) microarchitecture codename"
Update every 1 seconds
```

Socket 0		Socket 1	
Memory Channel Monitoring		Memory Channel Monitoring	
Mem Ch 0: Reads (MB/s):	5.67	Mem Ch 0: Reads (MB/s):	6.47
Writes(MB/s):	4.48	Writes(MB/s):	8.62
Mem Ch 1: Reads (MB/s):	5.71	Mem Ch 1: Reads (MB/s):	6.47
Writes(MB/s):	4.54	Writes(MB/s):	8.59
Mem Ch 2: Reads (MB/s):	5.71	Mem Ch 2: Reads (MB/s):	6.53
Writes(MB/s):	4.55	Writes(MB/s):	8.67
Mem Ch 3: Reads (MB/s):	5.28	Mem Ch 3: Reads (MB/s):	5.29
Writes(MB/s):	4.21	Writes(MB/s):	7.97
Mem Ch 4: Reads (MB/s):	5.24	Mem Ch 4: Reads (MB/s):	5.40
Writes(MB/s):	4.14	Writes(MB/s):	8.13
Mem Ch 5: Reads (MB/s):	5.23	Mem Ch 5: Reads (MB/s):	5.30
Writes(MB/s):	4.17	Writes(MB/s):	8.04
NODE 0 Mem Read (MB/s) :	32.84	NODE 1 Mem Read (MB/s) :	35.47
NODE 0 Mem Write(MB/s) :	26.08	NODE 1 Mem Write(MB/s) :	50.02
NODE 0 P. Write (T/s):	37628	NODE 1 P. Write (T/s):	37632
NODE 0 Memory (MB/s):	58.92	NODE 1 Memory (MB/s):	85.49
System Read Throughput(MB/s):		68.31	
System Write Throughput(MB/s):		76.11	
System Memory Throughput(MB/s):		144.41	

sudo pcm-memory.x -pmm

Socket 0		Socket 1	
Memory Channel Monitoring		Memory Channel Monitoring	
Mem Ch 0: Reads (MB/s):	2.28	Mem Ch 0: Reads (MB/s):	2.12
Writes(MB/s):	2.19	Writes(MB/s):	2.08
PMM Reads(MB/s) :	0.00	PMM Reads(MB/s) :	0.00
PMM Writes(MB/s) :	0.00	PMM Writes(MB/s) :	0.00
Mem Ch 1: Reads (MB/s):	2.36	Mem Ch 1: Reads (MB/s):	2.12
Writes(MB/s):	2.27	Writes(MB/s):	2.08
PMM Reads(MB/s) :	0.00	PMM Reads(MB/s) :	0.00
PMM Writes(MB/s) :	0.00	PMM Writes(MB/s) :	0.00
Mem Ch 2: Reads (MB/s):	2.32	Mem Ch 2: Reads (MB/s):	2.16
Writes(MB/s):	2.24	Writes(MB/s):	2.13
PMM Reads(MB/s) :	0.00	PMM Reads(MB/s) :	0.00
PMM Writes(MB/s) :	0.00	PMM Writes(MB/s) :	0.00
Mem Ch 3: Reads (MB/s):	2.05	Mem Ch 3: Reads (MB/s):	1.84
Writes(MB/s):	2.07	Writes(MB/s):	1.88
PMM Reads(MB/s) :	0.00	PMM Reads(MB/s) :	0.00
PMM Writes(MB/s) :	0.00	PMM Writes(MB/s) :	0.00
Mem Ch 4: Reads (MB/s):	2.02	Mem Ch 4: Reads (MB/s):	1.88
Writes(MB/s):	2.05	Writes(MB/s):	1.92
PMM Reads(MB/s) :	0.00	PMM Reads(MB/s) :	0.00
PMM Writes(MB/s) :	0.00	PMM Writes(MB/s) :	0.00
Mem Ch 5: Reads (MB/s):	2.05	Mem Ch 5: Reads (MB/s):	1.84
Writes(MB/s):	2.06	Writes(MB/s):	1.89
PMM Reads(MB/s) :	0.00	PMM Reads(MB/s) :	0.00
PMM Writes(MB/s) :	0.00	PMM Writes(MB/s) :	0.00
NODE 0 Mem Read (MB/s) :	13.07	NODE 1 Mem Read (MB/s) :	11.96
NODE 0 Mem Write(MB/s) :	12.88	NODE 1 Mem Write(MB/s) :	11.99
NODE 0 PMM Read (MB/s):	0.00	NODE 1 PMM Read (MB/s):	0.00
NODE 0 PMM Write(MB/s):	0.00	NODE 1 PMM Write(MB/s):	0.00
NODE 0.0 NM read hit rate :	0.83	NODE 1.0 NM read hit rate :	0.81
NODE 0.1 NM read hit rate :	0.80	NODE 1.1 NM read hit rate :	0.78
NODE 0 Memory (MB/s):	25.95	NODE 1 Memory (MB/s):	23.94
System DRAM Read Throughput(MB/s):		25.03	
System DRAM Write Throughput(MB/s):		24.86	
System PMM Read Throughput(MB/s):		0.00	
System PMM Write Throughput(MB/s):		0.00	
System Read Throughput(MB/s):		25.03	
System Write Throughput(MB/s):		24.86	
System Memory Throughput(MB/s):		49.89	

# Intel PCM

- How to add Intel PCM in your application (c/c++)
- Step1. Add git submodule
- Step2. Add CMake options
- Step3. Implement PCM parameter in your code
- See also [here!](#)



# References

- [1] <https://www.percona.com/blog/2016/02/29/graphing-mysql-performance-with-prometheus-and-grafana>
- [2] <https://software.intel.com/content/www/us/en/develop/articles/intel-performance-counter-monitor.html>
- [3] <https://prometheus.io/docs/introduction/overview/>
- [4] <https://www.notion.so/Intel-PCM-dc09508aa656436ab23c2487d89da805>
- [5] <https://www.percona.com/doc/percona-monitoring-and-management/dashboard.mysql-innodb-metrics.html#dashboard-mysql-innodb-metrics>
- [6] <https://www.percona.com/doc/percona-monitoring-and-management/dashboard.mysql-innodb-metrics-advanced.html>