

MySQL and MongoDB Monitoring and Optimization

with Percona Monitoring and Management

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PMM Stands for



PERCONA

Monitoring and Management

Why Did We Start Working on PMM

Percona Vision

100% Free and Open
Source Platform for 95%
of applications

Monitoring and Management

Critical need for modern
database infrastructure

Monitoring and Management Status

Commercial License

Cloud Based

Do it yourself

Would be great to have

100% Free and Open Source

Can run In the Cloud and on Premises

Easy to use

Available for

Anyone on the Team

- Engineers,
- DBA
- SREs

Any Environment

- Development
- Staging/QA
- Production

About PMM

PMM Philosophy

Do not reinvent the wheel

Use as much of industry leading components as possible

Make Integration and Customization easy

Industry Leading Components



Prometheus

An open-source service monitoring system and time series database.



<> with ♥ by GitHub

orchestrator

Current Focus

To Become Best 100%
Free and Open Source
Solution for MySQL and
MongoDB



Currently Works

Metrics for MySQL and MongoDB

Support for PXC, Galera, ProxySQL

Support of Amazon RDS

Query Analytics for MySQL

Experimental Orchestrator Integration

Do it yourself Grafana Alerting

PMM Platform Support

Server Side

- Docker
- Virtual Appliance
- AMI

Client Side

- Linux

In Works

Support for Longer retention period

Better Cloud Support

Ease of use

Query Analytics for MongoDB

Improved Query Analytics Interface

Alerting

By the Experts for the Experts ?

Assist Experts to Resolve the most complicated problems

But be friendly enough for Non-Expert use

Actionable Advice

Integration and Automation

PMM Data Capture

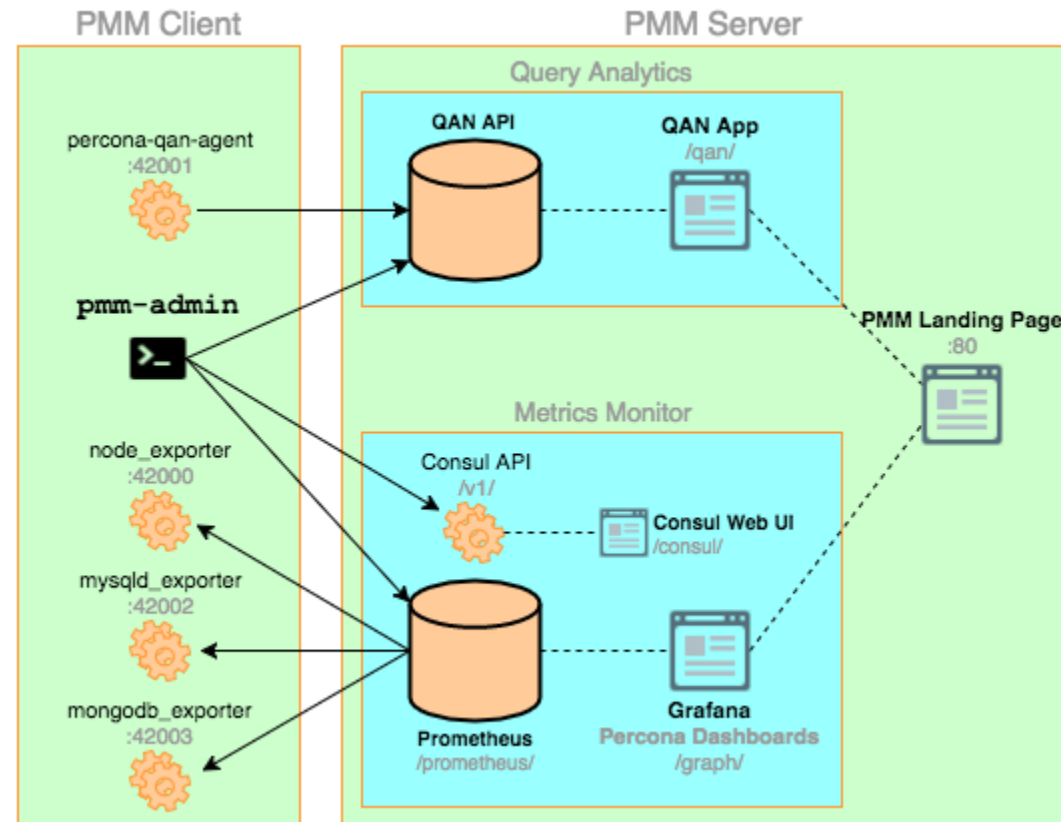
1 sec resolution data capture for most important data

Capture a lot more with lower resolution

Allow to perform deep analyses

1000s of metrics captured per instance

PMM Architecture Overview

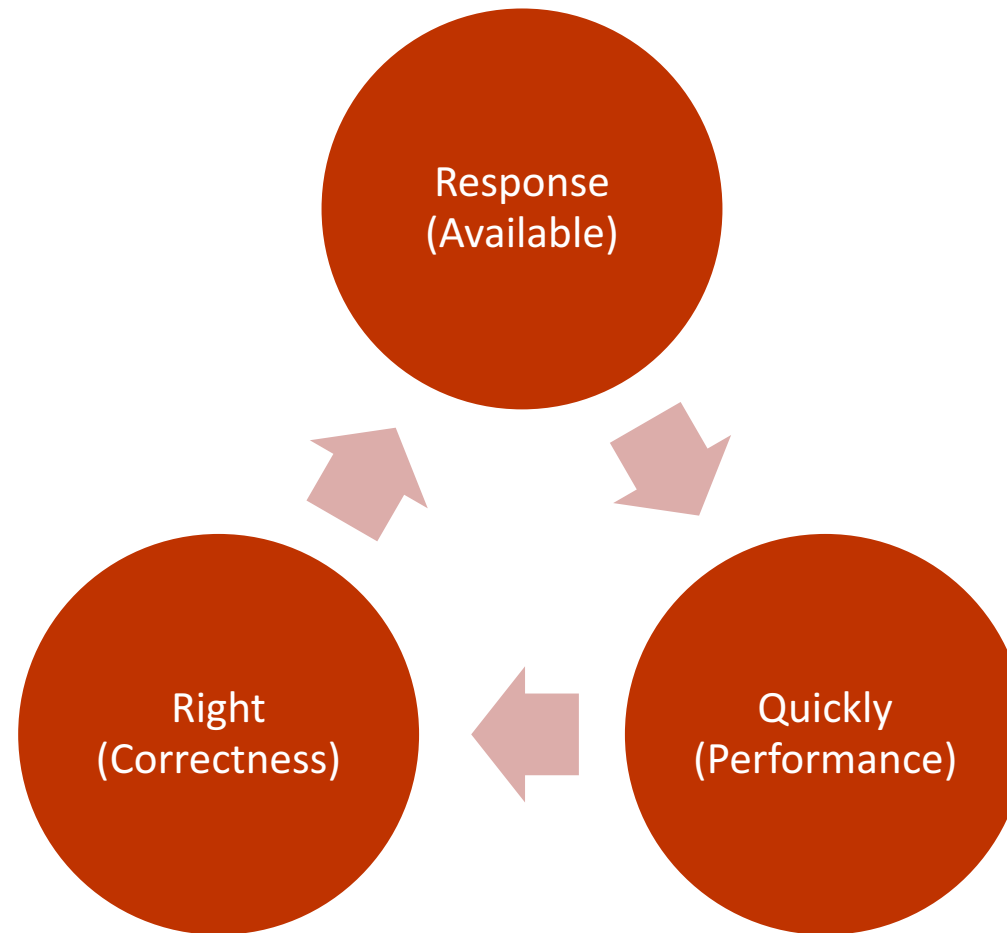


Database as a Black Box....

What does MySQL and MongoDB do ?

Responds Application Requests

Criteria



Problem Caused By

Application

- Too many Queries
- Bad Queries
- Improper Capacity Planning

Database

- Choosing Bad Plan
- Contention Issues
- Locking

Hardware and Environment


- CPU
- Disk
- Memory
- Network

Query Analyses

Working for MySQL

Will be available for MongoDB shortly

What Queries are causing the load ?



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Search by Fingerprint or ID













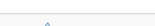

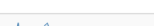

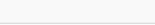
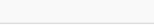
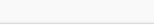


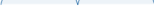










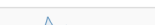

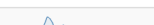

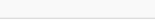
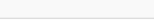
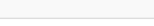





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⌚ Duration: an hour. 2016-11-06 07:20:09 to 2016-11-06 08:20:09 UTC

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DEMO















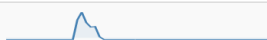



Top 10 of 57 Queries by % Grand Total Time (%GTT)									
#	Query Abstract	ID	Load	Count		Latency			
	TOTAL		 7.88 (100%)	780.82 QPS	 2.81 m (100%)	 10.10 ms avg			
1	UPDATE sbtest	D30AD7E3079ABCE7	 5.31 (67.30%)	258.58 QPS	 930.90 k (33.12%)	 20.52 ms avg			
2	LOCK sbtest	0B759DF6D01BDB8F	 1.20 (15.21%)	2.54 QPS	 9.15 k (0.33%)	 471.58 ms avg			
3	SELECT sbtest	558CAEF5F387E929	 0.42 (5.31%)	170.65 QPS	 614.35 k (21.86%)	 2.45 ms avg			
4	COMMIT	813031B8BBC3B329	 0.23 (2.86%)	14.06 QPS	 50.62 k (1.80%)	 16.05 ms avg			
5	SELECT myisam.sbtest	C4832A98728C4424	 0.18 (2.25%)	<0.01 QPS	 4.00 (0.00%)	 159.32 sec avg			
6	SELECT sbtest	87625C47A176BEDD	 0.08 (0.96%)	188.79 QPS	 679.63 k (24.18%)	 399.86 µs avg			
7	SELECT sbtest	6433B7802D745420	 0.07 (0.86%)	17.27 QPS	 62.19 k (2.21%)	 3.93 ms avg			
8	SELECT sbtest	9CD3EAA5A1950648	 0.07 (0.85%)	16.88 QPS	 60.75 k (2.16%)	 3.97 ms avg			
9	SELECT sbtest	FE6FFA06B3AC9BB4	 0.07 (0.83%)	17.09 QPS	 61.53 k (2.19%)	 3.83 ms avg			
10	SELECT sbtest	F54DBEF3D7AE474D	 0.06 (0.75%)	17.33 QPS	 62.39 k (2.22%)	 3.42 ms avg			

▼ Load next 10 queries ▼

Why are they causing this load ?

UPDATE sbtest

D30AD7E3079ABCE7

Selected query class: 930.90 k Queries (258.58 QPS, 67.30%, 5.31 Load) Total: 2.81 m Queries (780.82 QPS, 100.00%, 7.88 Load)			
Metrics	Rate/Sec	Sum	Per Query Stats
Query Count	259.12 (per sec) 	932.85 k 32.40% of total	
Query Time	5.31 load (67.16%) 	19101.45 sec 67.16% of total	5.25 ms avg 
Lock Time	1.38 (avg load) 	4965.60 sec 51.50% of total 15.13% of query time	793.79 µs avg 
Innodb Row Lock Wait	<0.01 (avg load) 	28.14 sec 42.03% of total 1.44% of query time	75.79 µs avg 
Innodb IO Read Wait	<0.01 (avg load) 	35.85 sec 2.47% of total 10.93% of query time	573.60 µs avg 
Innodb Read Ops	2.48 (per sec) 	8.91 k 1.86% of total	0.00 avg 
Innodb Read Bytes	39.61 KB (per sec) 	139.25 MB 1.86% of total 16.00 KB avg io size	3.50 KB avg 
Innodb Distinct Pages	-	-	6.03 avg 
Bytes Sent	13.18 KB (per sec) 	46.35 MB 1.72% of total	52.00 Bytes avg 
Rows Examined	258.17 (per sec) 	929.43 k 0.64% of total 0.00 per row sent	0.88 avg 

How to fix them

EXPLAIN

Database: innodb

EXPLAIN

Id	SelectType	Table	Partitions	CreateTable	Type	PossibleKeys	Key	KeyLen	Ref	Rows	Extra
1	SIMPLE	sbtest1			const	PRIMARY	PRIMARY	4	const	1	

CREATE

STATUS

```
CREATE TABLE `sbtest1` (  
  `id` int(10) unsigned NOT NULL AUTO_INCREMENT,  
  `k` int(10) unsigned NOT NULL DEFAULT '0',  
  `c` char(120) NOT NULL DEFAULT '',  
  `pad` char(60) NOT NULL DEFAULT '',  
  PRIMARY KEY (`id`),  
  KEY `k_1` (`k`)  
) ENGINE=MyISAM AUTO_INCREMENT=100000001 DEFAULT CHARSET=latin1
```

CREATE

STATUS

Name	Value
Name	sbtest1
Engine	MyISAM
Version	10
RowFormat	Fixed
Rows	100.00 m
AvgRowLength	189.00 Bytes
DataLength	17.60 GB
MaxDataLength	756.00 GB
IndexLength	1.70 GB

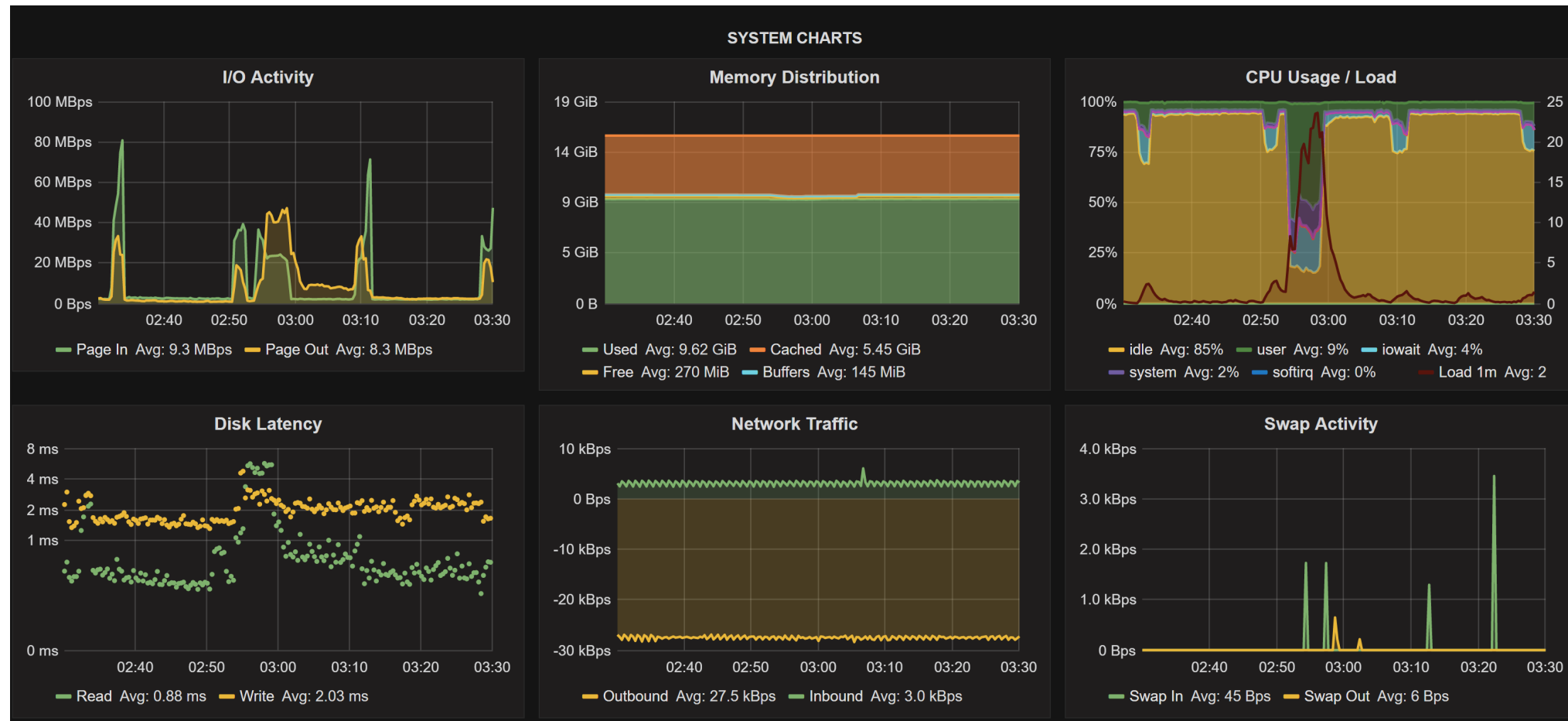
System Information

MySQL Summary

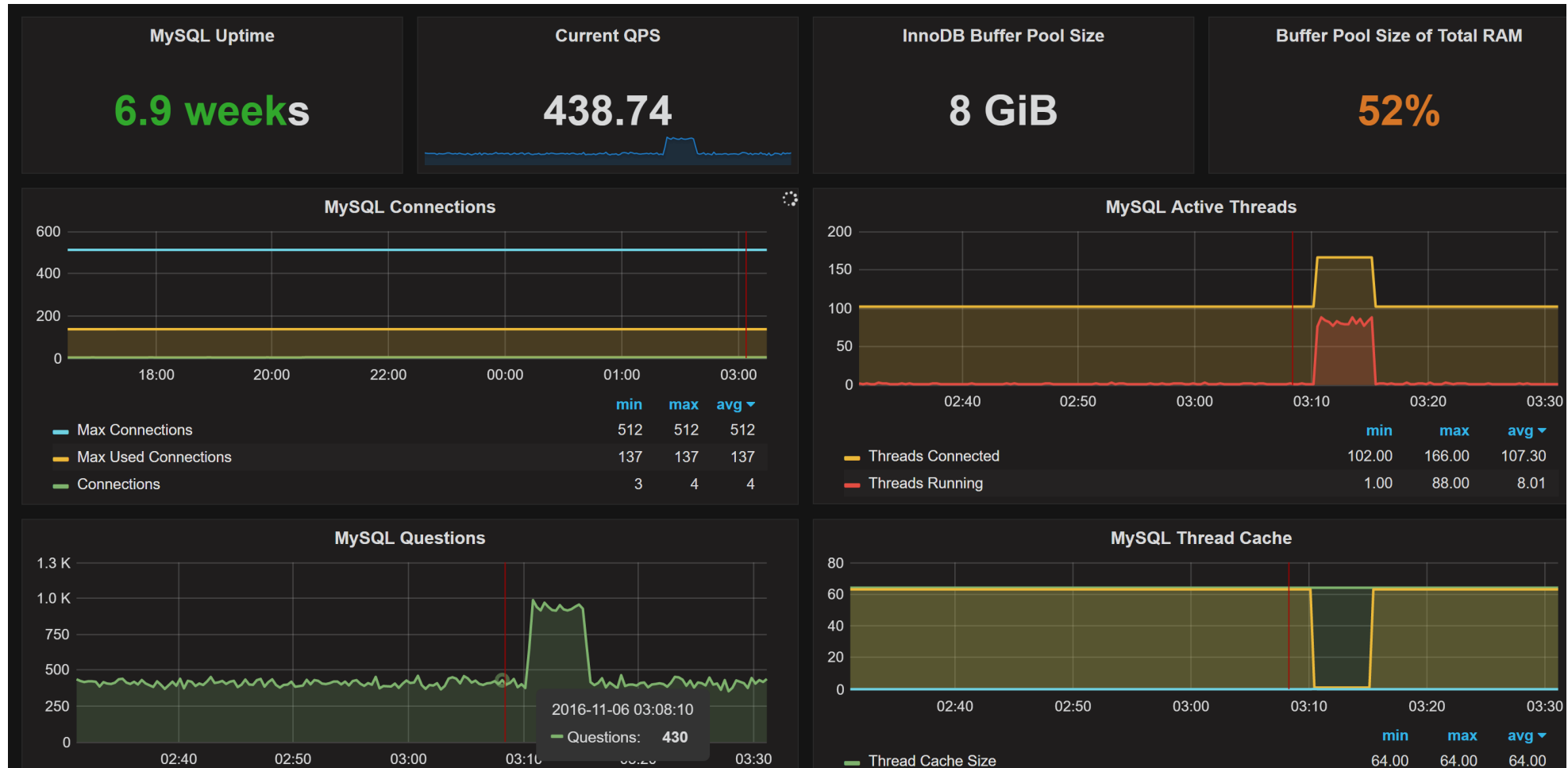
```
# Percona Toolkit MySQL Summary Report #####
      System time | 2016-11-06 08:27:41 UTC (local TZ: CET +0100)
# Instances #####
Port  Data Directory      Nice OOM Socket
=====
      0      0

# MySQL Executable #####
      Path to executable | /usr/sbin/mysqld
      Has symbols | No
# Report On Port 3306 #####
      User | root@localhost
      Time | 2016-11-06 09:27:41 (CEST)
      Hostname | ps57
      Version | 5.7.14-8-log Percona Server (GPL), Release 8, Revision 1f84ccd
      Built On | Linux x86_64
      Started | 2016-10-06 16:33 (up 30+16:54:37)
      Databases | 8
      Datadir | /var/lib/mysql/
      Processes | 250 connected, 2 running
      Replication | Is not a slave, has 1 slaves connected
      Pidfile | /var/run/mysqld/mysqld.pid (exists)
```

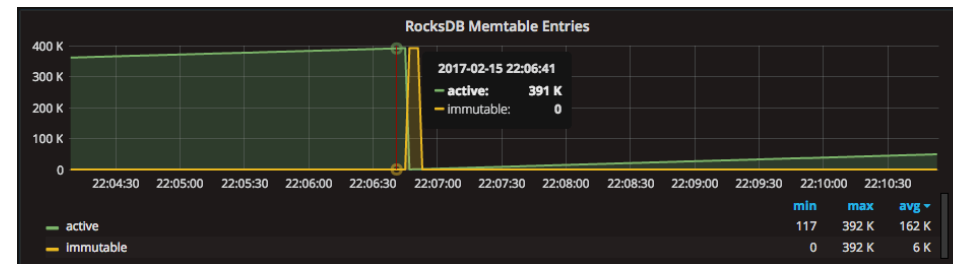
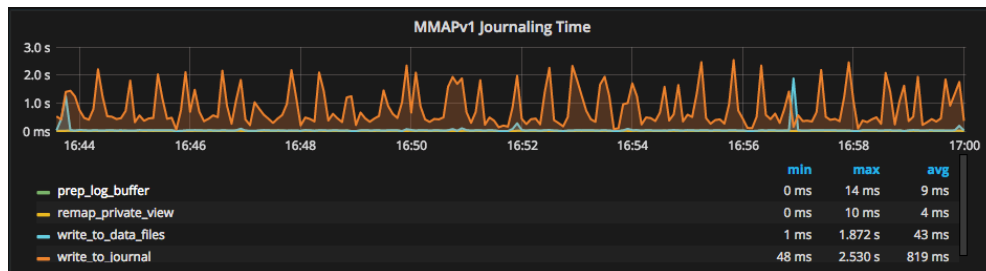
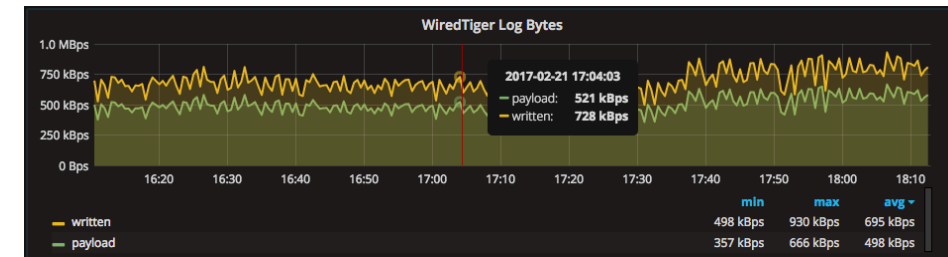
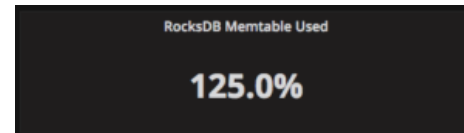
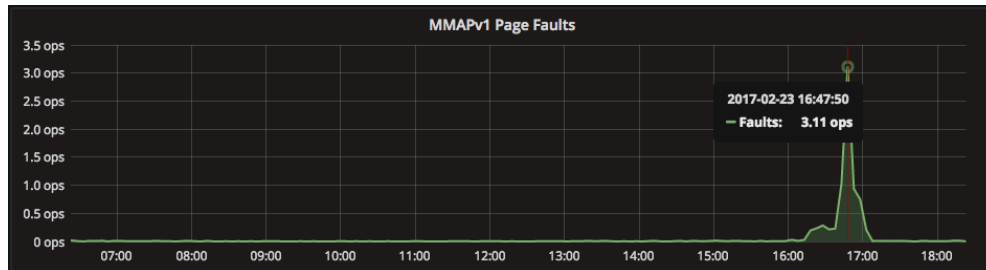
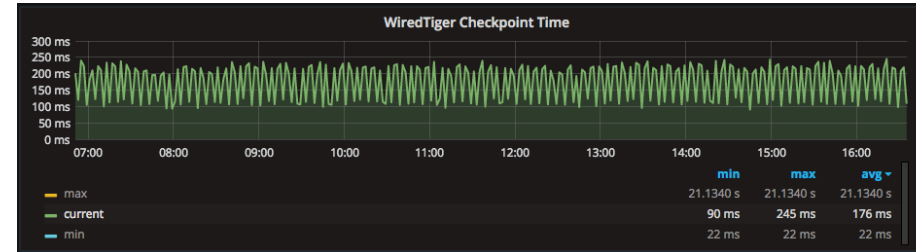
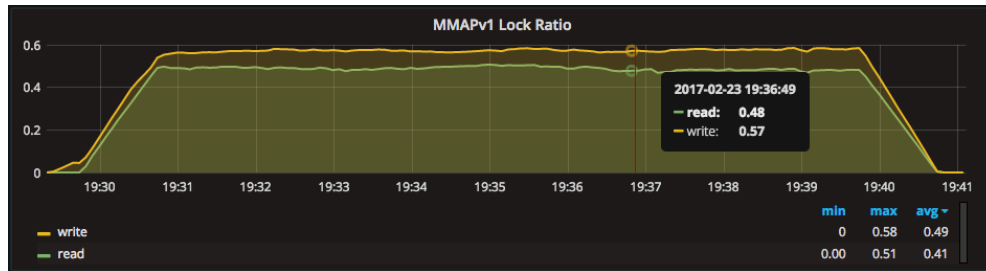
What happens on OS and Hardware Level



As well as Database Level



In-Depth MongoDB Dashboards



Lets Explore the Demo!

<http://pmmdemo.percona.com>

PERCONA

Query Analysis

2016-09-18 01:34:08 to 2016-09-18 02:34:08 UTC

Search by Fingerprint

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Top 10 of 48 Queries by % Grand Total Time (%GTT)

#	Query Abstract	ID	Load	Count	
	TOTAL			6.61 (100%)	739.23 QPS 2.66 m (100%)
1	UPDATE sbtest	D30AD7E3079ABCE7		4.60 (0.70%)	214.55 QPS 772.39 k (29.02%)
2	LOCK sbtest	0B759DF8D01BD8F		0.69 (0.10%)	2.45 QPS 8.83 k (0.33%)
3	SELECT sbtest	558CAEF5F387E929		0.34 (0.05%)	171.61 QPS 617.79 k (23.21%)
4	COMMIT	813031B8B9C3B329		0.19 (0.03%)	14.43 QPS 51.96 k (1.95%)
5	SELECT myisam.sbtest	C4832A96728C4424		0.18 (0.03%)	<0.01 QPS 4.00 (0.00%)
6	SELECT innodb.sbtest	53775C97B81D6C96		0.13 (0.02%)	<0.01 QPS 4.00 (0.00%)
7	SELECT sbtest	87625C47A176BEDD		0.07 (0.01%)	191.04 QPS 687.76 k (25.84%)
8	UPDATE sbtest	E96B374065B13356		0.07 (0.01%)	17.26 QPS 62.15 k (2.34%)
9	DELETE sbtest	EAB8A8ABEEFF705		0.06 (0.01%)	16.98 QPS 61.11 k (2.30%)
10	SELECT sbtest	FE6FFA06B3AC9B4		0.06 (0.01%)	17.24 QPS 62.07 k (2.33%)

UPDATE sbtest

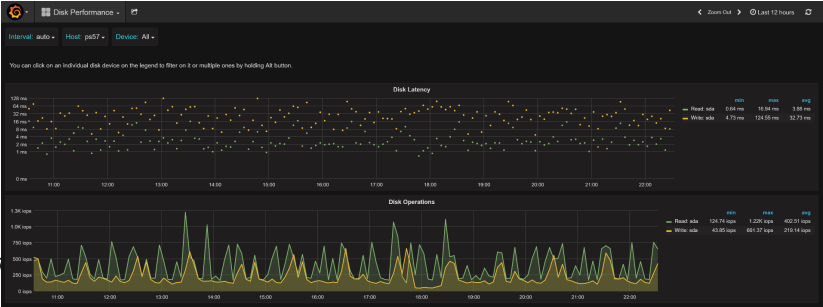
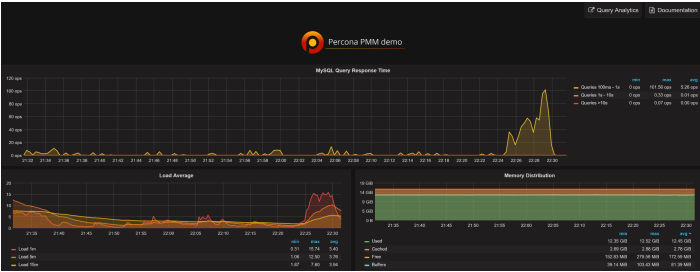
D30AD7E3079ABCE7

2.66 m Queries (739.23 QPS, 100.00%, 6.61 Load)

Metrics	Rate/Sec	Sum	Per Query Stats
Query Count	214.86 (per sec)	773.51 k 28.70% of total	
Query Time	4.60 load (69.24%)	16568.38 sec 69.24% of total	21.42 ms avg
Lock Time	<0.01 (avg load)	6447.28 sec 68.45% of total 38.91% of query time	8.34 ms avg
InnoDB Row Lock Wait	0.00 (avg load)	34.39 μs 54.13% of total 0.00% of query time	0.00 μs avg
InnoDB IO Read Wait	<0.01 (avg load)	61.63 sec 4.05% of total 0.37% of query time	79.87 μs avg
InnoDB Read Ops	2.48 (per sec)	8.92 k 1.43% of total	0.01 avg
InnoDB Read Bytes	39.64 KB (per sec)	139.38 MB 1.43% of total 10.00 KB avg to size	188.94 Bytes avg
InnoDB Distinct Pages			0.33 avg
Bytes Sent	10.06 KB (per sec)	36.52 MB 1.47% of total	52.21 Bytes avg
Rows Examined	213.17 (per sec)	767.42 k 0.33% of total 0.00 per row sent	0.99 avg
Rows Affected	213.17 (per sec)	767.42 k 80.40% of total	0.99 avg

QUERY

Last seen in 2 hours (Sunday, September 18, 2016 4:15 AM UTC) First seen 12 days ago (Monday, September 5, 2016 4:01 PM UTC)





Database Performance Matters