

# MySQL and MongoDB Monitoring and Optimization

with Percona Monitoring and Management

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# PMM Stands for

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**PERCONA**

Monitoring and Management

# Why Did We Start Working on PMM

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# Percona Vision

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

# Monitoring and Management

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Critical need for modern  
database infrastructure

# Monitoring and Management Status

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Commercial License

Cloud Based

Do it yourself

# Would be great to have

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100% Free and Open Source

Can run In the Cloud and on Premises

Easy to use

# Available for

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## Anyone on the Team

- Engineers,
- DBA
- SREs

## Any Environment

- Development
- Staging/QA
- Production



# About PMM

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# PMM Philosophy

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Do not reinvent the wheel

Use as much of industry leading components as possible

Make Integration and Customization easy

# Industry Leading Components

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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

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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

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## Server Side

- Docker
- Virtual Appliance
- AMI

## Client Side

- Linux

# In Works

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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 ?

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Assist Experts to Resolve the most complicated problems

But be friendly enough for Non-Expert use

Actionable Advice

Integration and Automation



# PMM Data Capture

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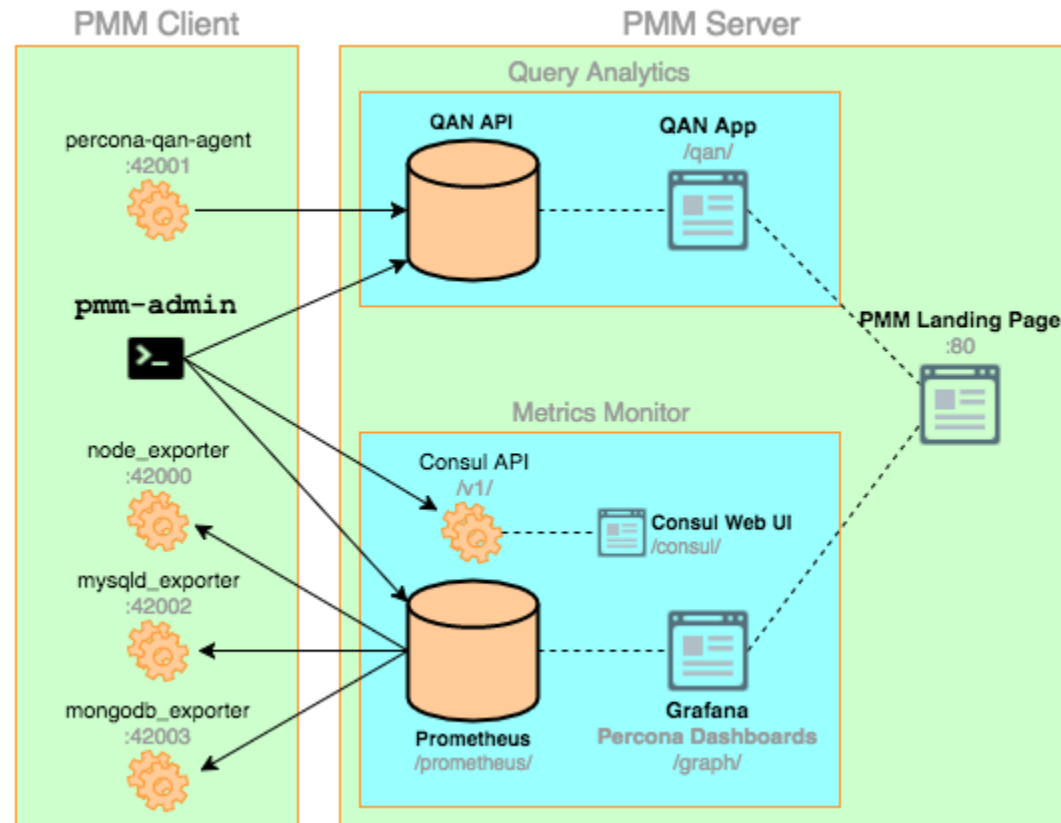
1 sec resolution data capture for most important data

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....

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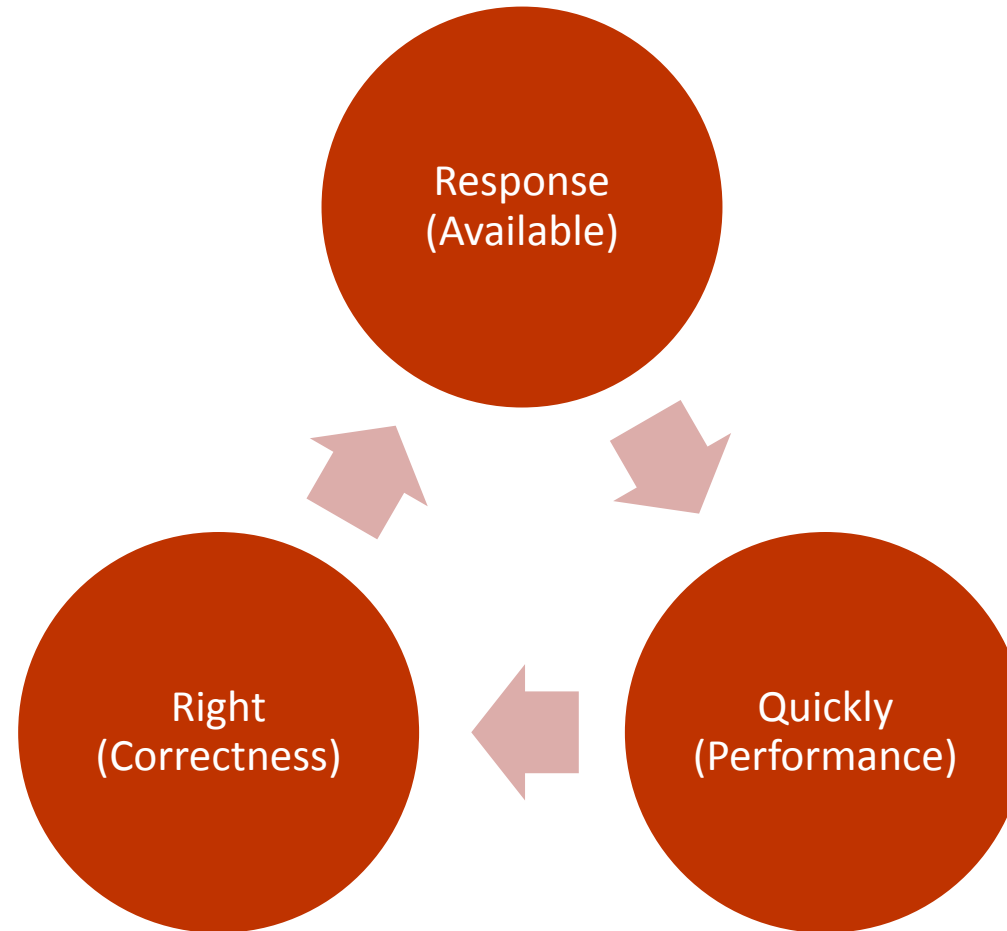
# What does MySQL and MongoDB do ?

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Responds Application Requests

# Criteria

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# Problem Caused By

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## Application

- Too many Queries
- Bad Queries
- Improper Capacity Planning

## Database

- Choosing Bad Plan
- Contention Issues
- Locking

## Hardware and Environment

- CPU
- Disk
- Memory
- Network

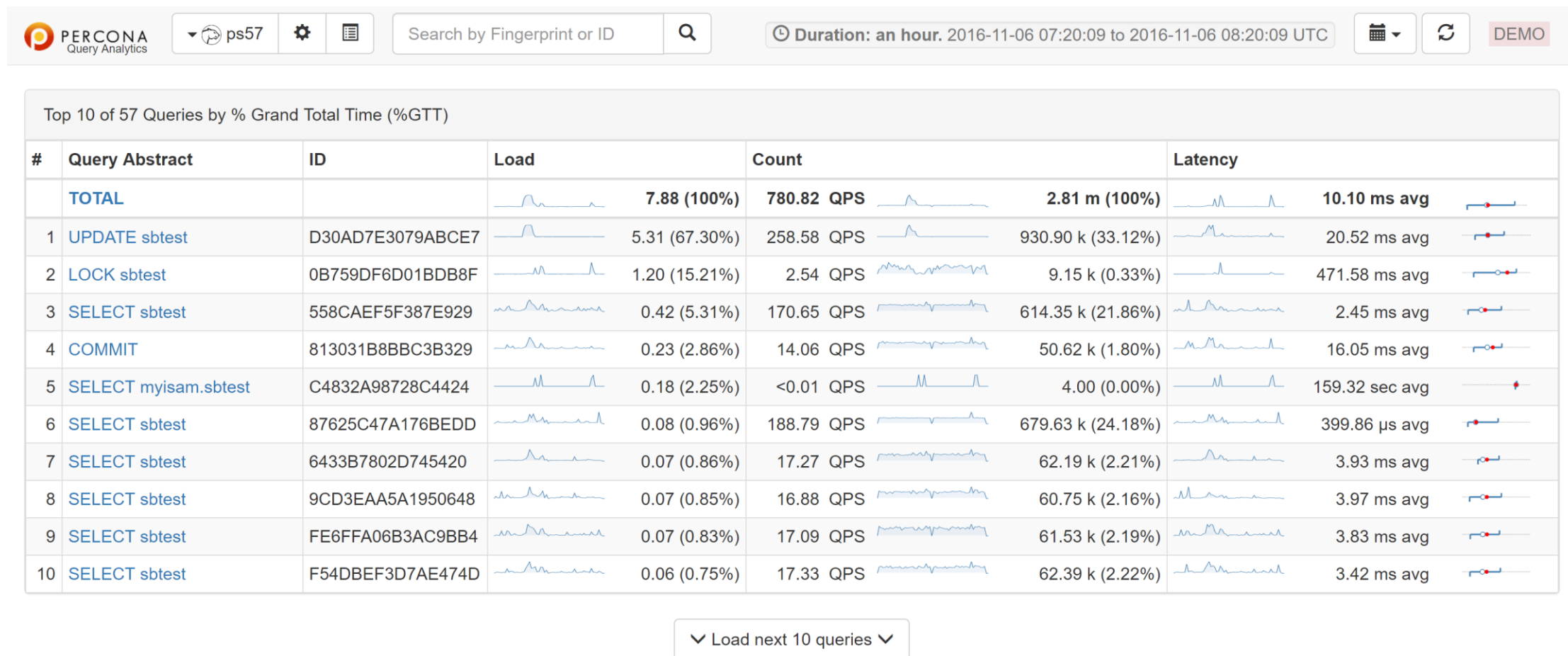
# Query Analyses

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**Working for MySQL**

**Will be available for MongoDB shortly**

# What Queries are causing the load ?















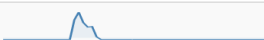







# Why are they causing this load ?

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: <input type="text" value="innodb"/>				<button>EXPLAIN</button>							
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

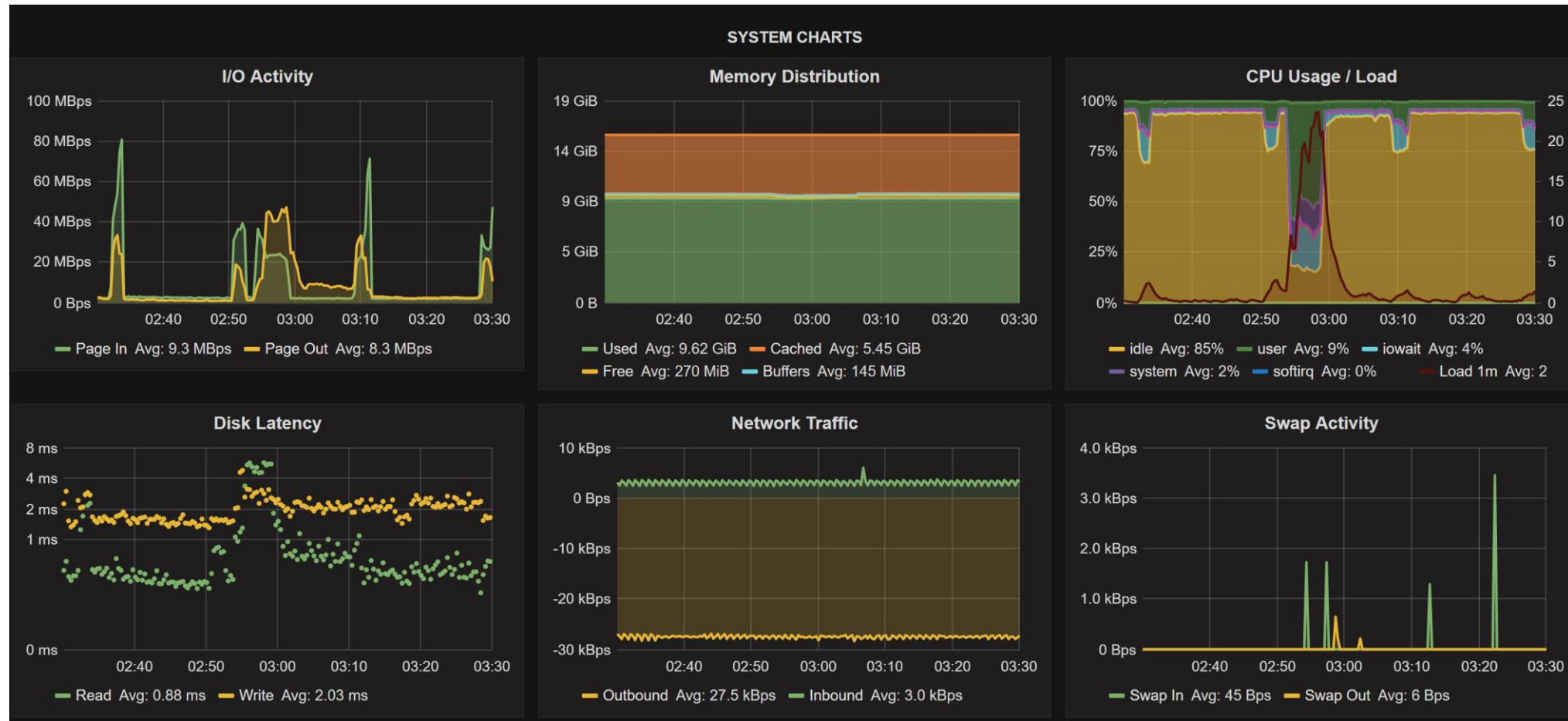
# System Information

## MySQL Summary

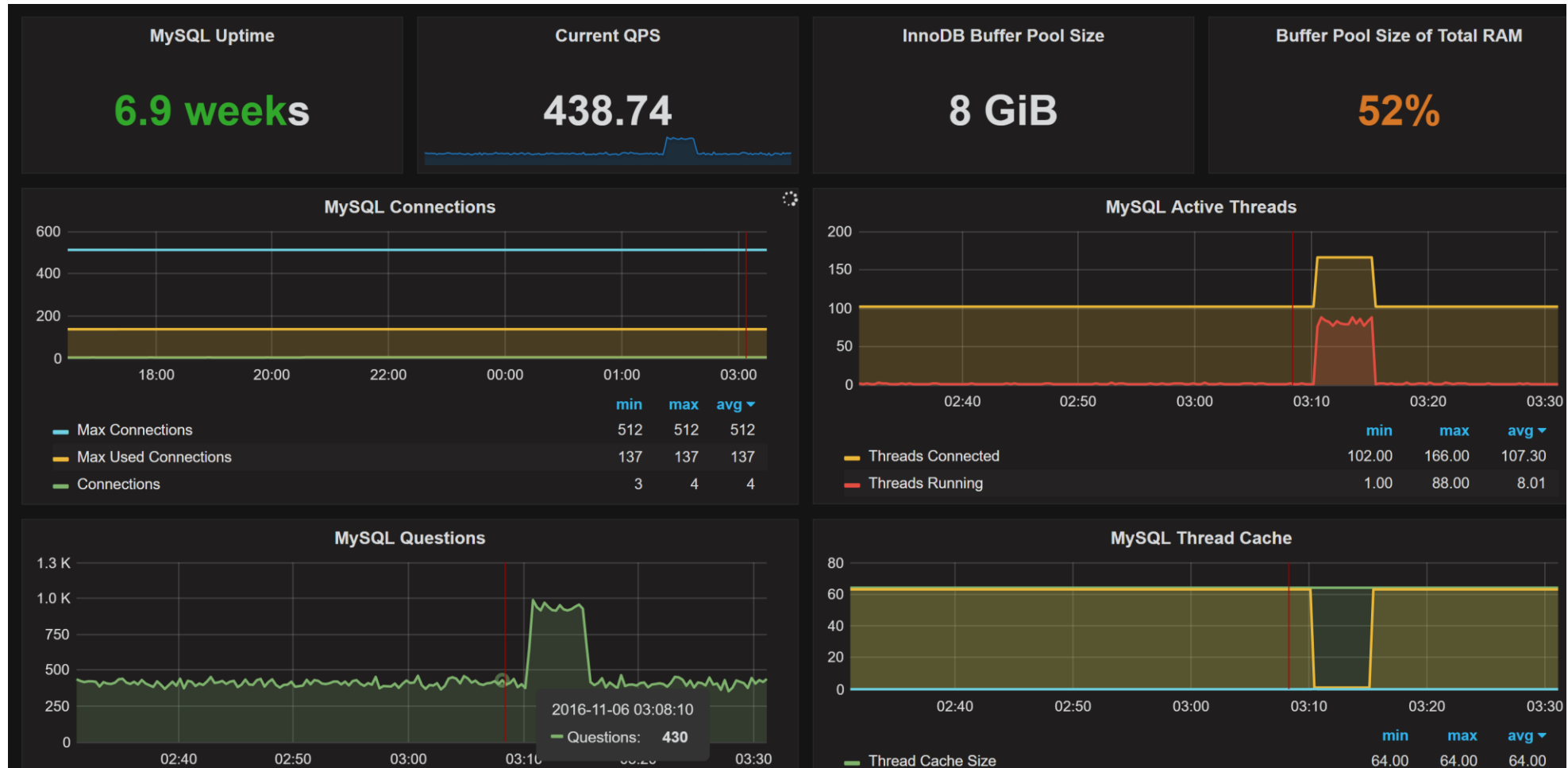
```
# Percona Toolkit MySQL Summary Report #####
      System time | 2016-11-06 08:27:41 UTC (local TZ: CET +0100)
# Instances #####
Port  Data Directory      Nice OOM Socket
=====
      0      0

# 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)
```

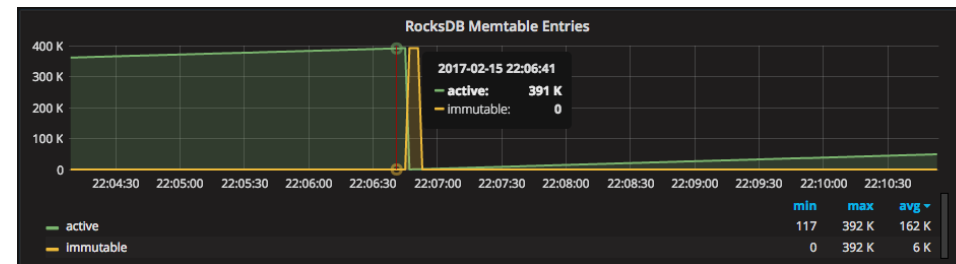
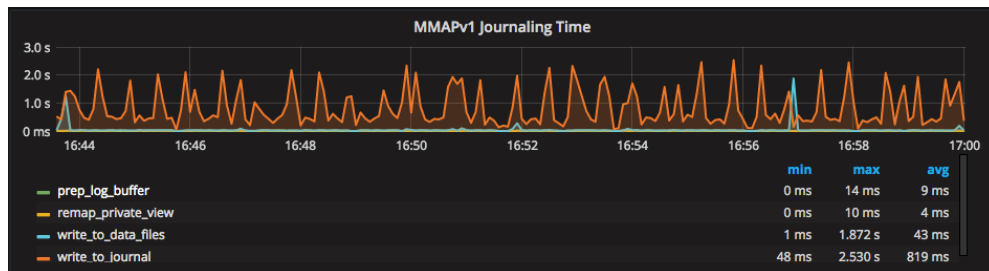
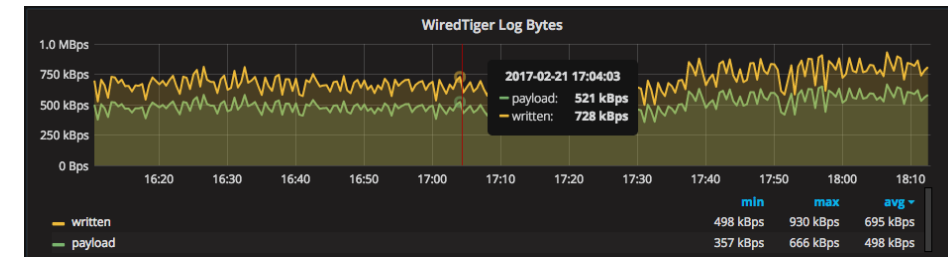
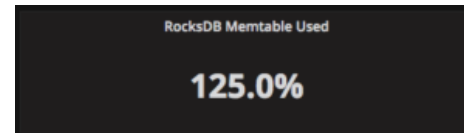
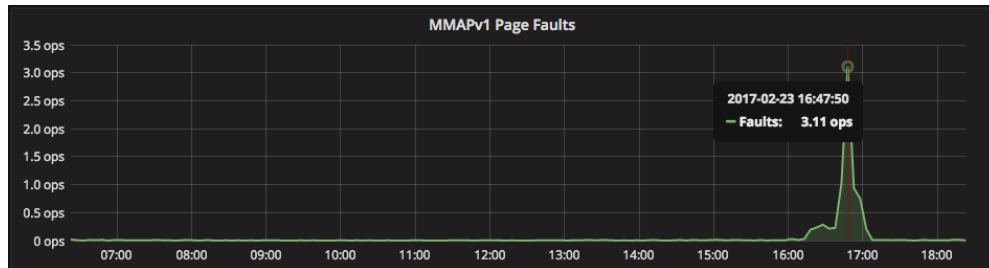
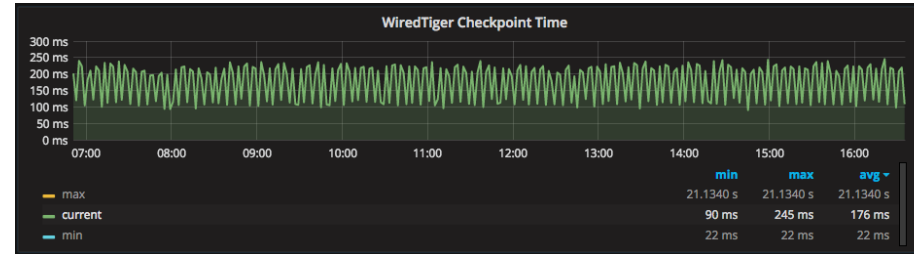
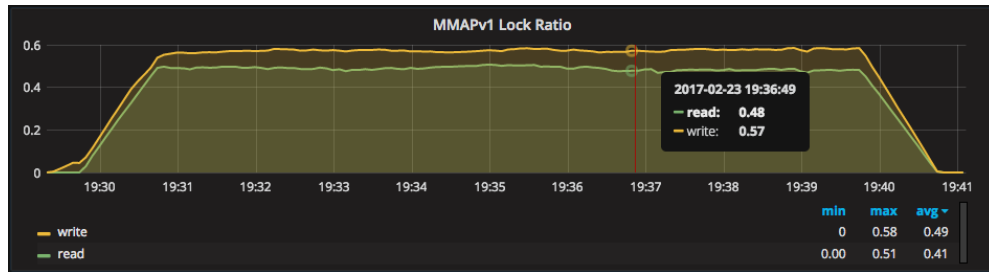
# What happens on OS and Hardware Level



# As well as Database Level



# In-Depth MongoDB Dashboards



# Lets Explore the Demo!

<http://pmmdemo.percona.com>

PERCONA

Query Analytics

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

Search by Fingerprint

Q

▼

ps57

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	0B759DF6D01BD8F		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	813031B8B8BC3B329		0.19 (0.03%)	14.43 QPS	51.96 k (1.95%)
5	SELECT myisam.sbtest	C4832A98728C4424		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	FE6FFA06B3AC9BB4		0.06 (0.01%)	17.24 QPS	62.07 k (2.33%)

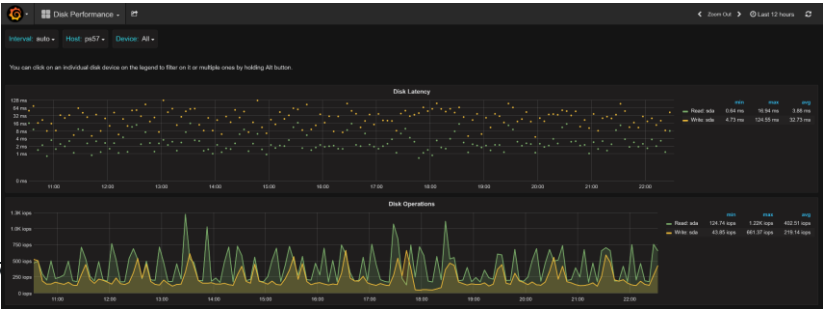
## UPDATE sbtest

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

D30AD7E3079ABCE7

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 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	79.67 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 16.00 KB avg io size	168.94 Bytes avg
InnoDB Distinct Pages			0.33 avg
Bytes Sent	10.96 KB (per sec)	38.52 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**