基于HIKARICP数据库连接池监控

Apache SkyWalking PMC

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2020/11/14

关于我

- 张 鑫
- Apache SkyWalking PMC
- GITHUB: https://github.com/ascrutae

一个悲伤的故事

我的应用告警了

2020-11-12
16:40:20

Response time of endpoint /projectA/{name} in projectA.business-zone is more than 1000ms in last 10 minutes.

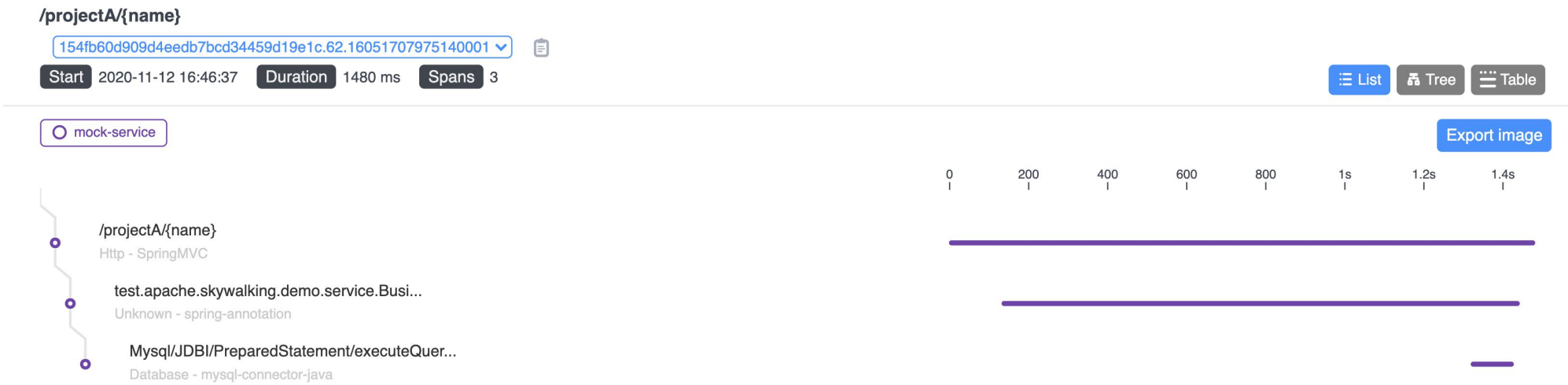
Endpoint

2020-11-12
16:34:20

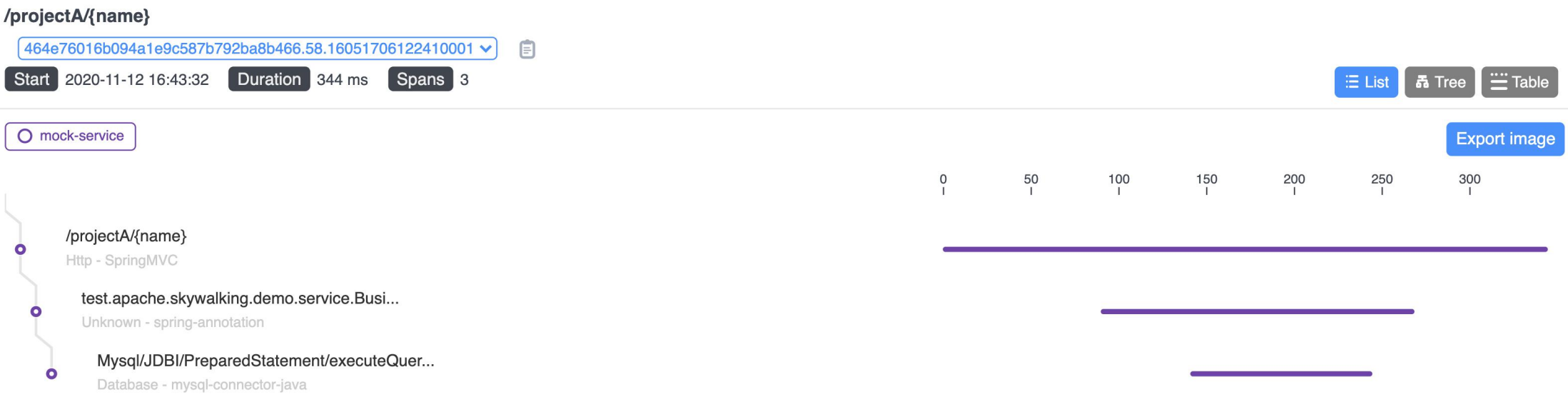
Response time of endpoint /projectA/{name} in projectA.business-zone is more than 1000ms in last 10 minutes.

Endpoint

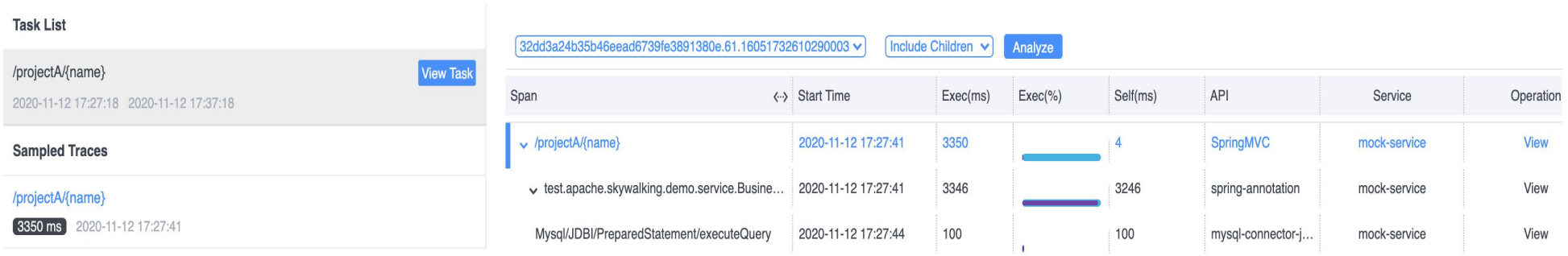
慢TRACE


/projectA/{name}
154fb60d909d4eedb7bcd34459d19e1c.62.16051707975140001
Start 2020-11-12 16:46:37
Duration 1480 ms
Spans 3
List
Tree
Table
mock-service
Export image
0
200
400
600
800
1s
1.2s
1.4s
/projectA/{name}
Http - SpringMVC
test.apache.skywalking.demo.service.Busi...
Unknown - spring-annotation
Mysql/JDBI/PreparedStatement/executeQuer...
Database - mysql-connector-java

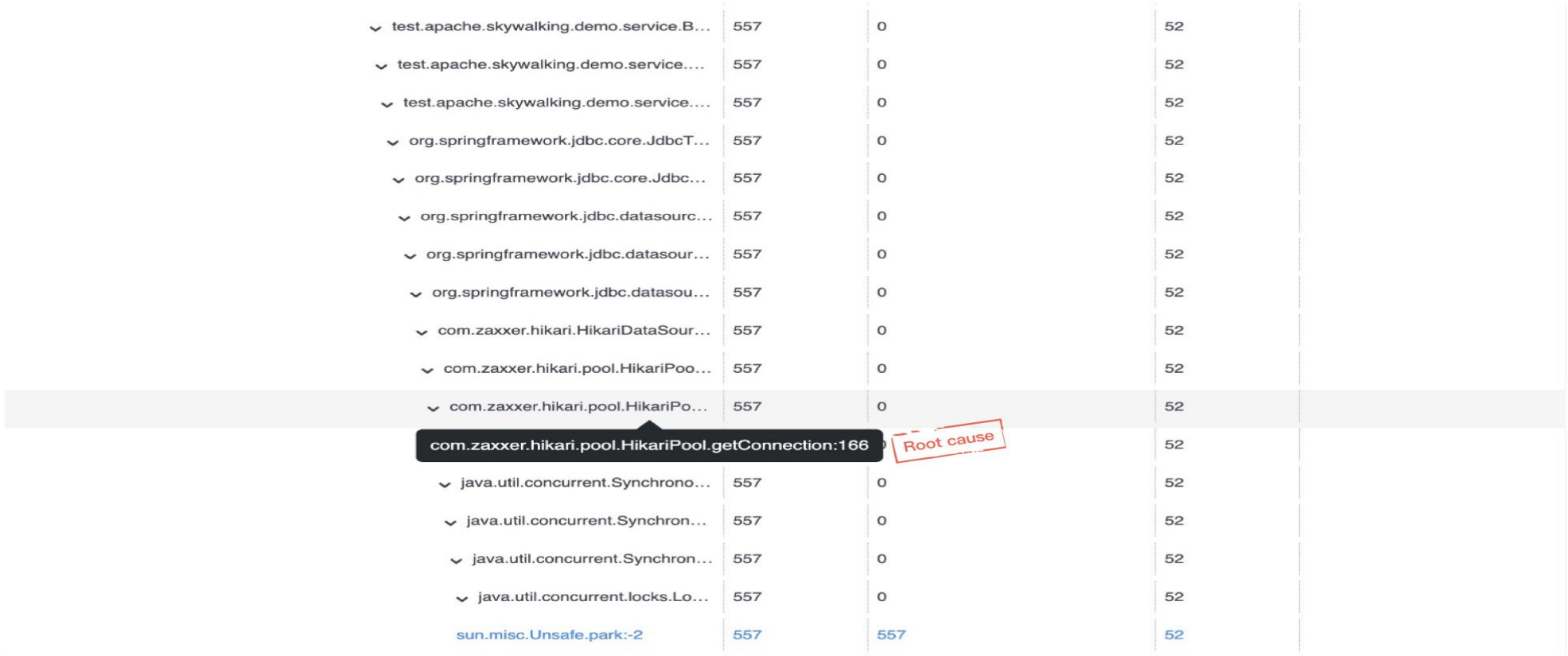
正常TRACE


/projectA/{name}
464e76016b094a1e9c587b792ba8b466.58.16051706122410001
Start 2020-11-12 16:43:32 Duration 344 ms Spans 3
List Tree Table
mock-service
Export image
0 50 100 150 200 250 300
/projectA/{name}
Http - SpringMVC
test.apache.skywalking.demo.service.Busi...
Unknown - spring-annotation
Mysql/JDBI/PreparedStatement/executeQuer...
Database - mysql-connector-java

时间消耗大杀器 – PROFILE



定位问题根因


test.apache.skywalking.demo.service.B... 557 0 52
test.apache.skywalking.demo.service.... 557 0 52
test.apache.skywalking.demo.service.... 557 0 52
org.springframework.jdbc.core.JdbcT... 557 0 52
org.springframework.jdbc.core.Jdbc... 557 0 52
org.springframework.jdbc.datasourc... 557 0 52
org.springframework.jdbc.datasour... 557 0 52
org.springframework.jdbc.datasou... 557 0 52
com.zaxxer.hikari.HikariDataSour... 557 0 52
com.zaxxer.hikari.pool.HikariPoo... 557 0 52
com.zaxxer.hikari.pool.HikariPo... 557 0 52
com.zaxxer.hikari.pool.HikariPool.getConnection:166
Root cause
52
java.util.concurrent.Synchrono... 557 0 52
java.util.concurrent.Synchron... 557 0 52
java.util.concurrent.Synchron... 557 0 52
java.util.concurrent.locks.Lo... 557 0 52
sun.misc.Unsafe.park:-2 557 557 52

数据库连接池

- 优势
  - 资源重用
  - 更快的系统反应速度

常用的配置参数

- MAX_POOL_SIZE
- MIN_IDLE
- MAX_IDLE
- CONNECTION_TIME_OUT

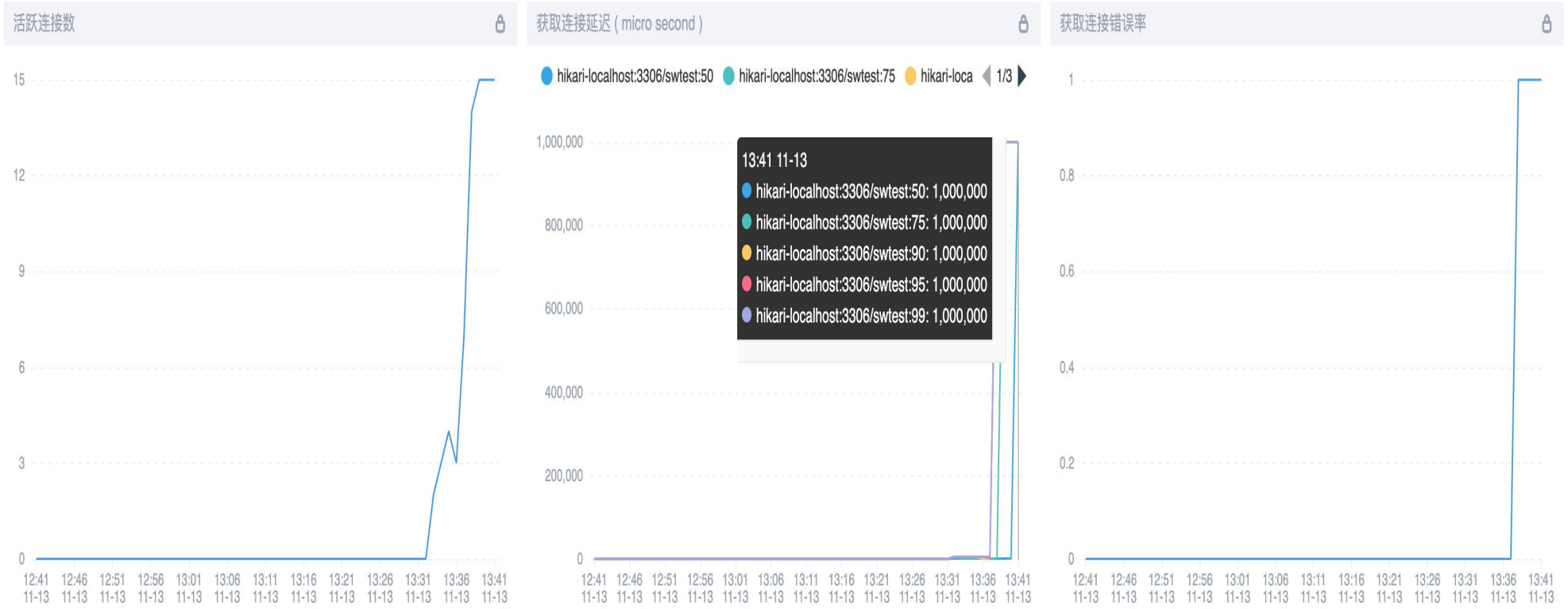
可能带来的性能问题

- 连接池泄漏
- 由于配置不正确，获取连接的延迟

连接泄漏的评估指标

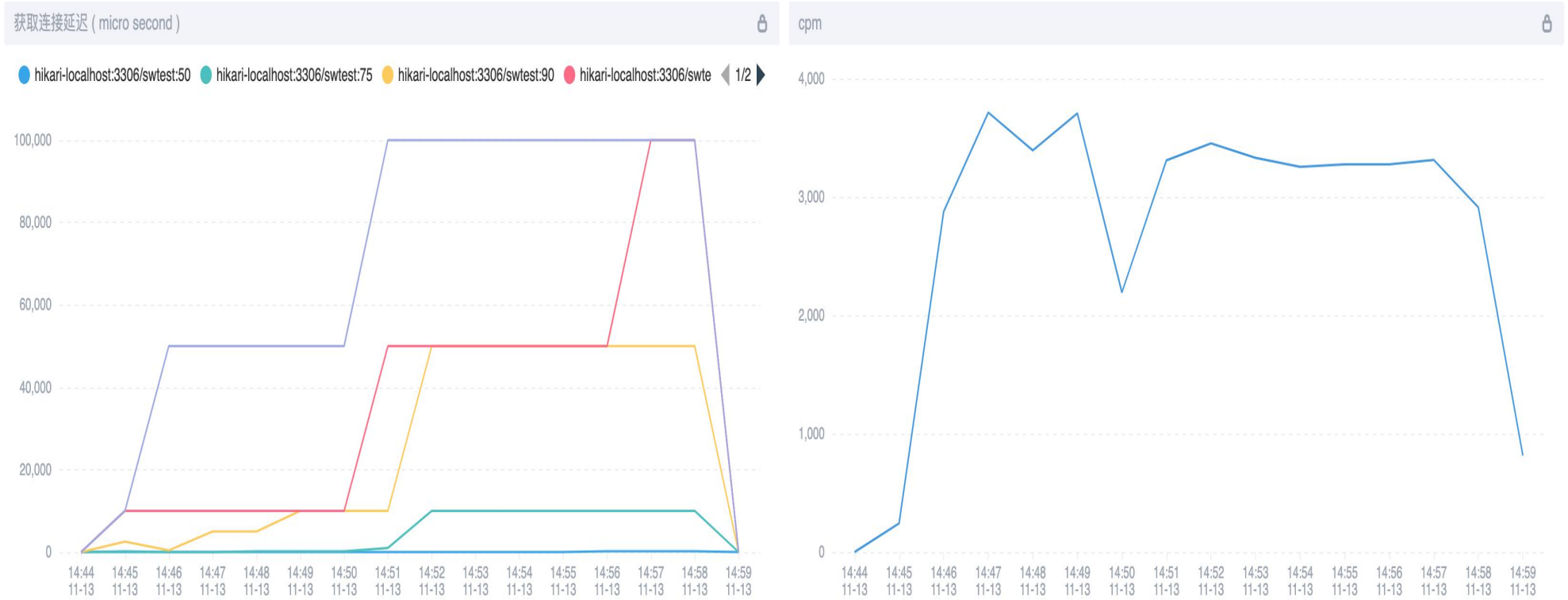
- 获取连接错误率
- 活跃连接数变化趋势
- 获取连接的延时

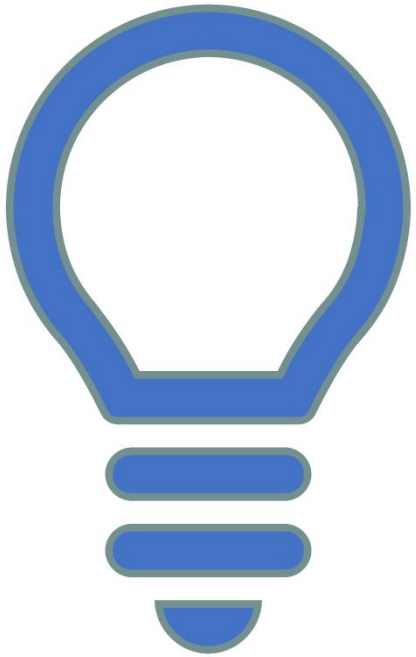
连接池泄漏


活跃连接数
15
12
9
6
3
0
12:41 11-13
12:46 11-13
12:51 11-13
12:56 11-13
13:01 11-13
13:06 11-13
13:11 11-13
13:16 11-13
13:21 11-13
13:26 11-13
13:31 11-13
13:36 11-13
13:41 11-13
获取连接延迟 (micro second)
hikari-localhost:3306/swtest:50
hikari-localhost:3306/swtest:75
hikari-loca
1/3
1,000,000
800,000
600,000
400,000
200,000
0
13:41 11-13
hikari-localhost:3306/swtest:50: 1,000,000
hikari-localhost:3306/swtest:75: 1,000,000
hikari-localhost:3306/swtest:90: 1,000,000
hikari-localhost:3306/swtest:95: 1,000,000
hikari-localhost:3306/swtest:99: 1,000,000
获取连接错误率
1
0.8
0.6
0.4
0.2
0

获取连接延时

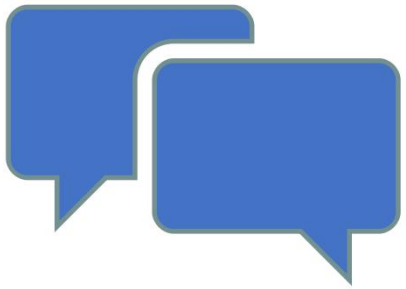
获取连接延时对TPS的影响





新的想法

- PreparedStatement命中率
- 业务数据库梳理，分析Trace涉及的数据表



FAQ

THANKS