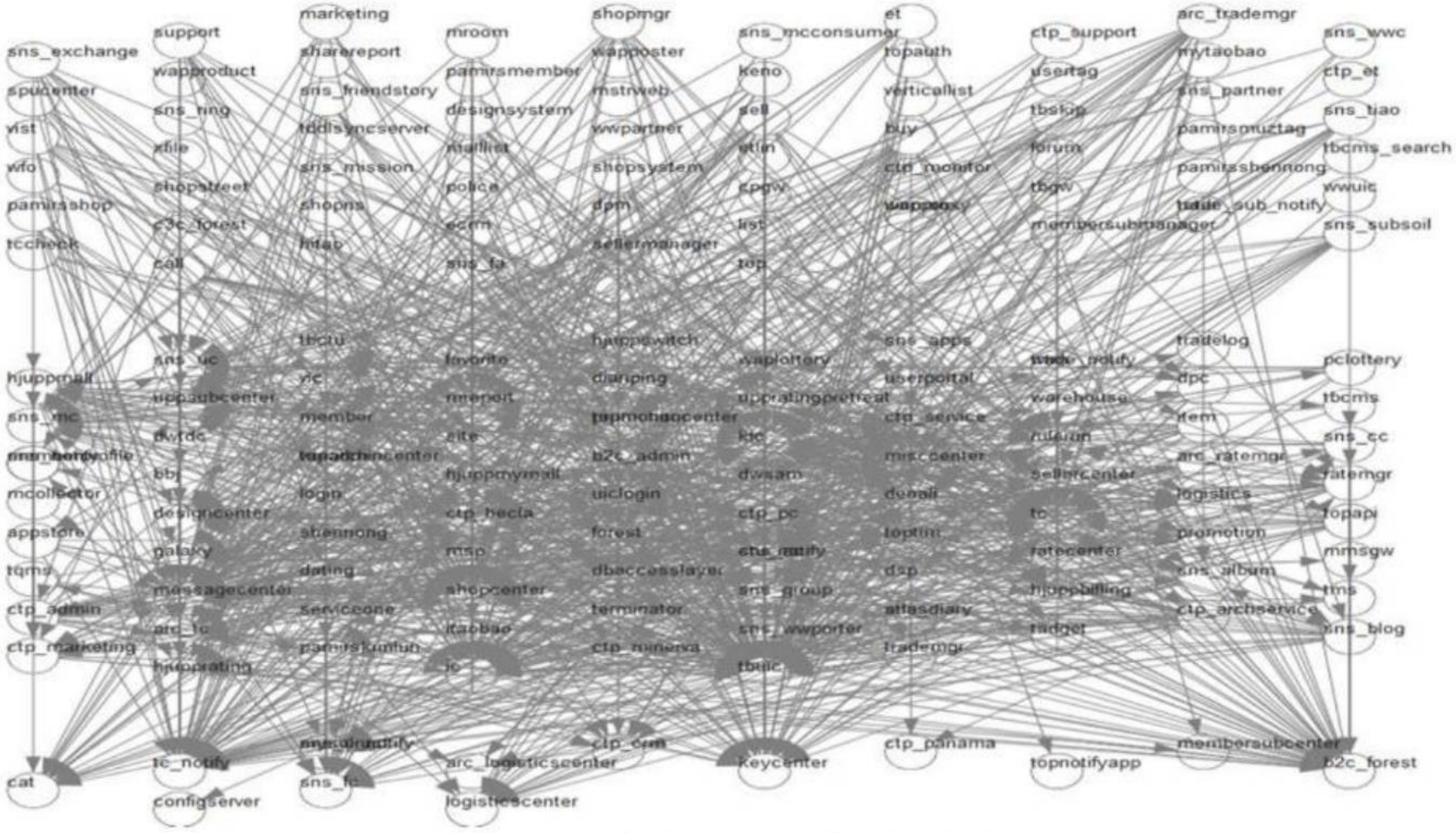
使用Apache SkyWalking(Incubating) 监控.NET Core分布式服务

刘浩杨
Apache SkyWalking Committer

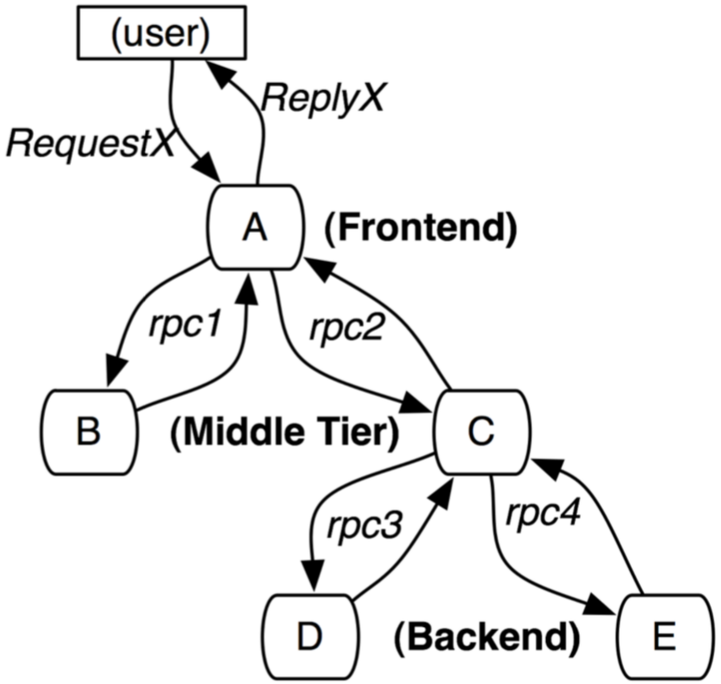
分布式系统之熵

- 故障定位?
- 容量预估?
- 链路梳理?
- 性能优化?

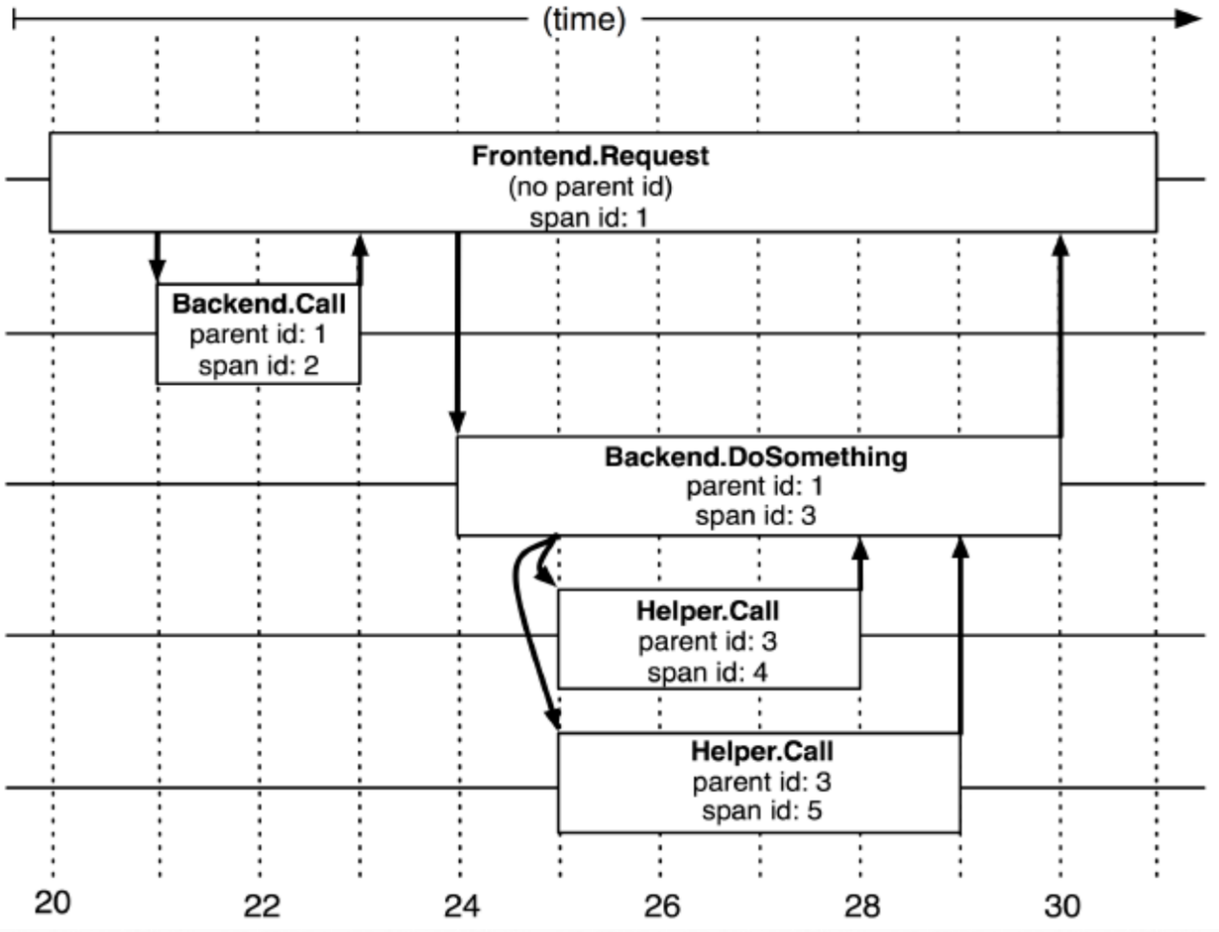


Google的解决方案： Dapper

Google 《Dapper, a Large-Scale Distributed Systems Tracing Infrastructure》



这个路径由用户的x请求发起，穿过一个简单的服务系统。用字母标识的节点代表分布式系统中的不同处理过程



- Span通过共用一个追踪ID构成追踪链
- 通过记录Span ID和父ID，以重建在一次追踪过程中不同Span之间的关系

生产级APM：Apache SkyWalking

SkyWalking创建于2015年，从提供分布式追踪功能，逐渐进化为一个完整功能的Application Performance Management系统，用于追踪、监控和诊断大型分布式系统，尤其是容器和云原生下的微服务系统。

- 分布式追踪和上下文传输
- 应用、实例、服务性能指标分析
- 根源分析
- 应用拓扑分析
- 应用和服务依赖分析
- 慢服务检测

SkyWalking 发展历程

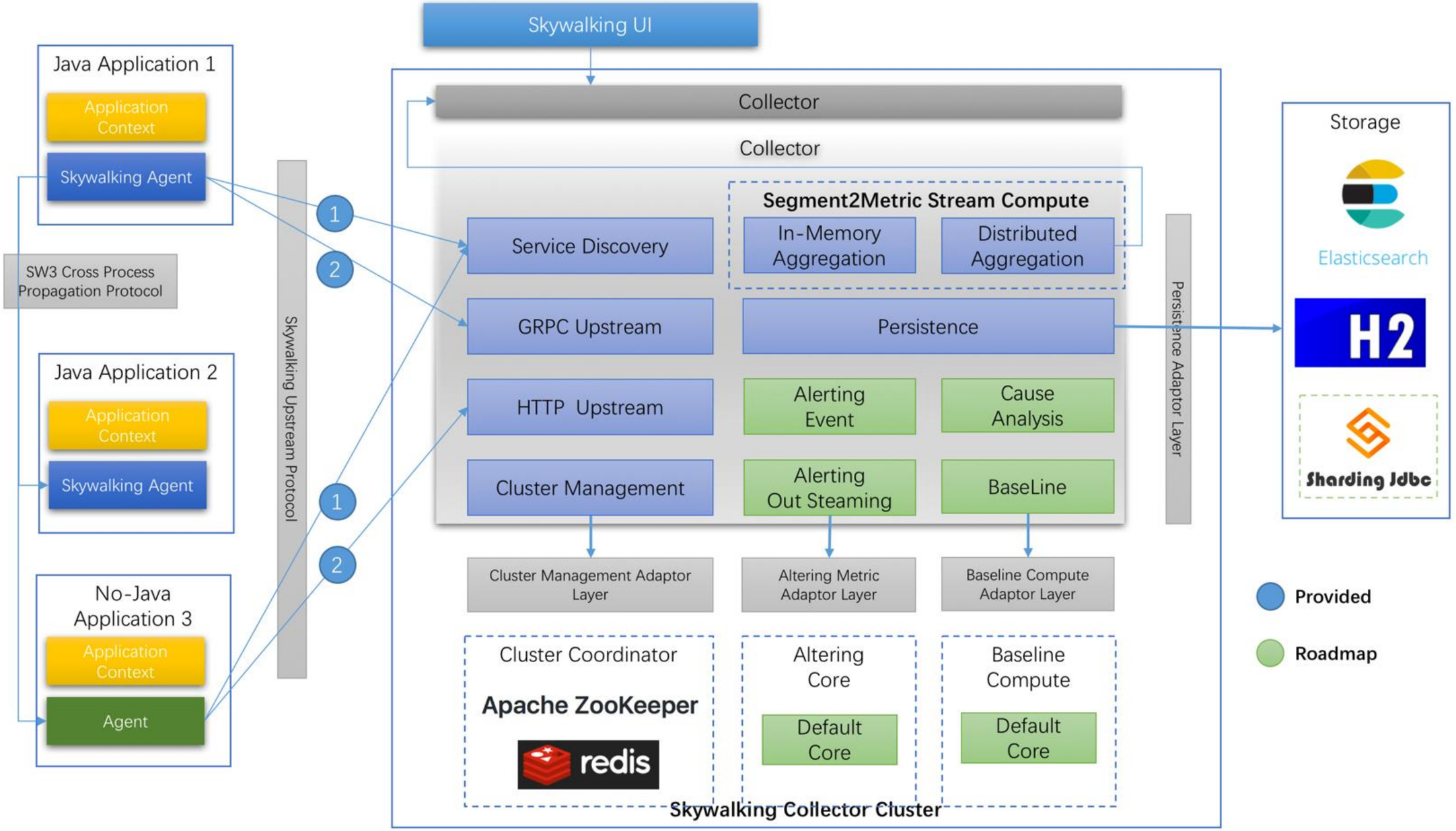
2015
SkyWalking项目创建
提供SDK通过手工埋点的方式进行链路抓取

2016
从追踪系统到APM
- 使用byte-buddy实现自动埋点
- 自动埋点的机制采样插件机制区分不同框架和不同版本
- 提供一个APM系统最基本的能力(应用拓扑图，链路展示，服务关系依赖，JVM统计指标)

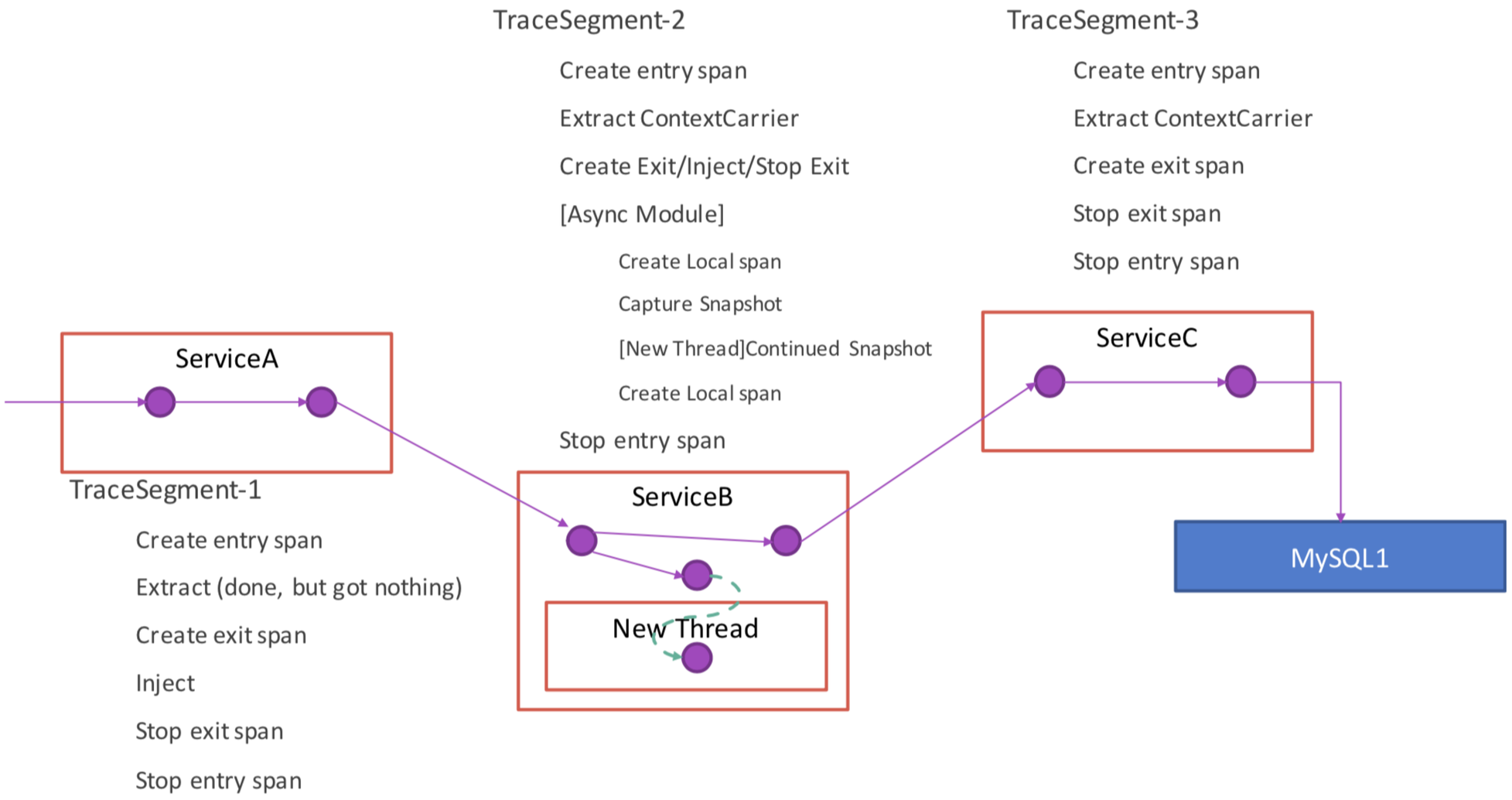
2017
SkyWalking生态建设
- OpenSkyWalking社区成立
- 华为和当当网加入SkyWalking生态
- 加入Apache孵化器

2018
Apache SkyWalking拥抱全球
- SkyWalking5.0 堪比商业APM的UI
- 多语言探针：Java，.NET，NodeJS

SkyWalking 架构



探针实现：跨进程追踪


TraceSegment-2
Create entry span
Extract ContextCarrier
Create Exit/Inject/Stop Exit
[Async Module]
Create Local span
Capture Snapshot
[New Thread]Continued Snapshot
Create Local span
Stop entry span
TraceSegment-3
Create entry span
Extract ContextCarrier
Create exit span
Stop exit span
Stop entry span
ServiceA
ServiceB
New Thread
ServiceC
MySQL1
TraceSegment-1
Create entry span
Extract (done, but got nothing)
Create exit span
Inject
Stop exit span
Stop entry span

探针实现：手动探针 vs 自动探针

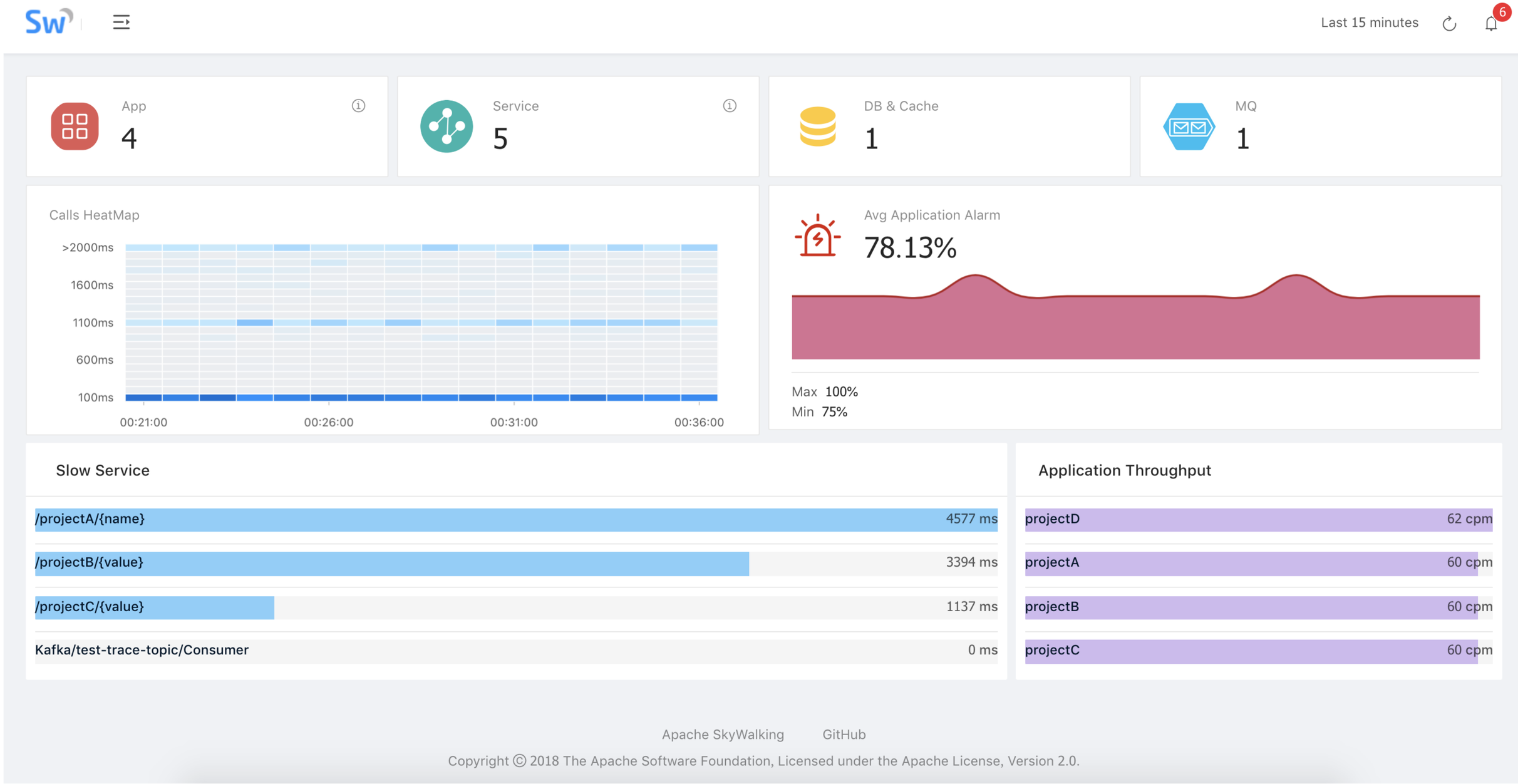
手动探针

- 实现简单，方便调试，可以灵活的记录业务信息。
- 对应用侵入大，往往需要改动现有应用
- 实现方式：Middleware, Mvc Filter ,DynamicProxy

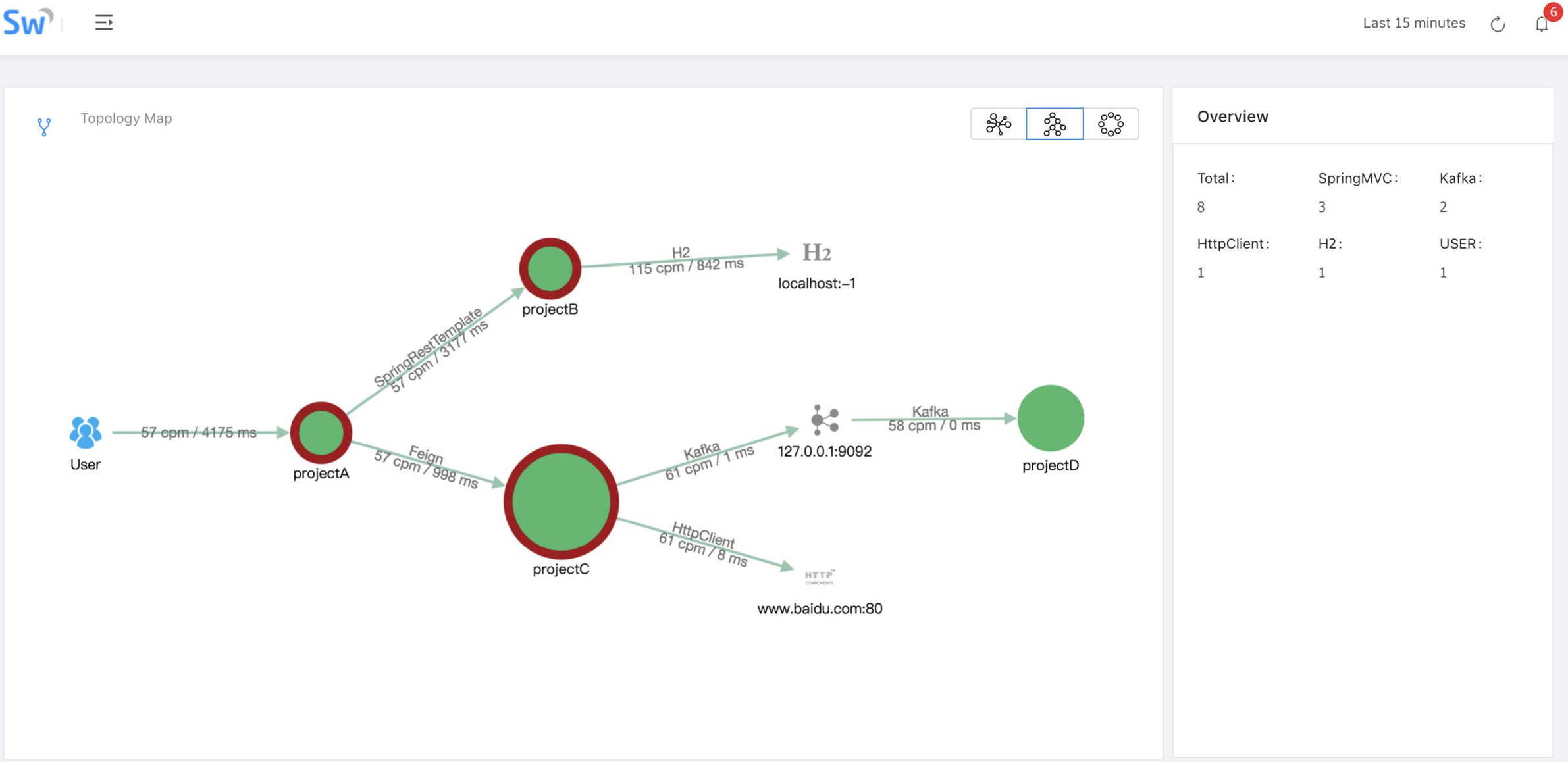
自动探针

- 对应用无侵入，更容易和CI/CD工具集成实现自动化监控
- 实现复杂，性能稍低于手动探针
- 实现方式：CLR Profiling API

功能: Dashboard



功能：全局拓扑图

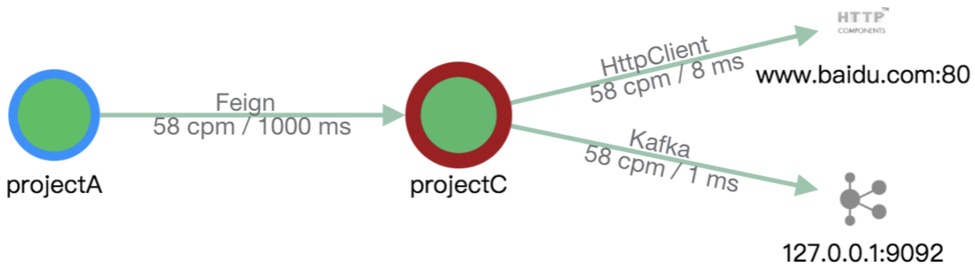

Sw
Last 15 minutes
6
Topology Map
Overview
Total:
8
SpringMVC:
3
Kafka:
2
HttpClient:
1
H2:
1
USER:
1
H2
115 cpm / 842 ms
localhost:-1
projectB
SpringRestTemplate
57 cpm / 3177 ms
57 cpm / 4175 ms
User
projectA
Feign
57 cpm / 998 ms
Kafka
61 cpm / 1 ms
127.0.0.1:9092
Kafka
58 cpm / 0 ms
projectD
projectC
HttpClient
61 cpm / 8 ms
www.baidu.com:80
Apache SkyWalking
GitHub

功能：应用程序分析

Last 15 minutes

projectC

Application Map



5718@192.168.0.59

Host：test-wusheng-20180115.novalocal

OS：Linux

Avg Throughput

58 cpm

Avg Response Time

994.81 ms

More Server Details···

Running Server

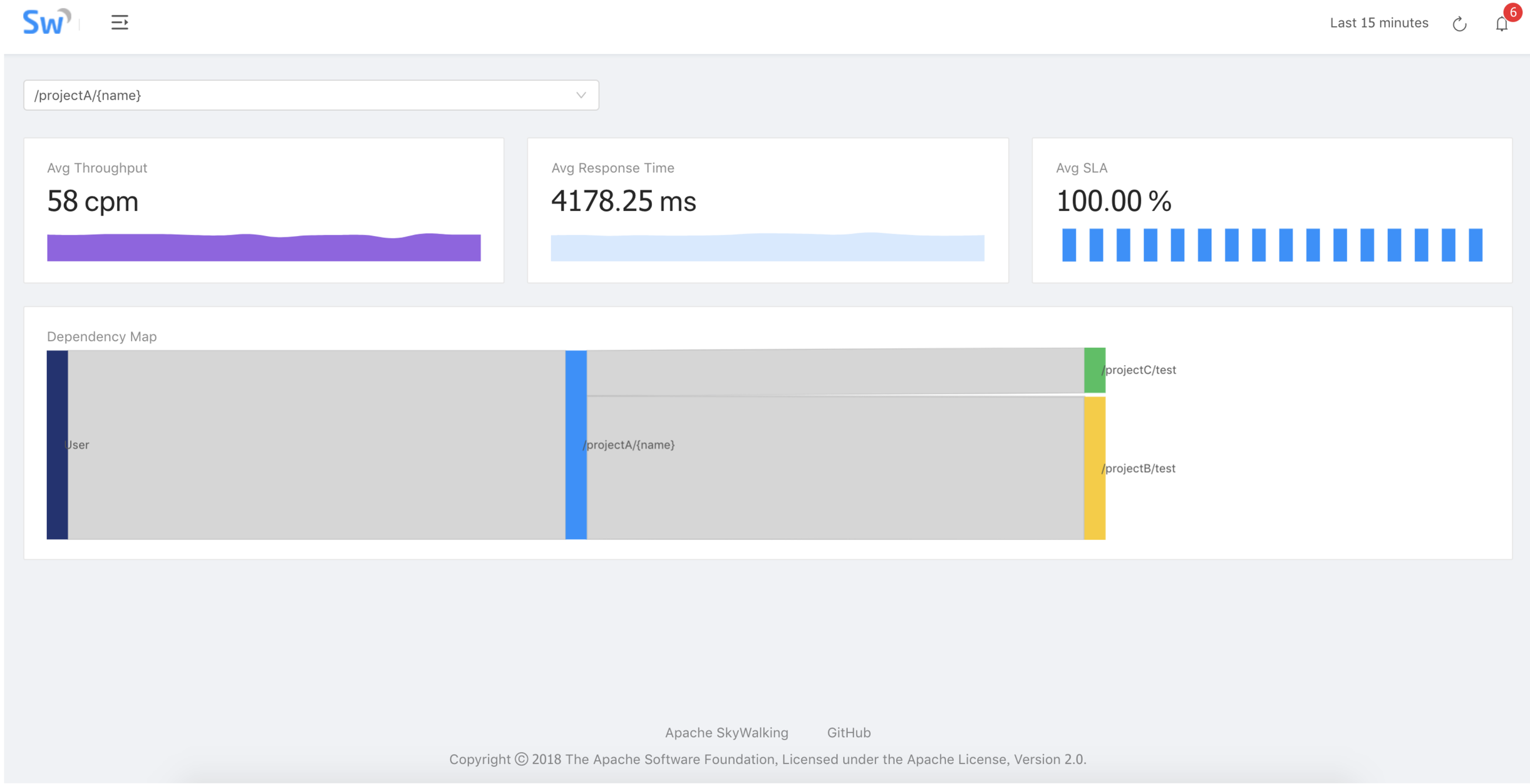
5718@192.168.0.59	58 cpm

Host test-wusheng-20180115.novalocal OS Linux

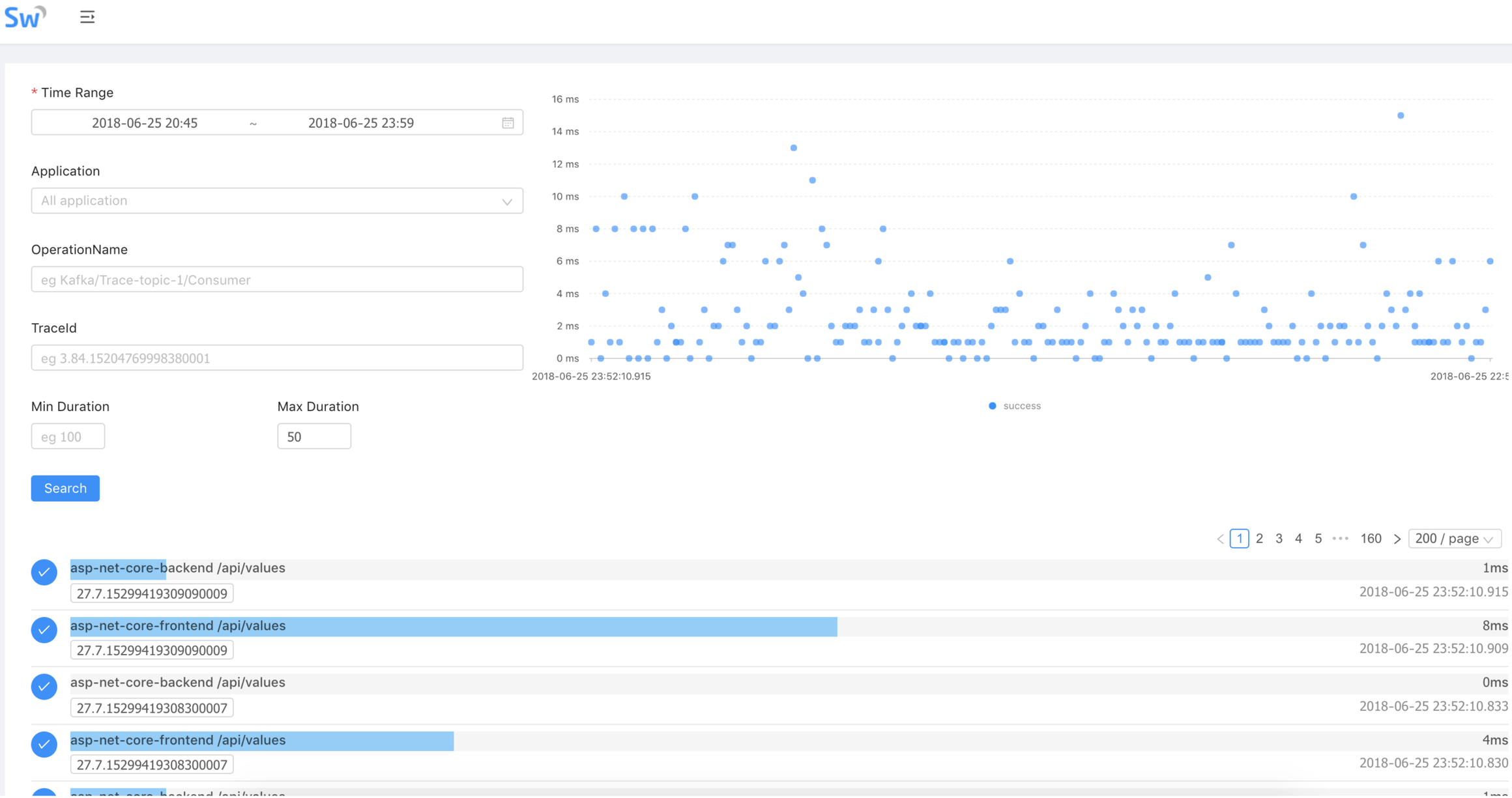
Slow Service

/projectC/{value}	1137 ms

功能：服务分析


Last 15 minutes
6
/projectA/{name}
Avg Throughput
58 cpm
Avg Response Time
4178.25 ms
Avg SLA
100.00 %
Dependency Map
User
/projectA/{name}
/projectC/test
/projectB/test
Apache SkyWalking
GitHub
Copyright © 2018 The Apache Software Foundation, Licensed under the Apache License, Version 2.0.

功能：链路查询


* Time Range
2018-06-25 20:45 ~ 2018-06-25 23:59
Application
All application
OperationName
eg Kafka/Trace-topic-1/Consumer
TraceId
eg 3.84.15204769998380001
Min Duration
eg 100
Max Duration
50
Search
16 ms
14 ms
12 ms
10 ms
8 ms
6 ms
4 ms
2 ms
0 ms
2018-06-25 23:52:10.915
success
1 2 3 4 5 160 200 / page
asp-net-core-backend /api/values
1ms
27.7.15299419309090009
2018-06-25 23:52:10.915
asp-net-core-frontend /api/values
8ms
27.7.15299419309090009
2018-06-25 23:52:10.909
asp-net-core-backend /api/values
0ms
27.7.15299419308300007
2018-06-25 23:52:10.833
asp-net-core-frontend /api/values
4ms
27.7.15299419308300007
2018-06-25 23:52:10.830

功能：调用链路分析

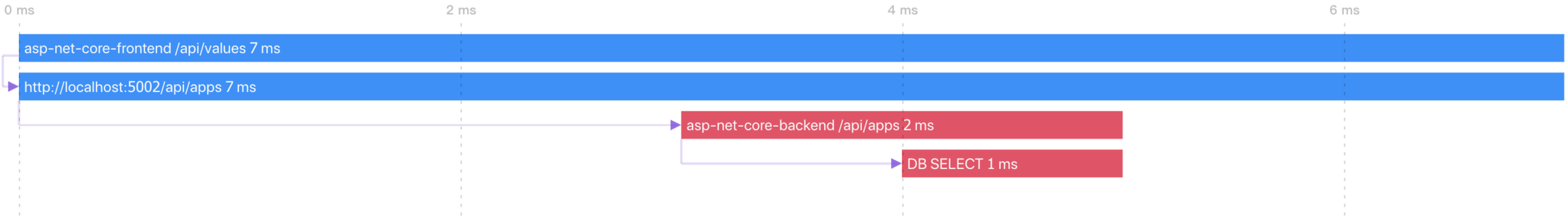
Sw

Go back

Start Time 2018-06-26 00:58:54 Total Duration 7 ms Spans 4

29.16.15299459348380013

asp-net-core-frontend asp-net-core-backend



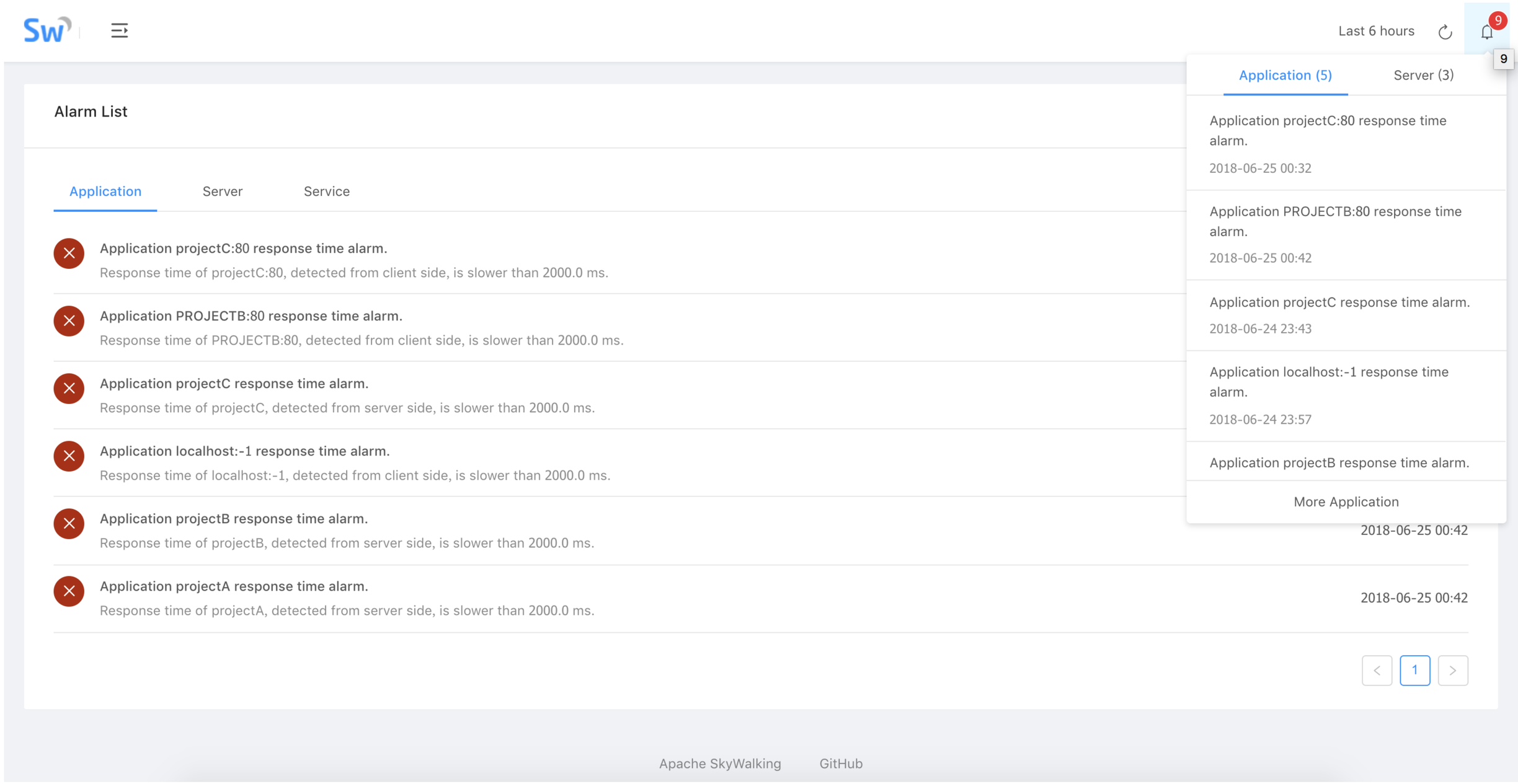
DB SELECT

Start Time 2018-06-26 00:58:54.842 Duration 1 ms

Tags Logs

span type:	component:	peer:
Exit	EntityFrameworkCore.Sqlite	localhost
is error:	db.type:	db.instance:
false	Sql	main
db.statement:	db.bind_vars:	
SELECT "a"."Id", "a"."Name" FROM "Applications" AS "a"		

功能：预警


Last 6 hours
9
9
Application (5)
Server (3)
Application projectC:80 response time alarm.
2018-06-25 00:32
Application PROJECTB:80 response time alarm.
2018-06-25 00:42
Application projectC response time alarm.
2018-06-24 23:43
Application localhost:-1 response time alarm.
2018-06-24 23:57
Application projectB response time alarm.
More Application
Alarm List
Application
Server
Service
Application projectC:80 response time alarm.
Response time of projectC:80, detected from client side, is slower than 2000.0 ms.
Application PROJECTB:80 response time alarm.
Response time of PROJECTB:80, detected from client side, is slower than 2000.0 ms.
Application projectC response time alarm.
Response time of projectC, detected from server side, is slower than 2000.0 ms.
Application localhost:-1 response time alarm.
Response time of localhost:-1, detected from client side, is slower than 2000.0 ms.
Application projectB response time alarm.
Response time of projectB, detected from server side, is slower than 2000.0 ms.
2018-06-25 00:42
Application projectA response time alarm.
Response time of projectA, detected from server side, is slower than 2000.0 ms.
2018-06-25 00:42
1
Apache SkyWalking
GitHub

Thanks!

- 官网： http://skywalking.apache.org/
- GitHub Repo: https://github.com/apache/incubator-skywalking/
- 社区资料，第三方文章：https://github.com/OpenSkywalking/Community
- OpenSkyWalking：https://github.com/OpenSkywalking
- 文档：https://github.com/apache/incubator-skywalking/blob/master/docs/README.md

Skywalking

THE APACHE SOFTWARE FOUNDATION