

How Is Apache SkyWalking Powering Istio Observability?

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#IstioCon

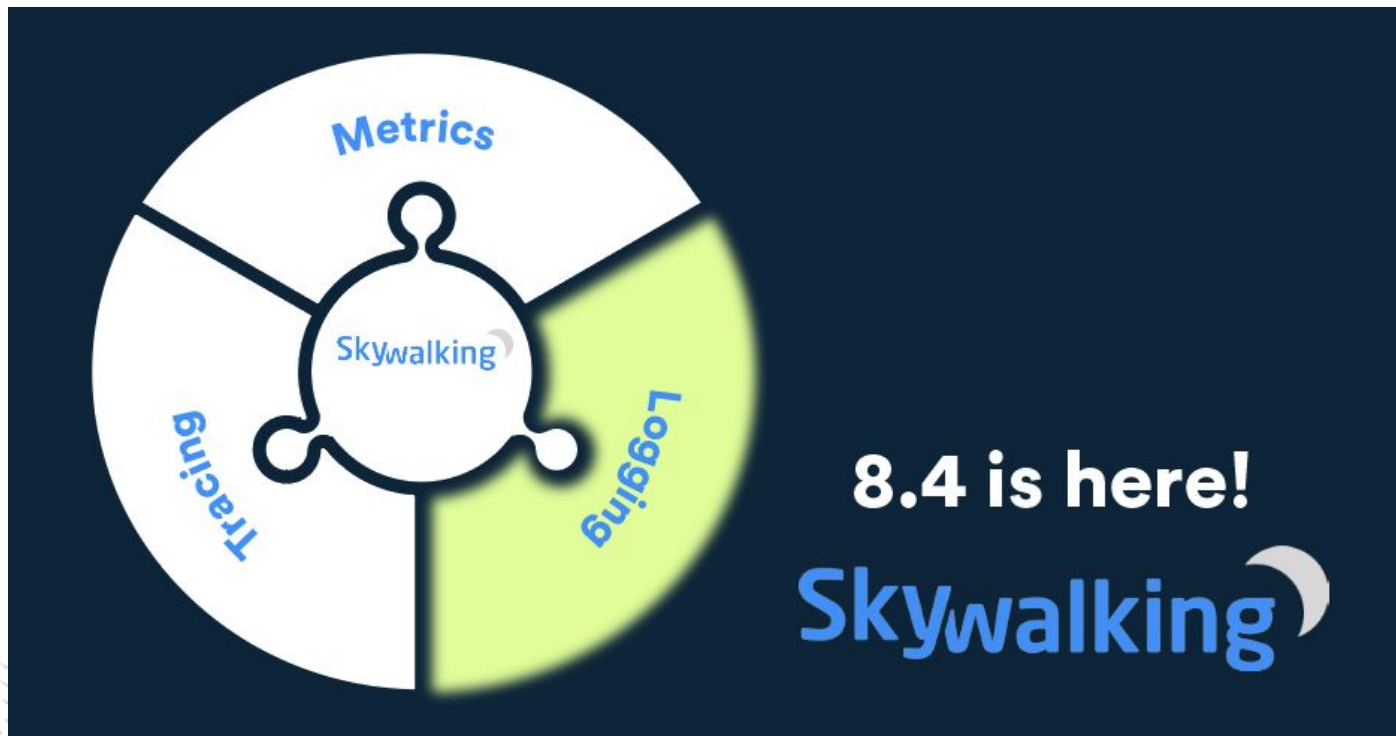
Sheng Wu

- Founding Engineer, Tetrade
- OSS Strategy Consultant. SkyWalking Consultant
- Apache Member
- Creator, VP and PMC member, Apache SkyWalking
- PMC member of Apache APISIX , Incubator, ShardingSphere, ECharts, DolphinScheduler
- Member of CNCF KubeCon Program Committee, 2019/2020

#IstioCon



Traces, Logs, Metrics - All In Open Source APM



Jan. 2021

**Full
Observability
Landscape**

8.4 is here!
Skywalking

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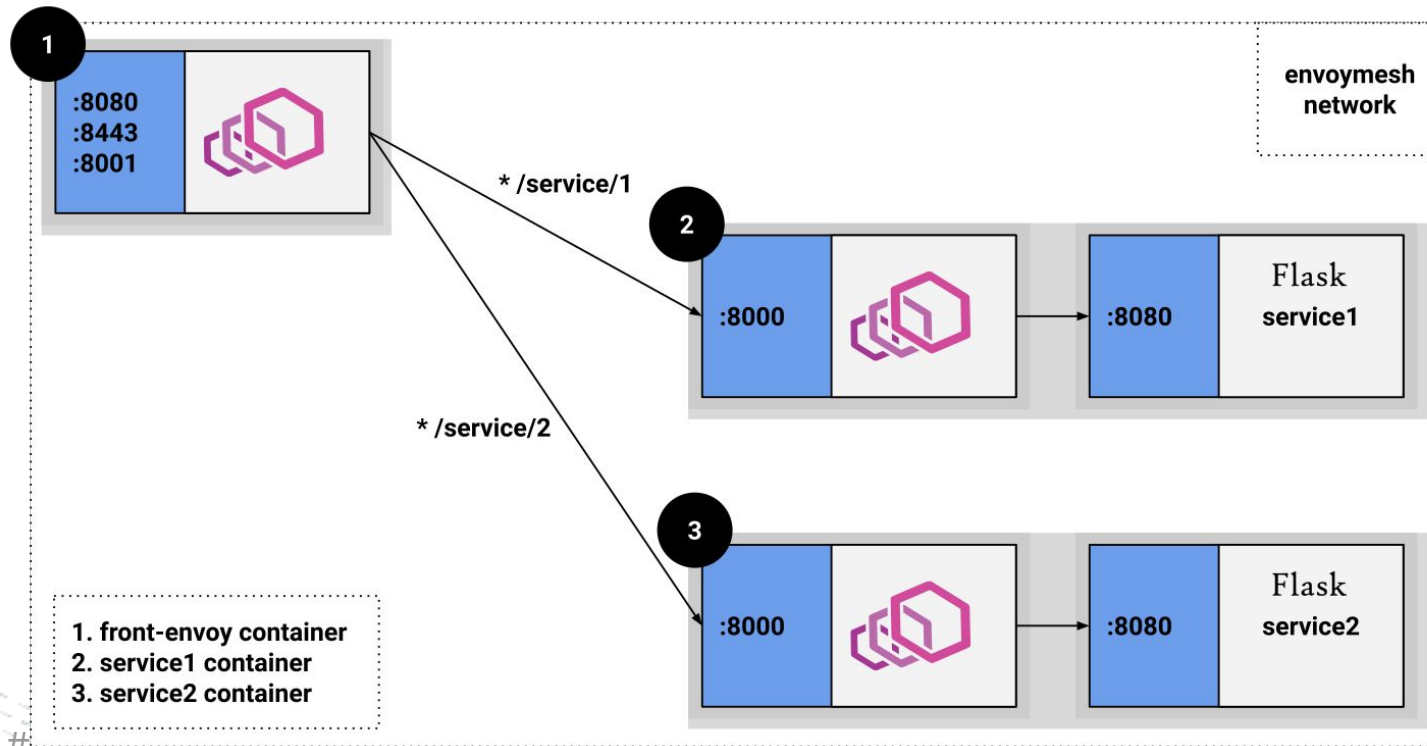


What SkyWalking Has for Istio?

- **Metrics**
 - Data Panel
 - Control Panel
 - Topology
 - Alarm
- **Tracing**
 - Native Tracer
- **Logs**
 - Access Log



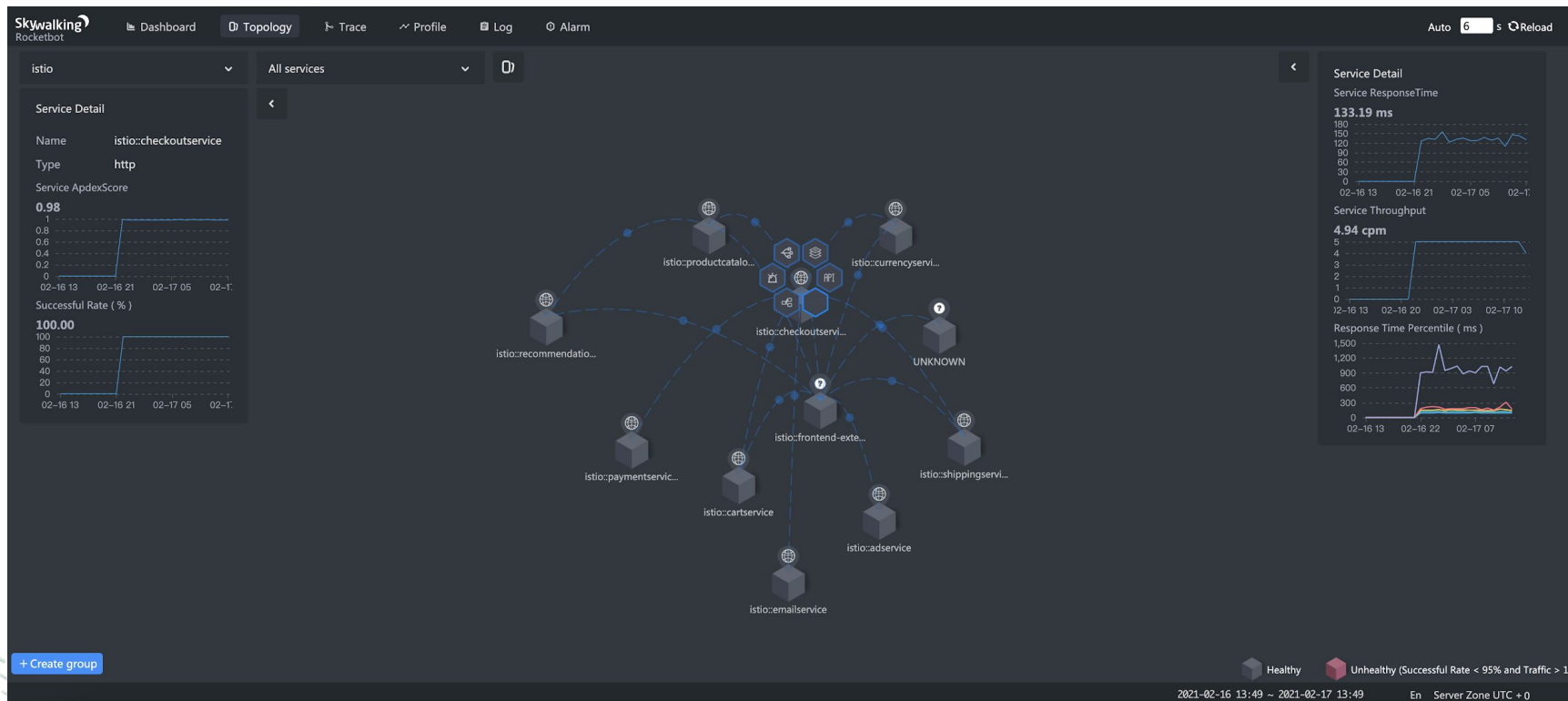
Typical Mesh Deployment



#istiocon

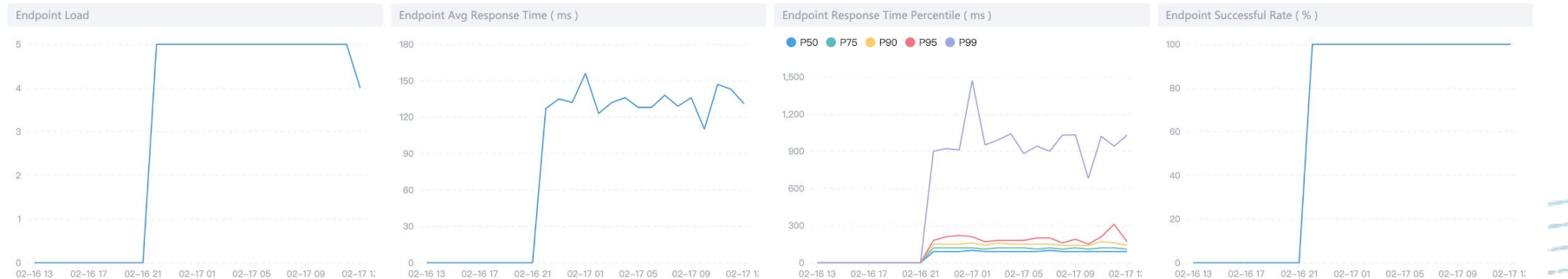
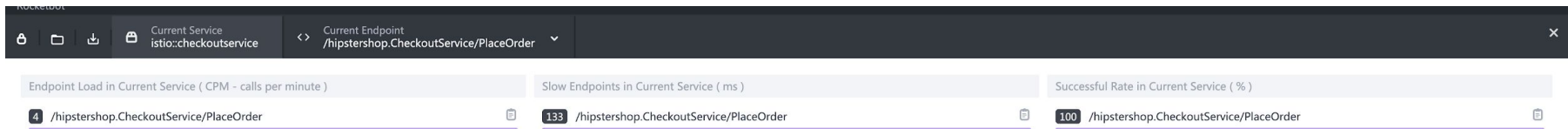


Visualize the Whole Mesh



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URI Level Metrics



ALS Solution - Level 1

Understand ALS in k8s

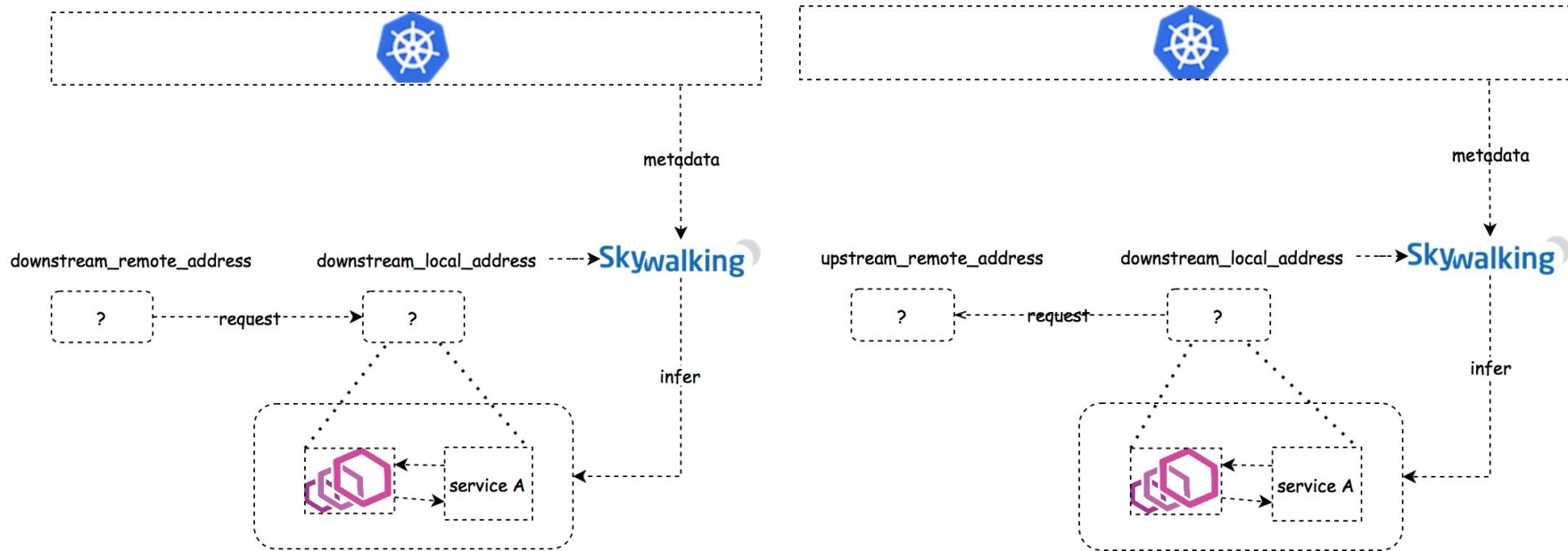


Keys of Access Log Service

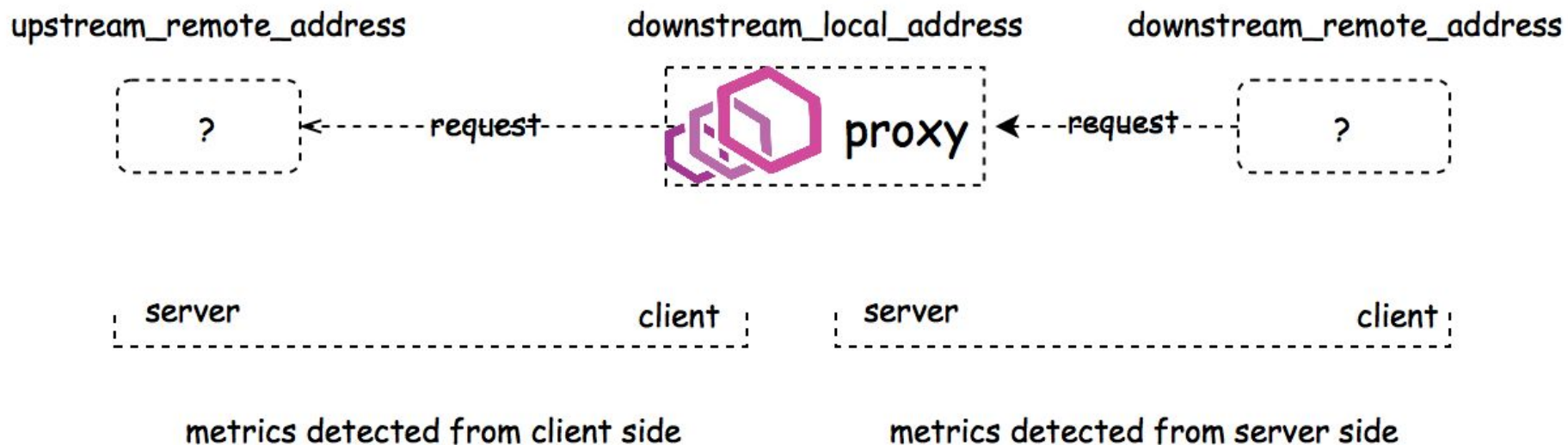
- `downstream_direct_remote_address` : This field is the downstream direct remote address on which the request from the user was received. Note: This is always the physical peer, even if the remote address is inferred from for example the `x-forwarded-for` header, proxy protocol, etc.
- `downstream_remote_address` : The remote/origin address on which the request from the user was received.
- `downstream_local_address` : The local/destination address on which the request from the user was received.
- `upstream_remote_address` : The upstream remote/destination address that handles this exchange.
- `upstream_local_address` : The upstream local/origin address that handles this exchange.
- `upstream_cluster` : The upstream cluster that `upstream_remote_address` belongs to.



Envoy Sidecar



Gateway - Ingress

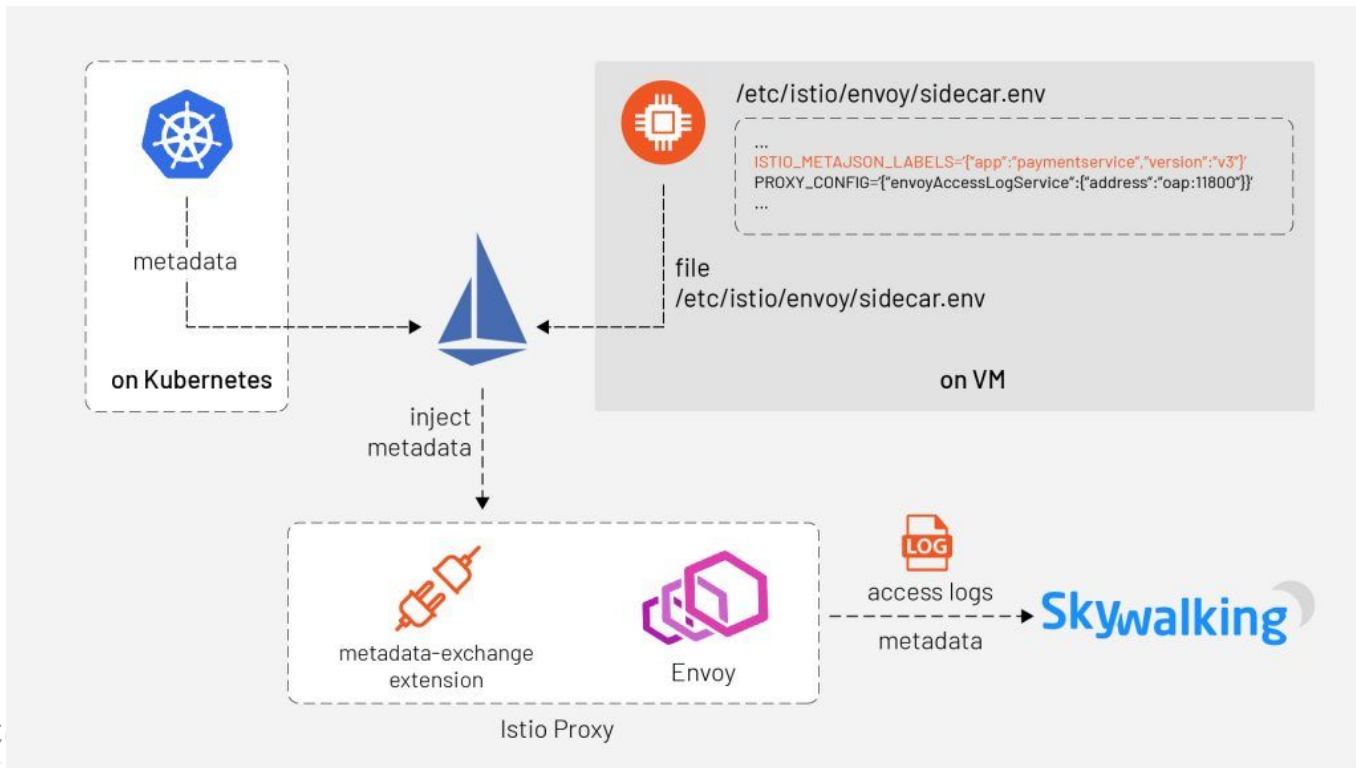


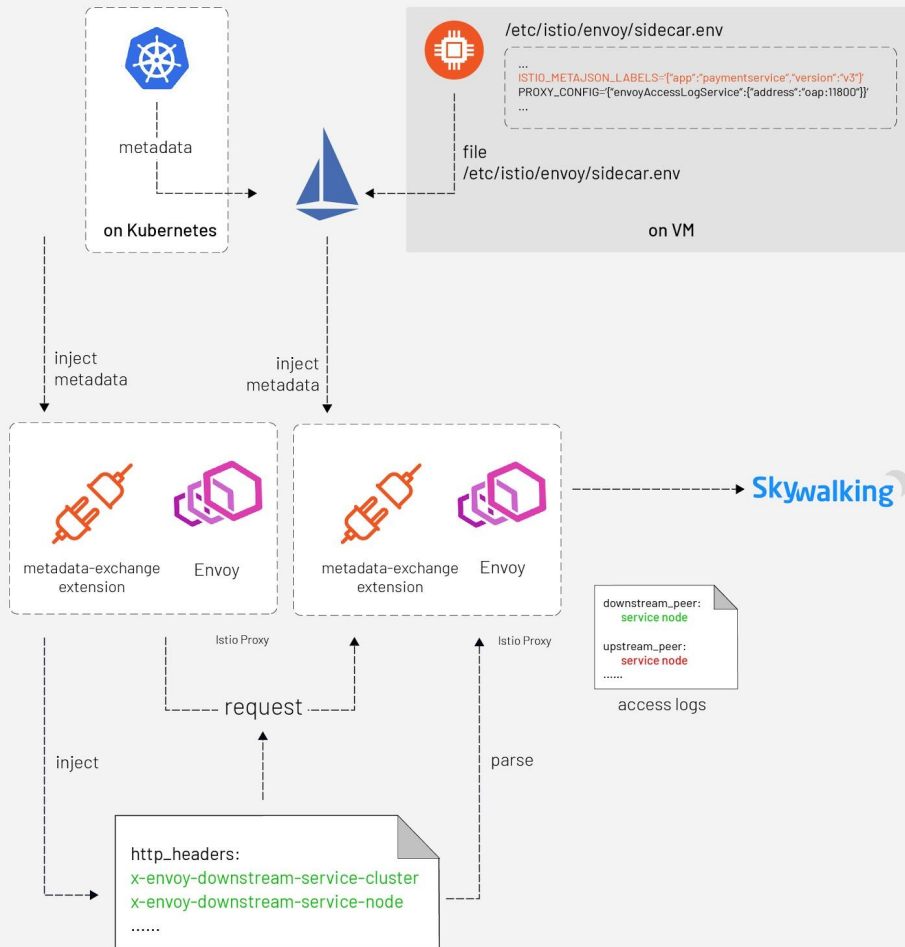
ALS Solution - Level 2

How ALS works on VM



Envoy WASM - Matadata Exchange

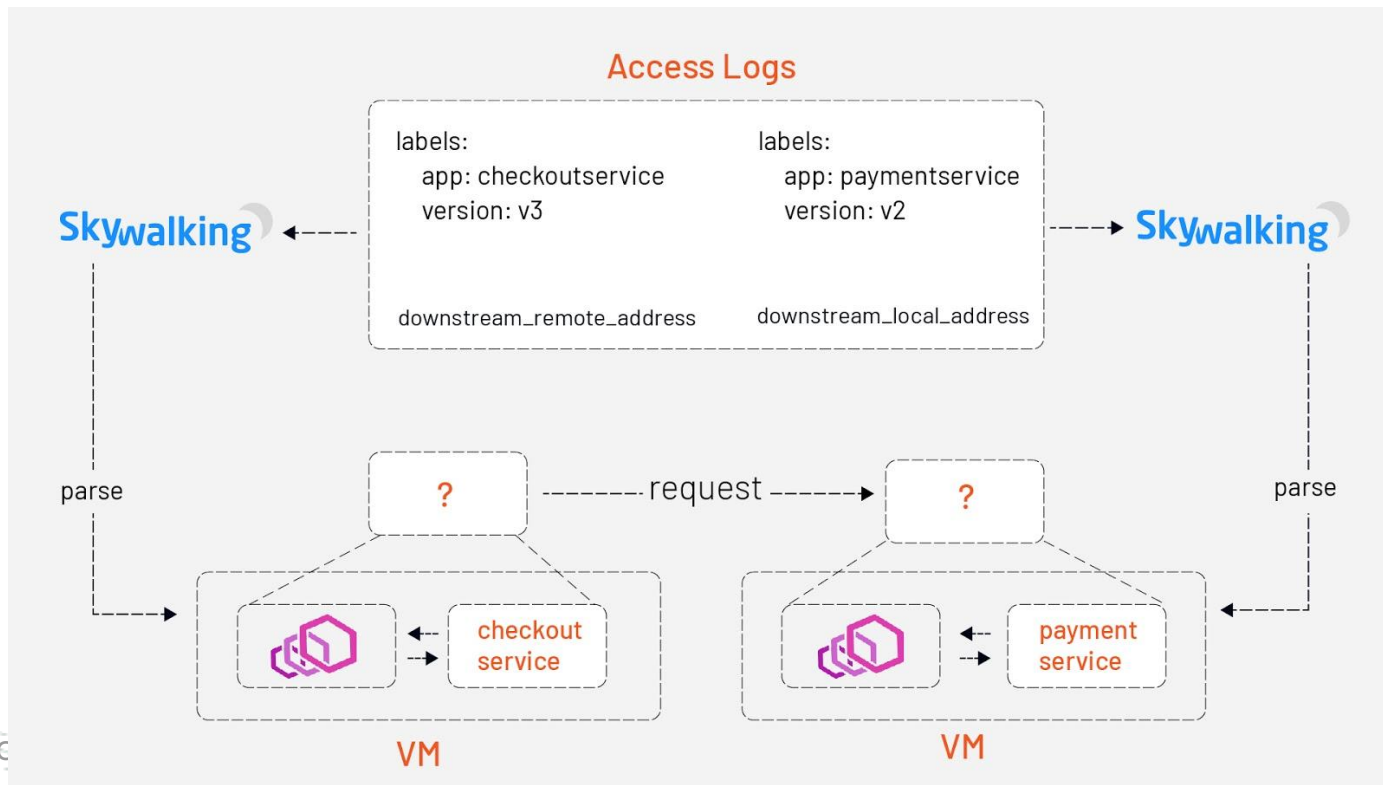




a plugin of istio-proxy named metadata-exchange injects the metadata into the HTTP headers (with a prefix like `x-envoy-downstream-`)



Use Metadata To Build Topology

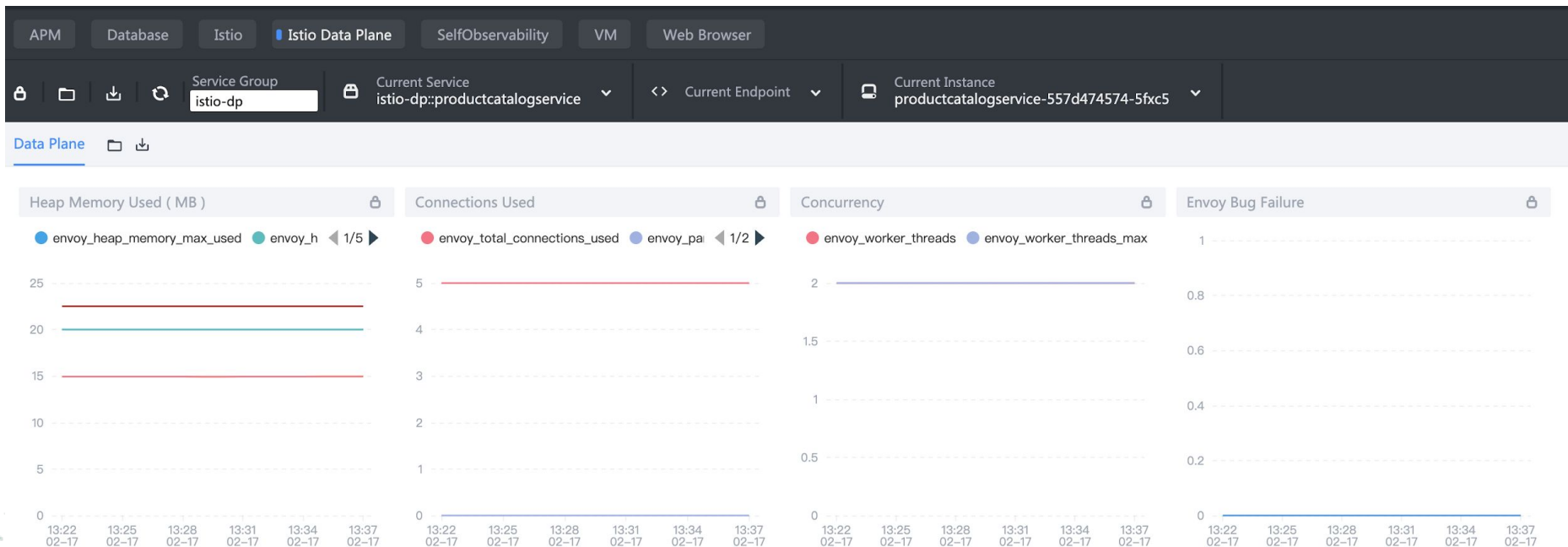


Data Panel

Envoy Metrics Service & Tracing



Envoy Load and Internal Failure



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Envoy Native SkyWalking tracer

```
filter_chains:  
- filters:  
  - name: envoy.filters.network.http_connection_manager  
    typed_config:  
      "@type": type.googleapis.com/envoy.extensions.filters.network.http_connection_manager.v3.HttpConnectionManager  
      generate_request_id: true  
      tracing:  
        provider:  
          name: envoy.tracers.skywalking  
          typed_config:  
            "@type": type.googleapis.com/envoy.config.trace.v3.SkyWalkingConfig  
            grpc_service:  
              envoy_grpc:  
                cluster_name: skywalking  
                timeout: 0.250s  
            client_config:  
              service_name: front-envoy  
              instance_name: front-envoy-1  
          →  
        - name: skywalking  
          connect_timeout: 1s  
          type: strict_dns  
          lb_policy: round_robin  
          http2_protocol_options: {}  
          load_assignment:  
            cluster_name: skywalking  
            endpoints:  
              - lb_endpoints:  
                  - endpoint:  
                      address:  
                        socket_address:  
                          address: skywalking-oap  
                          port_value: 11800
```



C++ Native Tracer Library

Basic usage

Config

cpp2sky provides simple configuration for tracer. The detail information is described in [official protobuf definition](#).

```
#include <cpp2sky/config.pb.h>

int main() {
    using namespace cpp2sky;

    static const std::string service_name = "service_name";
    static const std::string instance_name = "instance_name";
    static const std::string oap_addr = "oap:12800";
    static const std::string token = "token";

    TracerConfig tracer_config;

    config.set_instance_name(instance_name);
    config.set_service_name(service_name);
    config.set_address(oap_addr);
    config.set_token(token);
}
```

<https://github.com/SkyAPM/cpp2sky>

Create tracer

After you constructed config, then setup tracer. Tracer supports gRPC reporter only, also TLS adopted gRPC reporter isn't available now. TLS adoption and REST tracer will be supported in the future.

```
TracerConfig tracer_config(oap_addr, token);
TracerPtr tracer = createInsecureGrpcTracer(tracer_config);
```

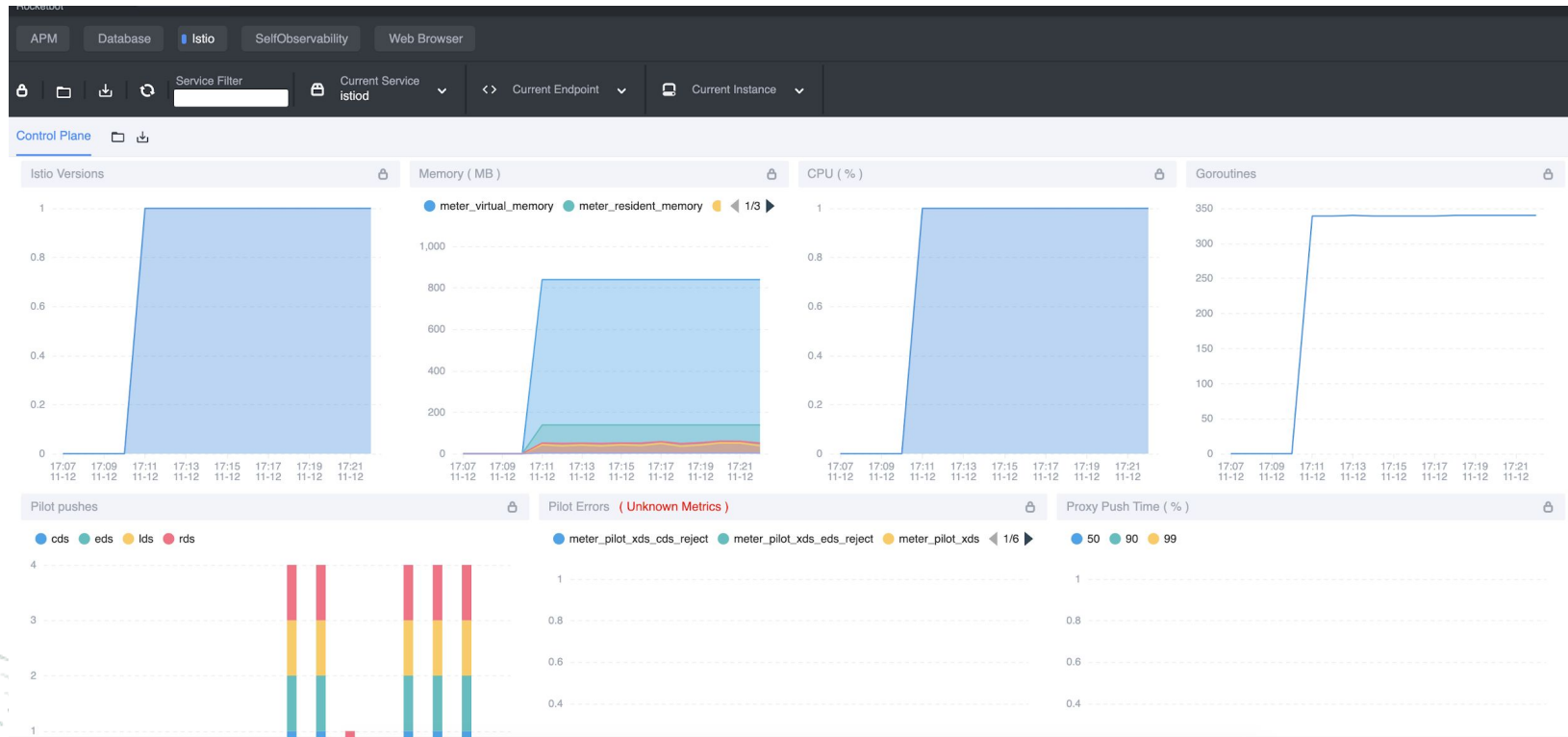


Istio Control Panel

Work with Prometheus and OpenTelemetry



Istio Load and xDS Push Status



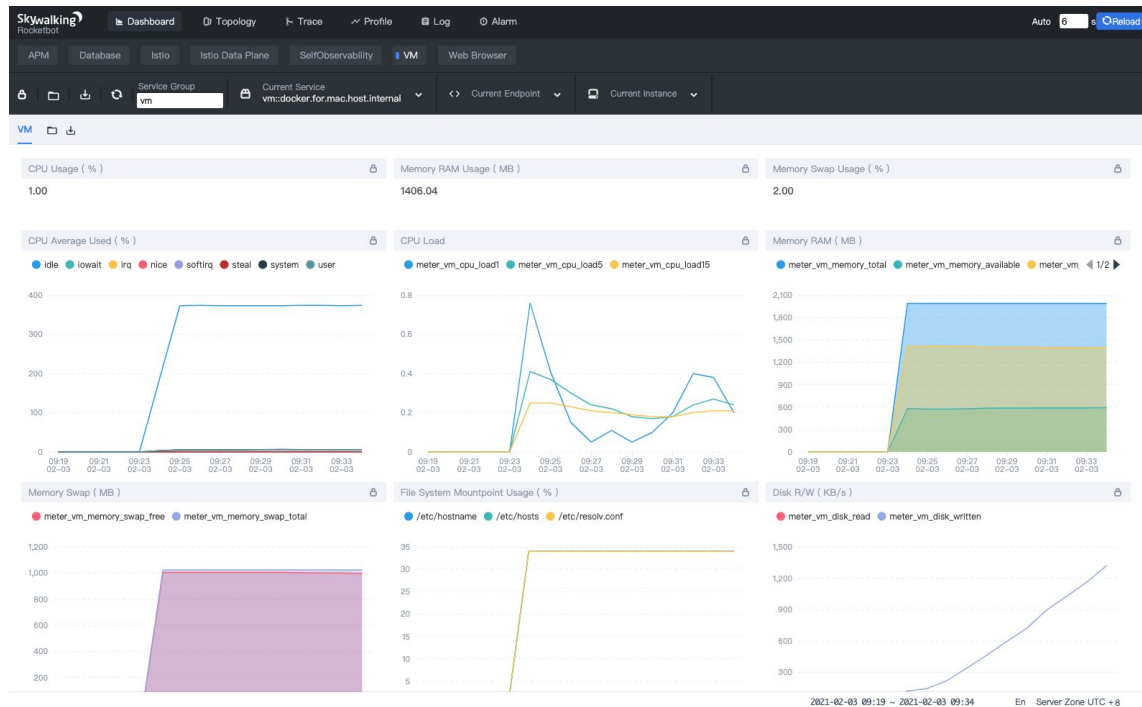
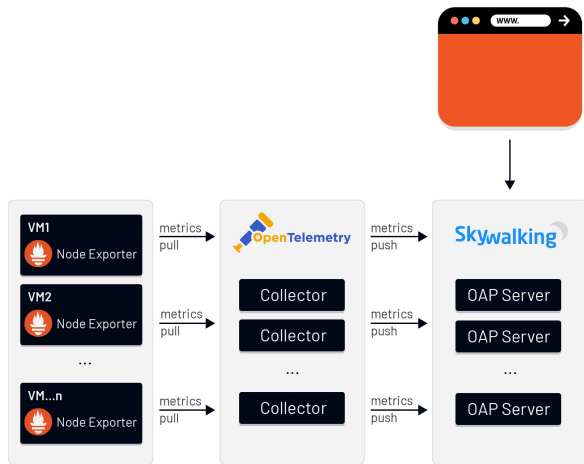
Infra Observability

VM nodes



Prometheus Node Exporter

Zabbix Agent



Logs And Incoming

Access Log Collection And Visualization



Log of Services



Dashboard
Topology
Trace
Profile
Log
Alarm

Log Detail

Current Service:

Current Instance:

Time:

Content Type:

Error:

Tags:

Content:

Your_ApplicationName

19830c3a7cbd42d19edc2548bd96c4eb@192.168.10.100

1928-01-03 09:09:07

TEXT

3cf9fe9e043c44638a7e5a188b09410.63.16118432566060001

level = ERROR

logger = org.apache.skywalking.e2e.controller.HealthController

thread = http-9090-exec-1

This is a test log

```

java.lang.Exception: Error Msg
at
    org.apache.skywalking.e2e.controller.HealthController.hello()HealthController.java:33
at
    java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke()NativeMethod
    java.base/jdk.internal.reflect.NativeMethodAccessorImpl.invoke()NativeMethodAccesso
    rImpl.java:62
at
    java.base/jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke()DelegatingMetho
    dAccessorImpl.java:43
at
    java.base/java.lang.reflect.Method.invoke(Method.java:566)
at
    org.springframework.web.method.support.InvocableHandlerMethod.doInvoke()Invocab
    leHandlerMethod.java:190
at
    org.springframework.web.method.support.InvocableHandlerMethod.invokeForRequest
    ()InvocableHandlerMethod.java:138
at
    org.springframework.web.servlet.mvc.method.annotation.ServletInvocableHandlerMet
    hod.invokeAndHandle(ServletInvocableHandlerMethod.java:106)
at
    org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandlerAd
    apter.invokeHandlerMethod(RequestMappingHandlerAdapter.java:879)
at
    org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandlerAd
    apter.handleInternal(RequestMappingHandlerAdapter.java:793)
at
    org.springframework.web.servlet.mvc.method.AbstractHandlerMethodAdapter.handle
    (AbstractHandlerMethodAdapter.java:87)
at
    org.springframework.web.servlet.DispatcherServlet.doDispatch(DispatcherServlet.ja
    va:1040)

```

Skywalking	Dashboard	Topology	Trace	Profile	Log	Alarm	Auto	Released
Log Category	Service All	Current Instance All	Current Endpoint	More Conditions	Search	Clear	1 / 14	
TraceID:	Keys Of Content:	Exclude Keys Of Content:						
Tags:	Please add a tag	Configuration Vocabulary page						
Current Service	Current Instance	Time	Content Type	Tags	Content	TraceID		
business-zone:projectC	119e78656d-4a-fbfcc128a700...	1614-01-31 04:03:04	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling http://www.baidu.com	cfd0c5de-5720-4d67-9634-0398f05e339		
business-zone:projectC	119e78656d-4a-fbfcc128a700...	1614-01-31 03:26:00	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectC(value)}	330ce89d-2039-4bc8-8c28-5cdabebcbca7		
business-zone:projectB	aee79464c5904dfcac204da56c8...	1614-01-30 20:54:04	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	select user test	94c0ec58-8f1e-408b-bdbf-bb74d86a303		
business-zone:projectA	332808dc3b-784b-d8e0832ca40e83...	1614-02-02 02:41:05	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectA(name)} service	59b32b3c-4763-4c84-a581-e69229086bd		
business-zone:projectB	aee79464c5904dfcac204da56c8...	1614-02-01 23:56:07	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	Save user test	01670744-5e38-4104-84dc-2fa88624a30e		
business-zone:projectA	aee79464c5904dfcac204da56c8...	1614-02-01 22:56:07	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectC(value)}	01670744-5e38-4104-84dc-2fa88624a30e		
business-zone:projectA	b9afaa471104f78bb61eccdf0ff...	1614-02-01 22:56:06	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectA(name)} service	01670744-5e38-4104-84dc-2fa88624a30e		
business-zone:projectC	119e78656d-4a-fbfcc128a700...	1614-02-01 05:34:02	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling http://www.baidu.com	220e1f5c-d460-4d80-9ed7-3fa1a12bd490		
business-zone:projectC	119e78656d-4a-fbfcc128a700...	1614-02-01 04:34:01	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectC(value)}	220e1f5c-d460-4d80-9ed7-3fa1a12bd490		
business-zone:projectB	aee79464c5904dfcac204da56c8...	1614-01-31 23:01:05	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	Save user test	f1eece3c-dbe7-4040-598b-becae8571281c1		
business-zone:projectA	332808dc3b-784b-d8e0832ca40e83...	1614-01-31 01:22:00	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectA(name)} service	002b7e0c-4f66-4861-40c4e477d8bf		
business-zone:projectB	aee79464c5904dfcac204da56c8...	1614-01-30 22:29:09	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	Save user test	4b2cfad6-dc99-4652-bccb-8bca3c5b594		
business-zone:projectB	aee79464c5904dfcac204da56c8...	1614-01-30 21:29:09	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectB(value)}	4b2cfad6-dc99-4652-bccb-8bca3c5b594		
business-zone:projectA	b9afaa471104f78bb61eccdf0ff...	1614-01-30 21:29:08	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectA(name)} service	4b2cfad6-dc99-4652-bccb-8bca3c5b594		
business-zone:projectC	119e78656d-4a-fbfcc128a700...	1614-01-30 03:10:05	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling http://www.baidu.com	b7338b46-3707-4d66-8c12-d0dbabb45a		
business-zone:projectC	119e78656d-4a-fbfcc128a700...	1614-01-30 02:10:04	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectC(value)}	b7338b46-3707-4d66-8c12-d0dbabb45a		
business-zone:projectB	aee79464c5904dfcac204da56c8...	1614-01-29 20:30:08	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	Save user test	28efcc8f-7f50-7b3c-9093-64fe50b6a34e		
business-zone:projectA	332808dc3b-784b-d8e0832ca40e83...	1614-02-01 02:31:08	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectA(name)} service	cb0c6255-2afc-4123-82d1-4b86c477f67d		
business-zone:projectB	aee79464c5904dfcac204da56c8...	1614-01-31 23:55:05	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	select user test	aae4269f-0211-4d4d-642a-64ab0880ac8		
business-zone:projectA	b9afaa471104f78bb61eccdf0ff...	1614-01-31 23:01:08	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectA(name)} service	aae4269f-0211-4d4d-642a-64ab0880ac8		
business-zone:projectA	aee79464c5904dfcac204da56c8...	1614-01-31 23:01:08	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectB(value)}	aae4269f-0211-4d4d-642a-64ab0880ac8		
business-zone:projectC	119e78656d-4a-fbfcc128a700...	1614-01-31 05:14:06	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling http://www.baidu.com	1332acd1-1-8fc-4162-9149-be5336116ba0		
business-zone:projectC	119e78656d-4a-fbfcc128a700...	1614-01-31 04:14:05	TEXT	level=DEBUG,Jogger-test,skywalking.springcloud.t...	calling {projectC(value)}	1332acd1-1-8fc-4162-9149-be5336116ba0		



Thank you!

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<https://skywalking.apache.org/>

#IstioCon

