



# Azure Spring Cloud on Learn TV

Azure Spring Cloud - fully managed service  
for Spring Boot apps

Asir Selvasingh  
Principal PM Architect -- Java on Azure  
[@asirselvasingh](#)

---

# Agenda

---

Intro Azure Spring Cloud

Demo

How to get started?

# Session Objectives

Azure Spring Cloud abstracts away the complexity of infrastructure management and Spring Cloud middleware management, so you can focus on building your business logic and let Azure take care of dynamic scaling, patches, security, compliance, and high availability. With a few steps, you can provision Azure Spring Cloud, create apps, deploy, and scale Spring Boot apps and start monitoring in minutes. Learn more about Azure Spring Cloud in this overview session and see how easy it is to get started today.

# Asir Selvasingh

Principal PM Architect

Java on Microsoft Azure

On-point for everything developers need to build, migrate and scale Java applications on Azure.

Started software engineering career in the early days of Java, in 1995, and built enterprise products, applications and open source projects.



# Spring – trusted and growing



**75%**

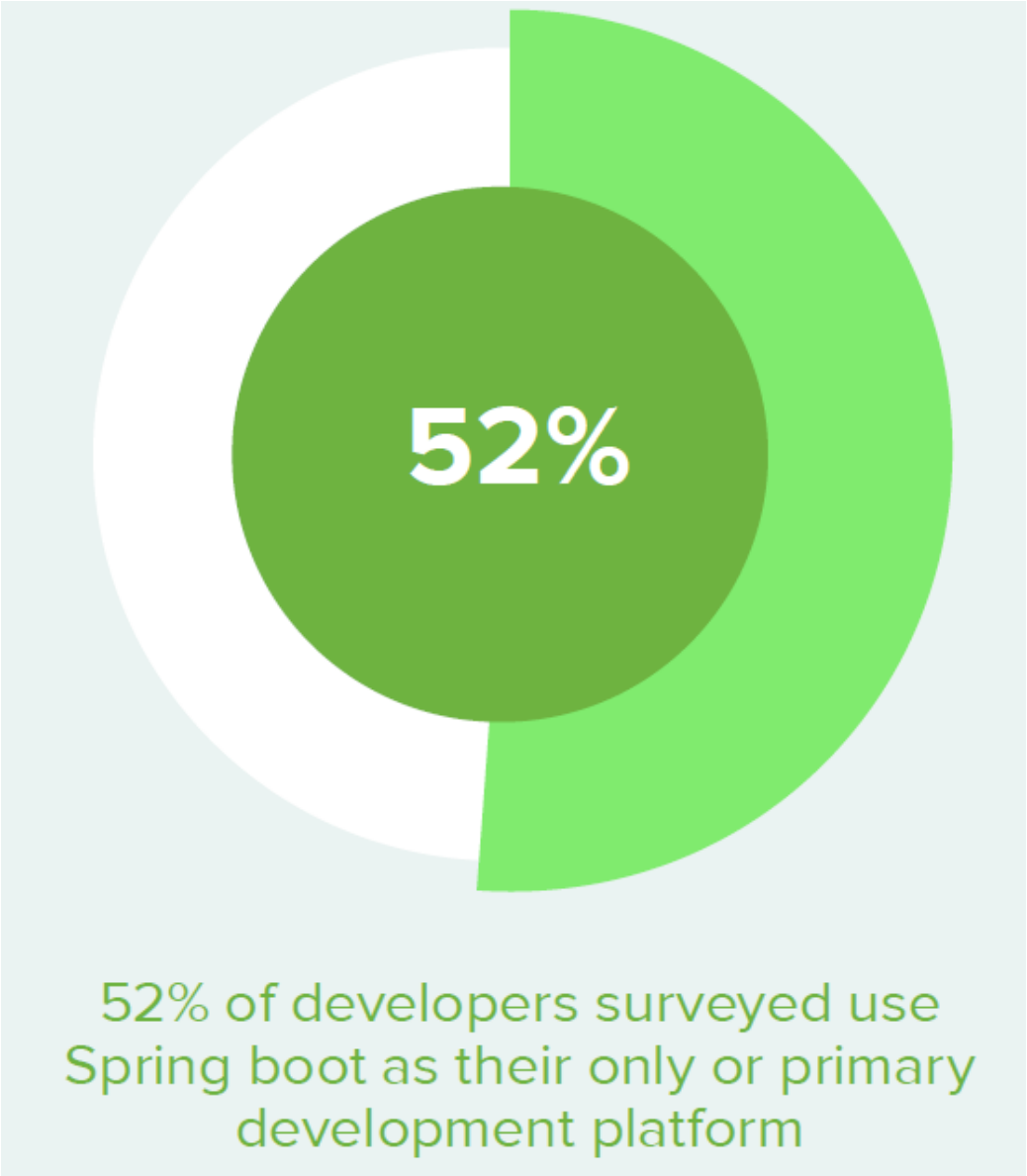
of respondents expect  
Spring Boot usage  
to grow over the next  
2 years



**82%**

of respondents say Spring  
Boot is growing because  
of new project starts

Nov 2018	Nov 2019
52.5 Million+ Spring Boot downloads per month	95 Million+ Spring Boot downloads per month

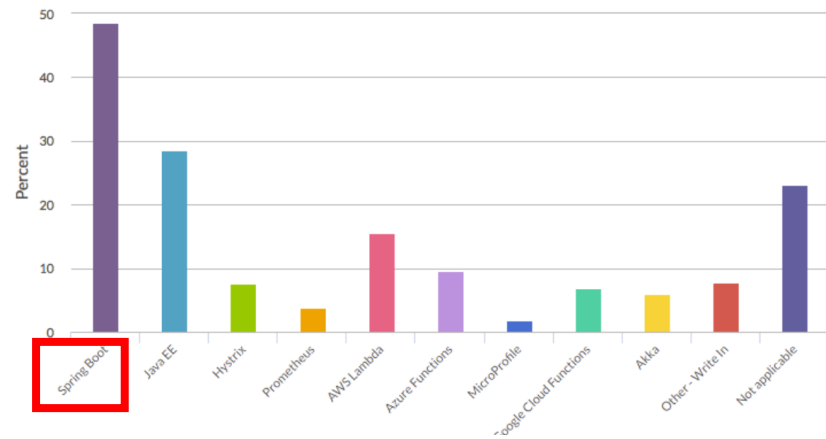


**52%**

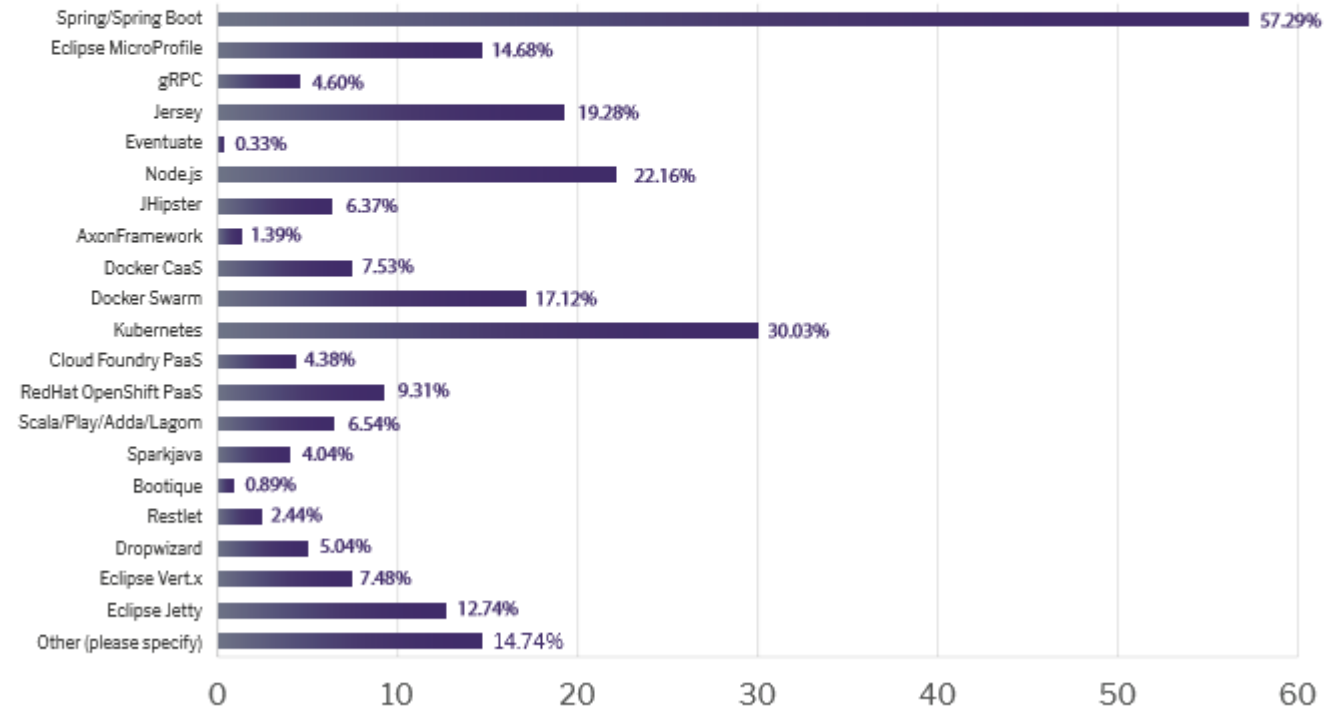
52% of developers surveyed use  
Spring boot as their only or primary  
development platform

# Why Spring and Spring Cloud Apps

11. What frameworks or tools do you use to build microservices?

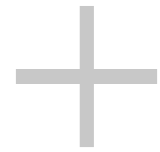


IF YOU ARE BUILDING MICROSERVICES, WHAT FRAMEWORKS ARE YOU EMPLOYING? SELECT ALL THAT APPLY.



“The Spring and Spring/Boot frameworks (57%) dominate today when it comes to building microservices ” – Jakarta EE Developer Survey

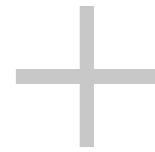
Jakarta EE Developer Survey



Pivotal®



Microsoft



vmware®



# The world's leading brands run on Azure



Azure



# Spring on Azure

[cloud.spring.io/spring-cloud-azure/](https://cloud.spring.io/spring-cloud-azure/)



## Spring Cloud

**App Configuration**

**Event Hubs**

**Service Bus**

**Storage**

**Redis**

**Functions**



## R2DBC

**SQL Database**

**PostgreSQL**

**MySQL**



## Spring Data

**SQL Database**

**MySQL**

**PostgreSQL**

**Maria DB**

**Cosmos DB**

- SQL
- MongoDB
- Cassandra
- Gremlin



## Spring Security

**Active Directory (AAD)**

**AAD B2C**



## Spring Cache

**Redis Cache**



## Spring Resource

**Storage**



## Spring Messaging

**Service Bus**



## Micrometer

**Monitor (includes  
Log Analytics)**

# Spring-based Microservices

---

## Spring Boot

Build anything

designed to get you  
up and running as  
quickly as possible,  
with minimal upfront  
configuration of  
Spring

---

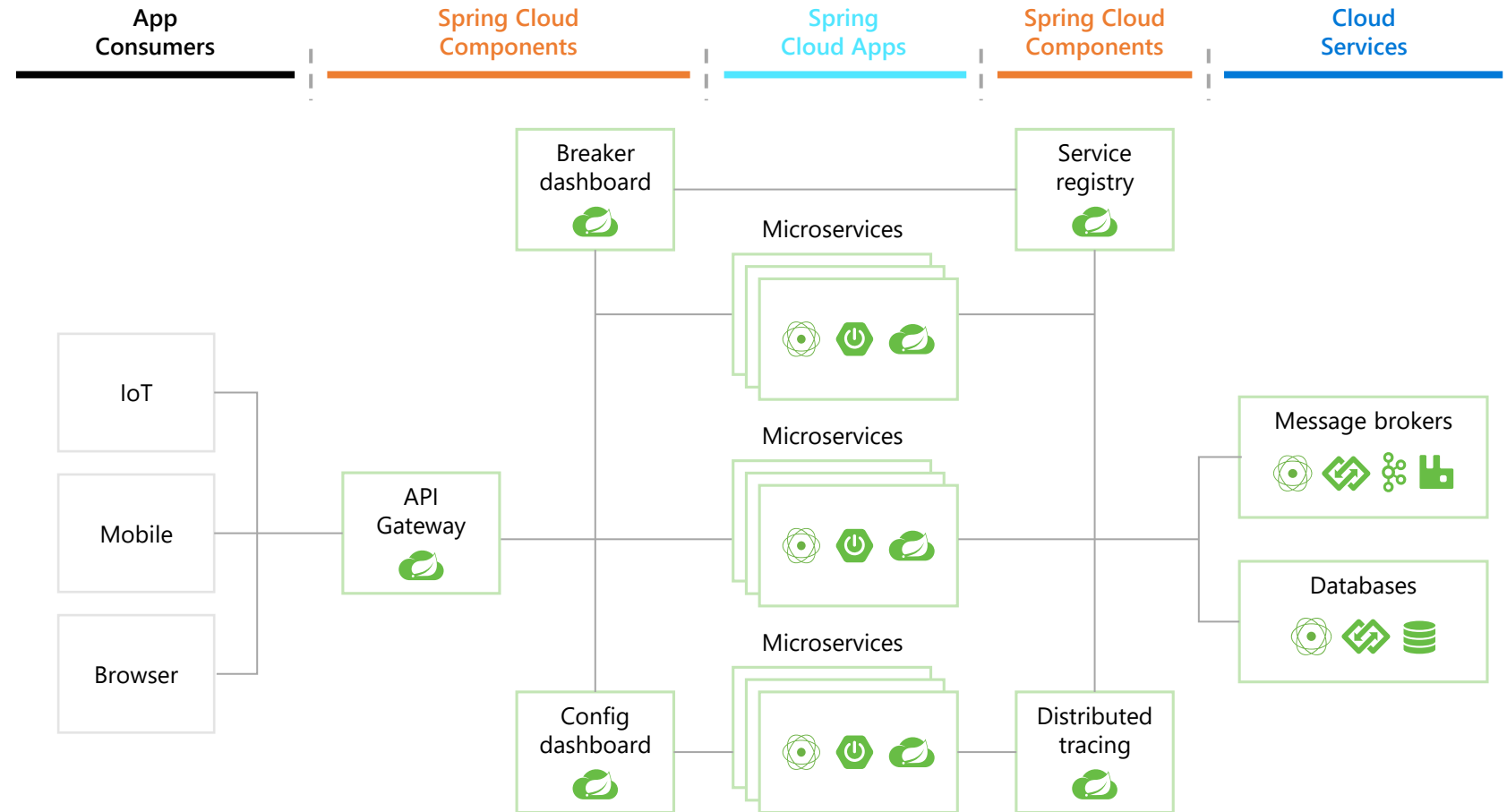
## Spring Cloud

Coordinate anything

provides a set of  
tools that makes  
communication  
between  
microservices  
easier

---

# Spring-based Microservices

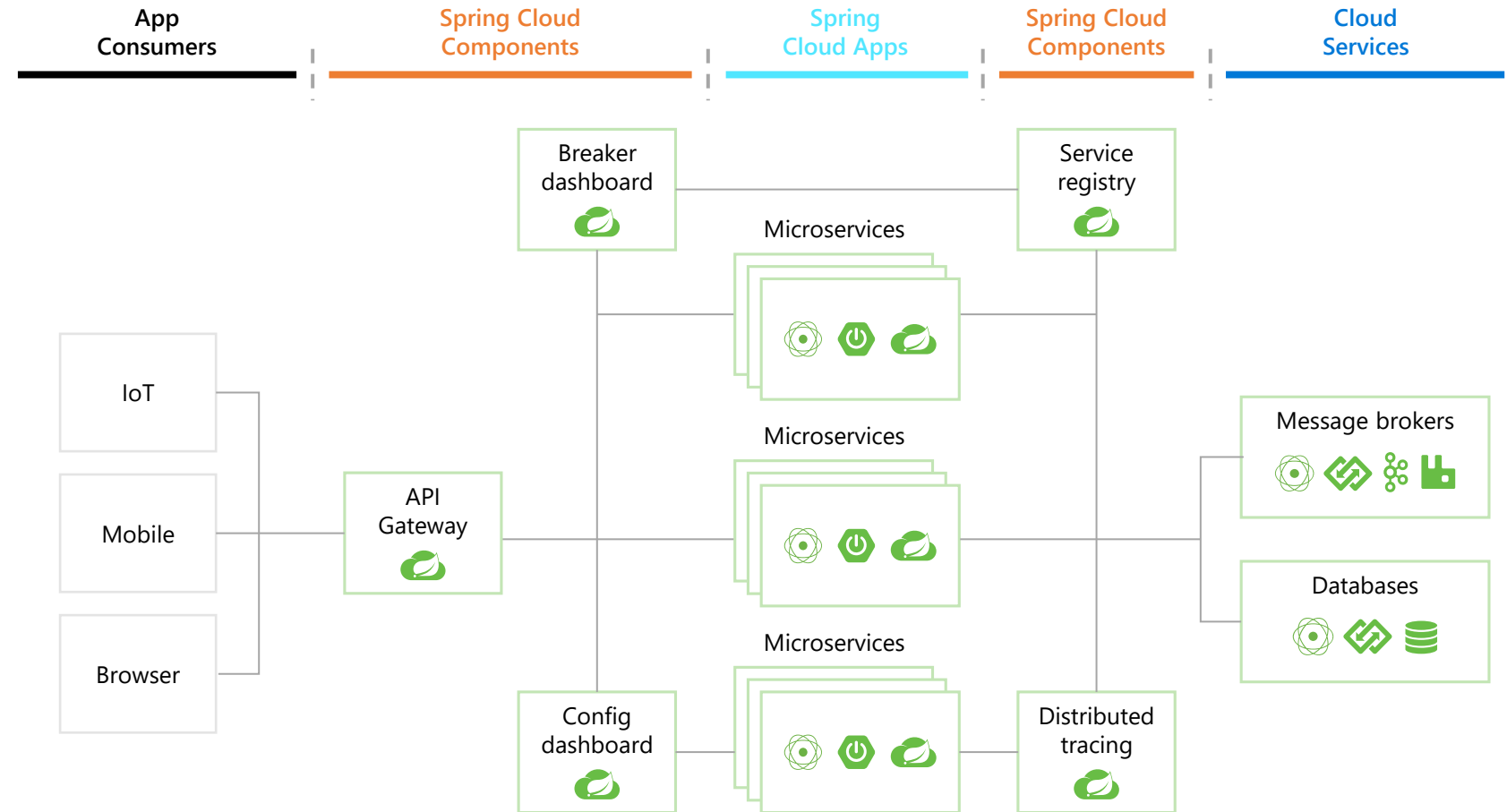


# Common Impediments

High effort required to manage cloud infrastructure for Spring boot applications

Application lifecycle is difficult to manage

Painful to troubleshoot application issues



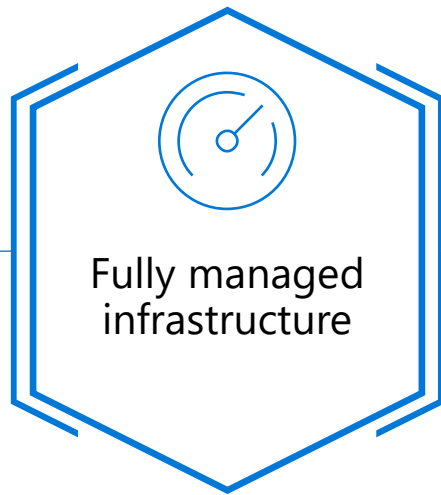
Azure Spring  
Cloud



# Azure Spring Cloud

A fully managed service for Spring Boot microservices

More choices and full integration into Azure's ecosystem and services



Enterprise ready

# Azure Spring Cloud

**Jointly developed,  
operated, and supported**



**Managed service**



Tanzu Build Service

**Zero code changes**



**Out-of-the-box  
monitoring and tracing**



New Relic.





# Demo – Azure Spring Cloud



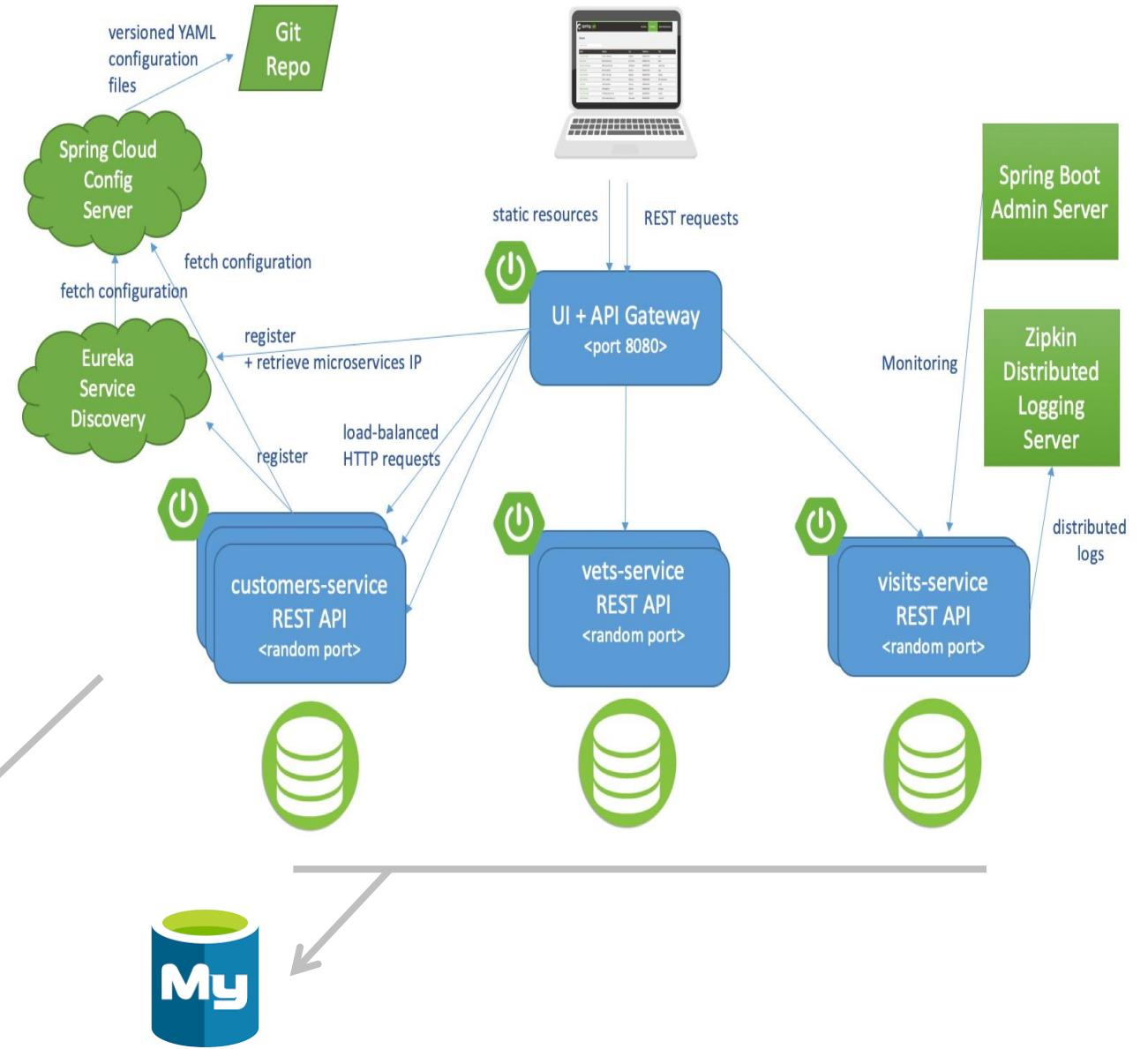
# Demo

Deploy Spring Cloud apps  
to Azure without worrying about:

Infrastructure and scaling

Spring Cloud middleware – config, registry,  
tracing and gateway, or

Monitoring



# Deploy and Visualize

Microsoft Azure (Preview) Search resources, services, and docs (G+)

Home > petclinic-microservices | Apps Azure Spring Cloud Directory: Microsoft

Search (Cmd+/) << + Create App Refresh

Filter by app name

5 items

Name	Provisioning State	Running Instance	Registered Instance	Persistent Storage
<a href="#">admin-server</a>	Succeeded	1/1	1/1	Enabled
<a href="#">api-gateway</a>	Succeeded	2/2	1/2	Enabled
<a href="#">customers-service</a>	Succeeded	3/3	3/3	Enabled
<a href="#">vets-service</a>	Succeeded	2/2	2/2	Enabled
<a href="#">visits-service</a>	Succeeded	2/2	2/2	Enabled

Automation

- Export template
- Resource explorer

Settings

- Apps
- Config Server

petclinic-microservices | Diagn

ms.portal.azure.com/#@72f988bf-86f1-41af-91ab-2d7cd011db47/resource/subscrip...

Microsoft Azure (Preview) Search resources, services, and docs (G+)

asirveda@microsoft.com MICROSOFT

Home > petclinic-microservices > spring-microservices >

# petclinic-microservices | Diagnostic settings

Azure Spring Cloud | Directory: Microsoft

Search (Cmd+/) Refresh Provide feedback

Overview  
Activity log  
Access control (IAM)  
Tags  
Diagnose and solve problems

Settings  
Apps  
Config Server  
Deployments  
TLS/SSL settings  
Test endpoint keys  
Properties

Diagnostic settings are used to configure streaming export of platform logs and metrics for a resource to the destination of your choice. You may create up to five different diagnostic settings to send different logs and metrics to independent destinations. [Learn more about diagnostics settings](#)

Diagnostics settings

Name	Storage account	Event hub	Log Analytics workspace	Edit setting
send-logs-and-metrics-to-l...	-	-	petclinic-microservices	<a href="#">Edit setting</a>

[+ Add diagnostic setting](#)

Click 'Add Diagnostic setting' above to configure the collection of the following data:

- ApplicationConsole
- SystemLogs
- Performance
- Request
- Error
- Session

Setup Diagnostics

Logs - Microsoft Azure

ms.portal.azure.com/#blade/Microsoft\_Azure\_Monitoring\_Logs/LogsBlade/resourceId/%2Fsubscriptions%2F685ba005-af8d-4b04-8f16-a7bf38b2eb...

Microsoft Azure (Preview)

Search resources, services, and docs (G+)

Home > petclinic-microservices > spring-microservices > petclinic-microservices >

Logs

petclinic-microservices

api-gateway... customers-s...

Example queries Query explorer

petclinic-microservices Select scope Run Time range : Last 4 hours Save Copy link New alert rule Export Pin to dashboard Format query

```
where AppName == "api-gateway"
limit 500
order by TimeGenerated asc
project TimeGenerated, Log
```

Results Chart Columns Display time (UTC+00:00) Group columns

Completed. Showing results from the last 4 hours. 00:00:00.416 500 records

TimeGenerated [UTC]	Log
5/31/2020, 9:38:53.389 PM	2020-05-31 21:38:53.389 INFO [api-gateway,...] 1 --- [trap-executor-0] c.n.d.s.r.aws.ConfigClusterResolver : Resolving eureka endpoints via configuration
5/31/2020, 9:37:12.207 PM	2020-05-31 21:37:12.207 INFO [api-gateway,d38121536066a207,b073b51762fcc282,false] 1 --- [ndedElastic-168] c.c.c.ConfigServicePropertySourceLocator : Located environment: name=api-gateway, profiles=[mysql], label=null, version=f2720d311330e0...
5/31/2020, 9:37:12.118 PM	2020-05-31 21:37:12.117 INFO [api-gateway,d38121536066a207,b073b51762fcc282,false] 1 --- [ndedElastic-168] c.c.c.ConfigServicePropertySourceLocator : Fetching config from server at : https://petclinic-microservices.svc.azuremicroservices.io/config
5/31/2020, 9:37:01.479 PM	2020-05-31 21:37:01.478 ERROR [api-gateway,2653af9cab791070,2653af9cab791070,true] 1 --- [or-http-epoll-1] o.s.w.s.adapter.HttpWebHandlerAdapter : [da7ecc8f] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedChann...
5/31/2020, 9:36:01.390 PM	2020-05-31 21:36:01.389 ERROR [api-gateway,ffb3639eeff6735,ffb3639eeff6735,true] 1 --- [or-http-epoll-4] o.s.w.s.adapter.HttpWebHandlerAdapter : [f0fff757] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedChannelExc...
5/31/2020, 9:36:01.389 PM	2020-05-31 21:36:01.389 ERROR [api-gateway,478a110e942a9b5b,478a110e942a9b5b,true] 1 --- [or-http-epoll-4] o.s.w.s.adapter.HttpWebHandlerAdapter : [d117d503] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedCha...
5/31/2020, 9:34:01.285 PM	2020-05-31 21:34:01.284 ERROR [api-gateway,6f2c6d3f6bfa4154,6f2c6d3f6bfa4154,true] 1 --- [or-http-epoll-4] o.s.w.s.adapter.HttpWebHandlerAdapter : [03cf88ab] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedChannel...
5/31/2020, 9:34:01.283 PM	2020-05-31 21:34:01.283 ERROR [api-gateway,99dbe0bd91d2da78,99dbe0bd91d2da78,true] 1 --- [or-http-epoll-4] o.s.w.s.adapter.HttpWebHandlerAdapter : [3a6fca3d] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedChan...
5/31/2020, 9:33:53.389 PM	2020-05-31 21:33:53.388 INFO [api-gateway,...] 1 --- [trap-executor-0] c.n.d.s.r.aws.ConfigClusterResolver : Resolving eureka endpoints via configuration
5/31/2020, 9:32:12.224 PM	2020-05-31 21:32:12.224 INFO [api-gateway,963188963ecc59a3,9201a37c70f5a4e7,false] 1 --- [ndedElastic-165] c.c.c.ConfigServicePropertySourceLocator : Located environment: name=api-gateway, profiles=[mysql], label=null, version=f2720d311330e08...
5/31/2020, 9:32:12.071 PM	2020-05-31 21:32:12.070 INFO [api-gateway,963188963ecc59a3,9201a37c70f5a4e7,false] 1 --- [ndedElastic-165] c.c.c.ConfigServicePropertySourceLocator : Fetching config from server at : https://petclinic-microservices.svc.azuremicroservices.io/config
5/31/2020, 9:32:01.998 PM	2020-05-31 21:32:01.998 WARN [api-gateway,...] 1 --- [or-http-epoll-3] reactor.netty.channel.FluxReceive : [id: 0x2d6fa179, L:/10.242.0.100:1025 - R:/10.242.0.47:57690] An exception has been observed post termination, use DEBUG level to see the full sta...
5/31/2020, 9:28:53.386 PM	2020-05-31 21:28:53.386 INFO [api-gateway,...] 1 --- [trap-executor-0] c.n.d.s.r.aws.ConfigClusterResolver : Resolving eureka endpoints via configuration
5/31/2020, 9:25:01.889 PM	2020-05-31 21:25:01.889 ERROR [api-gateway,f55868fdbc74871,f55868fdbc74871,true] 1 --- [or-http-epoll-1] o.s.w.s.adapter.HttpWebHandlerAdapter : [46da45d1] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedChann...
5/31/2020, 9:25:01.888 PM	2020-05-31 21:25:01.888 ERROR [api-gateway,2f9ff4b9be9a606b,2f9ff4b9be9a606b,true] 1 --- [or-http-epoll-1] o.s.w.s.adapter.HttpWebHandlerAdapter : [6fb53899] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedChannel...
5/31/2020, 9:25:01.888 PM	2020-05-31 21:25:01.888 ERROR [api-gateway,4b9d7452edded088,4b9d7452edded088,true] 1 --- [or-http-epoll-1] o.s.w.s.adapter.HttpWebHandlerAdapter : [85b8190c] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedCha...
5/31/2020, 9:25:01.885 PM	2020-05-31 21:25:01.884 ERROR [api-gateway,d38f5e99339e026e,d38f5e99339e026e,true] 1 --- [or-http-epoll-2] o.s.w.s.adapter.HttpWebHandlerAdapter : [646dbee8] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedChan...
5/31/2020, 9:24:02.105 PM	2020-05-31 21:24:02.104 ERROR [api-gateway,ba6da084b5cd6f64,ba6da084b5cd6f64,true] 1 --- [or-http-epoll-3] o.s.w.s.adapter.HttpWebHandlerAdapter : [84b63c94] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedChan...
5/31/2020, 9:24:02.104 PM	2020-05-31 21:24:02.104 ERROR [api-gateway,0febcb1b51919cf68,0febcb1b51919cf68,true] 1 --- [or-http-epoll-3] o.s.w.s.adapter.HttpWebHandlerAdapter : [649cabea] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedChanne...
5/31/2020, 9:24:02.096 PM	2020-05-31 21:24:02.096 ERROR [api-gateway,73971f787989654f,73971f787989654f,true] 1 --- [or-http-epoll-3] o.s.w.s.adapter.HttpWebHandlerAdapter : [93c89adf] Error [reactor.netty.ReactorNetty\$InternalNettyException: java.nio.channels.ClosedChanne...

Schema and Filter

Page 1 of 10 50 items per page 1 - 50 of 500 items

Troubleshoot



```
~ — selvasingh@tomcat-vm-01: /tmp — python • az spring-cloud app logs -f -n api-gateway — 157x54
~ — selvasingh@tomcat-vm-01: /tmp — python • az spring-cloud app logs -f -n api-gateway bash
bash-3.2$ pwd
/Users/selvasingh/GitHub/selvasingh/spring-netclinic-microservices
bash-3.2$ az spring-cloud app logs -f -n api-gateway
Command group 'spring-cloud' is in preview and may be changed/removed in a future release.
2020-05-31 21:04:01.496 ERROR [api-gateway,6eb42fd493543e,6eb42fd493543e,true] 1 --- [or-http-epoll-3] o.s.w.s.adapter.HttpWebHandlerAdapter : [2bf6543d] Error [reactor.netty.ReactorNetty$InternalNettyException: java.nio.channels.ClosedChannelException] for HTTP POST "/api/customer/owners/", but ServerHttp Response already committed (201 CREATED)
2020-05-31 21:04:01.576 ERROR [api-gateway,e0fd0cd20c178198,e0fd0cd20c178198,true] 1 --- [or-http-epoll-2] o.s.w.s.adapter.HttpWebHandlerAdapter : [0987fde2] Error [reactor.netty.ReactorNetty$InternalNettyException: java.nio.channels.ClosedChannelException] for HTTP POST "/api/customer/owners/", but ServerHttp Response already committed (201 CREATED)
2020-05-31 21:04:01.592 ERROR [api-gateway,690be9a657730431,690be9a657730431,true] 1 --- [or-http-epoll-3] o.s.w.s.adapter.HttpWebHandlerAdapter : [9766edd8] Error [reactor.netty.ReactorNetty$InternalNettyException: java.nio.channels.ClosedChannelException] for HTTP POST "/api/customer/owners/", but ServerHttp Response already committed (201 CREATED)
2020-05-31 21:04:01.596 WARN [api-gateway,...] 1 --- [or-http-epoll-2] r.netty.http.client.HttpClientConnect : [id: 0x03e71b39, L:/10.242.0.100:37502 ! R: customers-service/10.0.182.24:80] The connection observed an error
reactor.netty.http.client.PrematureCloseException: Connection prematurely closed BEFORE response

2020-05-31 21:04:01.597 ERROR [api-gateway,f5e3c6c5b1465ecd,f5e3c6c5b1465ecd,true] 1 --- [or-http-epoll-2] a.w.r.e.AbstractErrorWebExceptionHandler : [a7cdf58f] 500 Server Error for HTTP GET "/api/customer/petTypes"

reactor.netty.http.client.PrematureCloseException: Connection prematurely closed BEFORE response
Suppressed: reactor.core.publisher.FluxOnAssembly$OnAssemblyException:
Error has been observed at the following site(s):
|_ checkpoint ? org.springframework.cloud.gateway.filter.WeightCalculatorWebFilter [DefaultWebFilterChain]
|_ checkpoint ? org.springframework.cloud.sleuth.instrument.web.TraceWebFilter [DefaultWebFilterChain]
|_ checkpoint ? org.springframework.boot.actuate.metrics.web.reactive.server.MetricsWebFilter [DefaultWebFilterChain]
|_ checkpoint ? HTTP GET "/api/customer/petTypes" [ExceptionHandlerWebHandler]
Stack trace:

2020-05-31 21:04:01.597 WARN [api-gateway,...] 1 --- [or-http-epoll-1] r.netty.http.client.HttpClientConnect : [id: 0x1754485b, L:/10.242.0.100:37474 ! R: customers-service/10.0.182.24:80] The connection observed an error
reactor.netty.http.client.PrematureCloseException: Connection prematurely closed BEFORE response

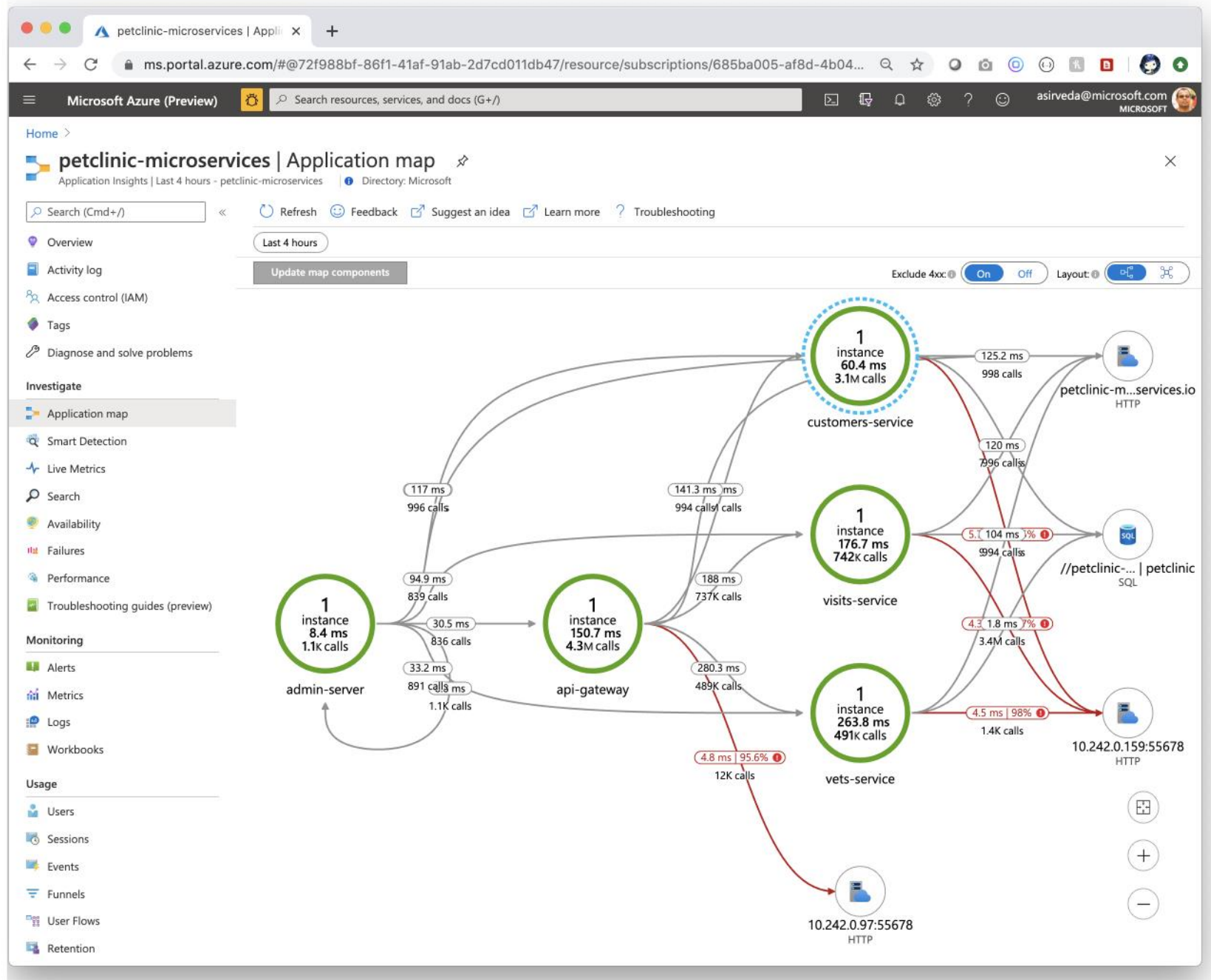
2020-05-31 21:04:01.598 ERROR [api-gateway,5c540fbe0ccf04fb,5c540fbe0ccf04fb,true] 1 --- [or-http-epoll-1] a.w.r.e.AbstractErrorWebExceptionHandler : [01da9e41] 500 Server Error for HTTP GET "/api/customer/petTypes"

reactor.netty.http.client.PrematureCloseException: Connection prematurely closed BEFORE response
Suppressed: reactor.core.publisher.FluxOnAssembly$OnAssemblyException:
Error has been observed at the following site(s):
|_ checkpoint ? org.springframework.cloud.gateway.filter.WeightCalculatorWebFilter [DefaultWebFilterChain]
|_ checkpoint ? org.springframework.cloud.sleuth.instrument.web.TraceWebFilter [DefaultWebFilterChain]
|_ checkpoint ? org.springframework.boot.actuate.metrics.web.reactive.server.MetricsWebFilter [DefaultWebFilterChain]
|_ checkpoint ? HTTP GET "/api/customer/petTypes" [ExceptionHandlerWebHandler]
Stack trace:

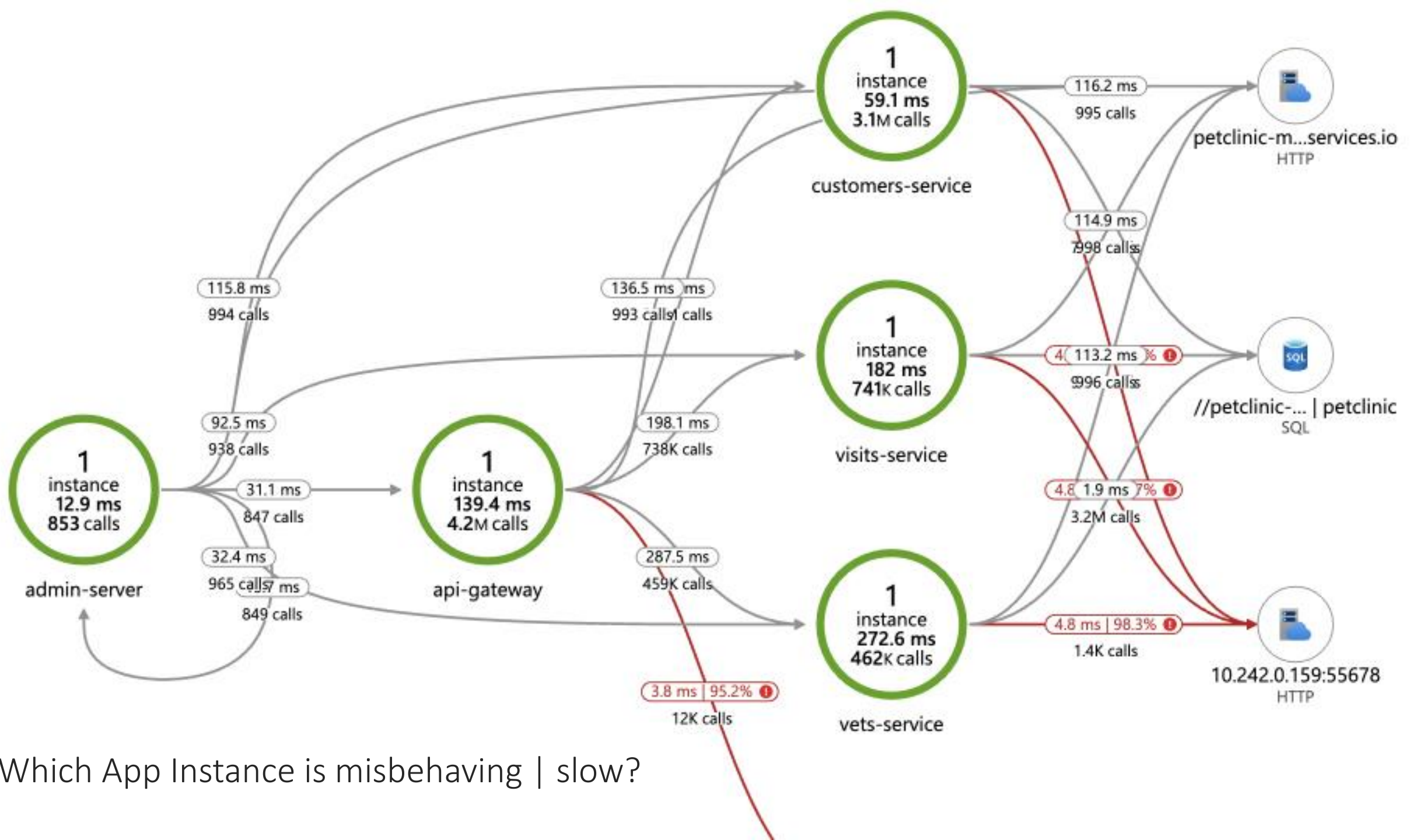
2020-05-31 21:05:01.196 ERROR [api-gateway,965ec24a15551154,965ec24a15551154,true] 1 --- [or-http-epoll-1] o.s.w.s.adapter.HttpWebHandlerAdapter : [4a181701] Error [reactor.netty.ReactorNetty$InternalNettyException: java.nio.channels.ClosedChannelException] for HTTP GET "/api/customer/petTypes", but ServerHttp Response already committed (200 OK)
2020-05-31 21:05:01.197 ERROR [api-gateway,cec33c7967c7d522,cec33c7967c7d522,true] 1 --- [or-http-epoll-1] o.s.w.s.adapter.HttpWebHandlerAdapter : [ced96d7e] Error [reactor.netty.ReactorNetty$InternalNettyException: java.nio.channels.ClosedChannelException] for HTTP GET "/api/customer/petTypes", but ServerHttp Response already committed (200 OK)
2020-05-31 21:05:01.292 ERROR [api-gateway,bf6977536c023c3b,bf6977536c023c3b,true] 1 --- [or-http-epoll-2] o.s.w.s.adapter.HttpWebHandlerAdapter : [d4c1b6
```

Troubleshoot

Which app instance is misbehaving | slow?



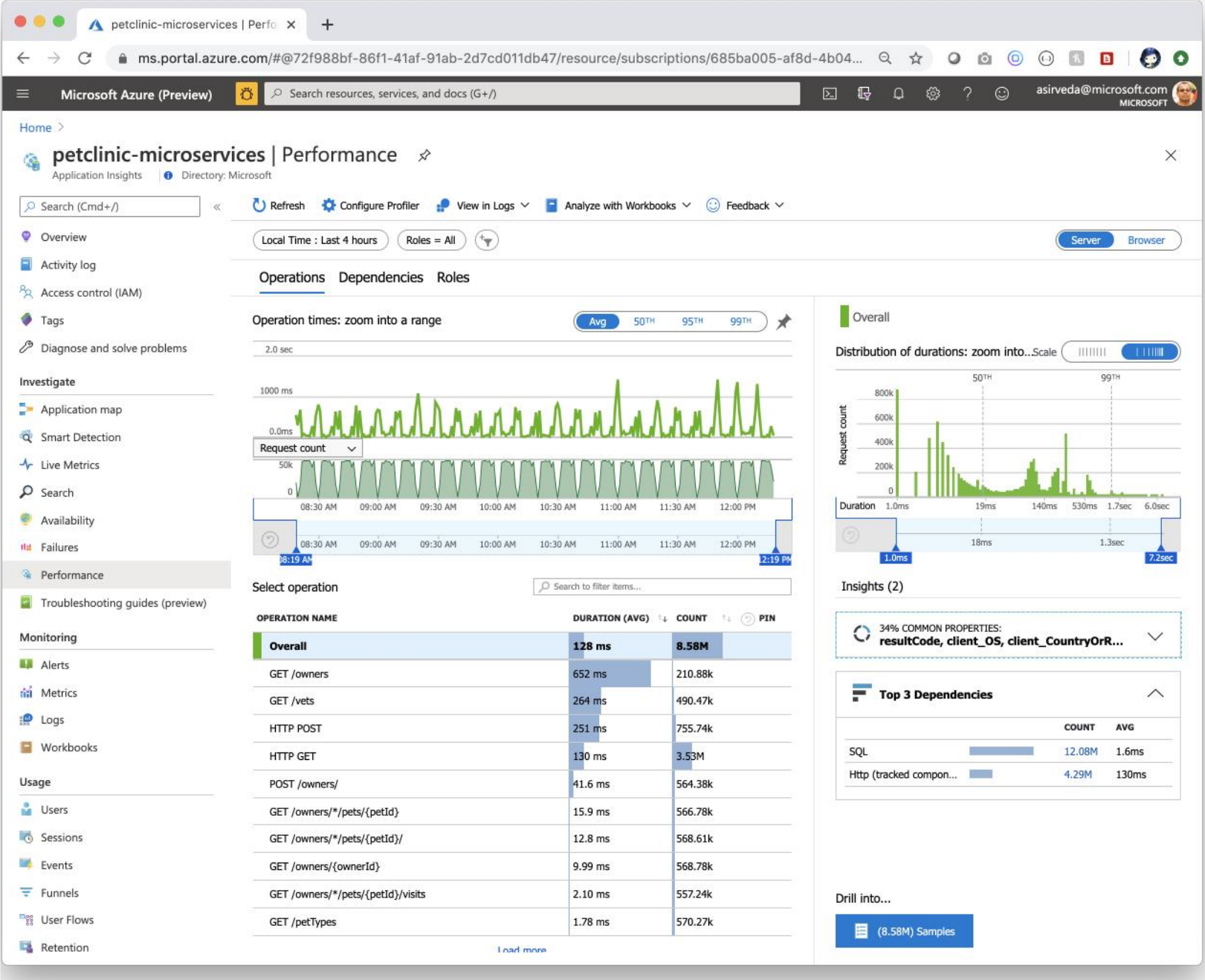


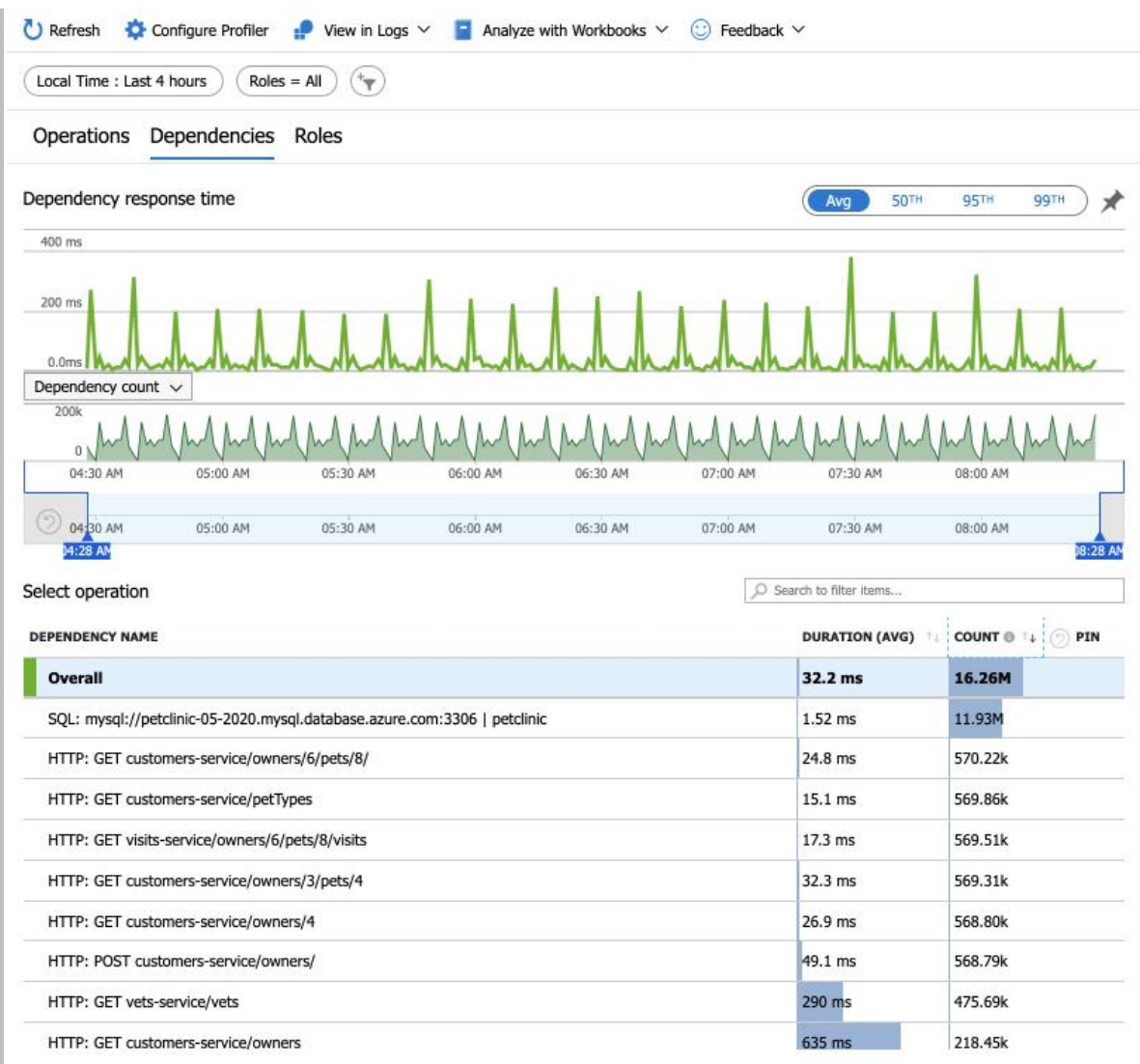
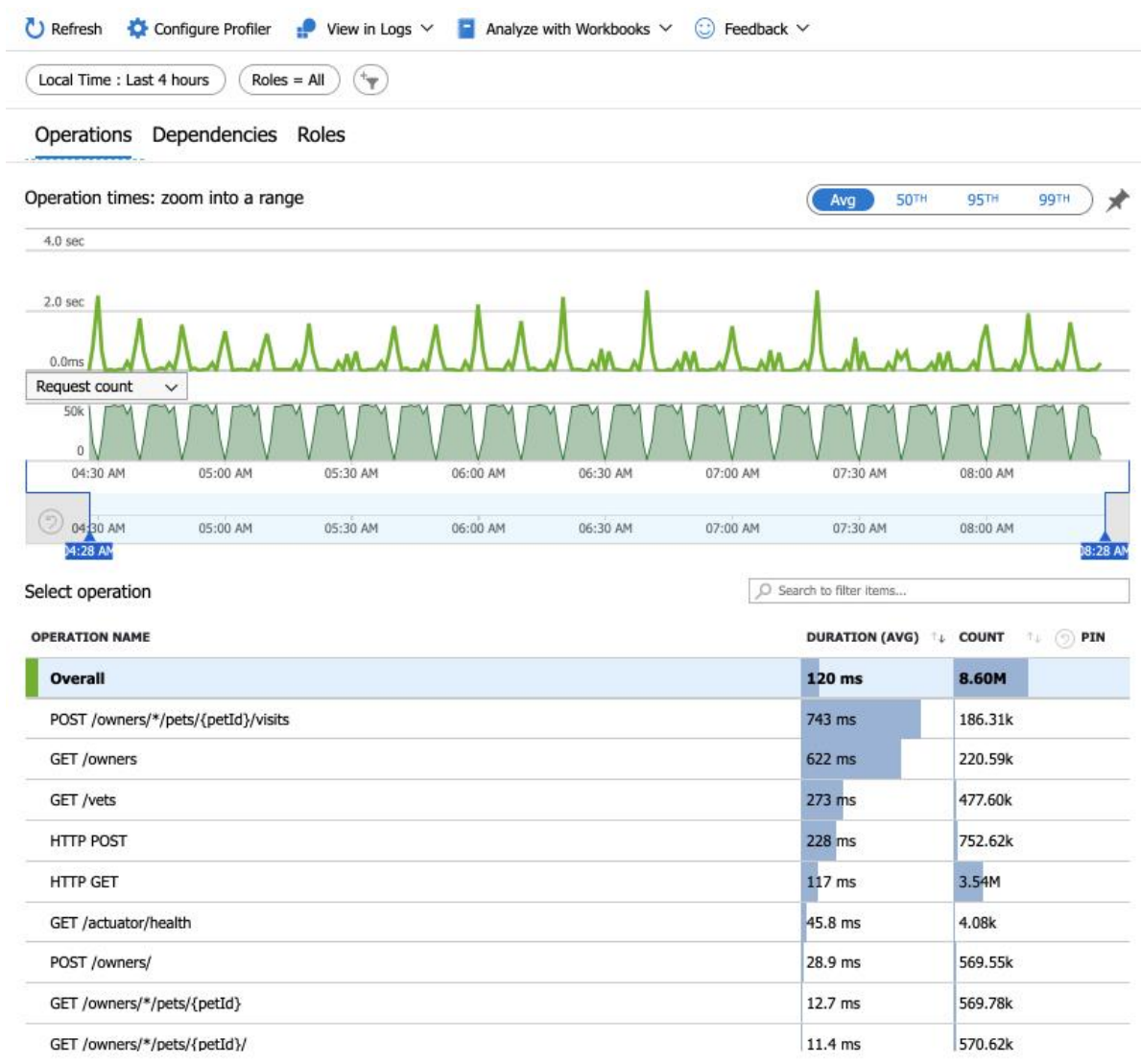


Which App Instance is misbehaving | slow?



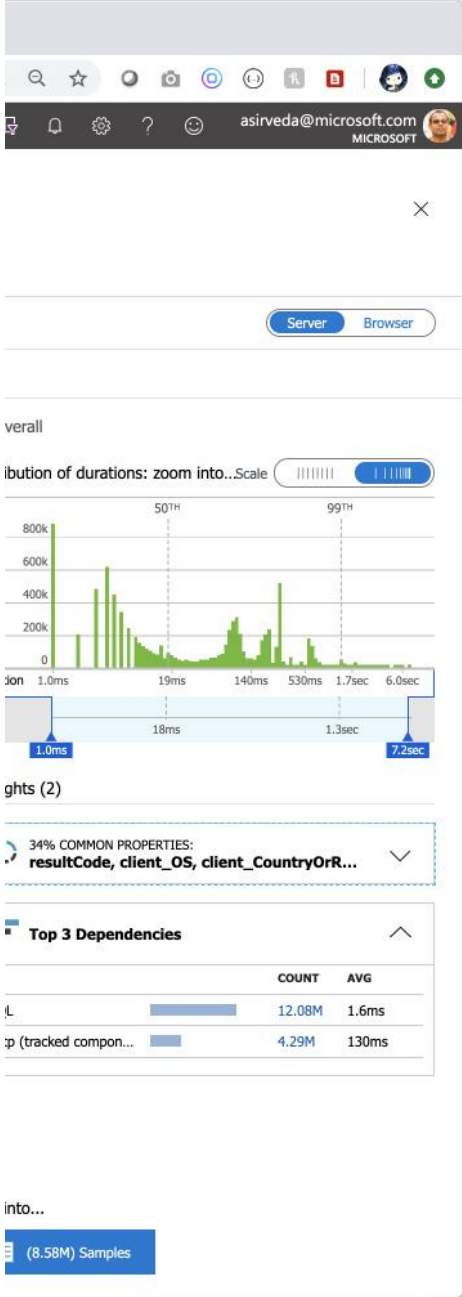
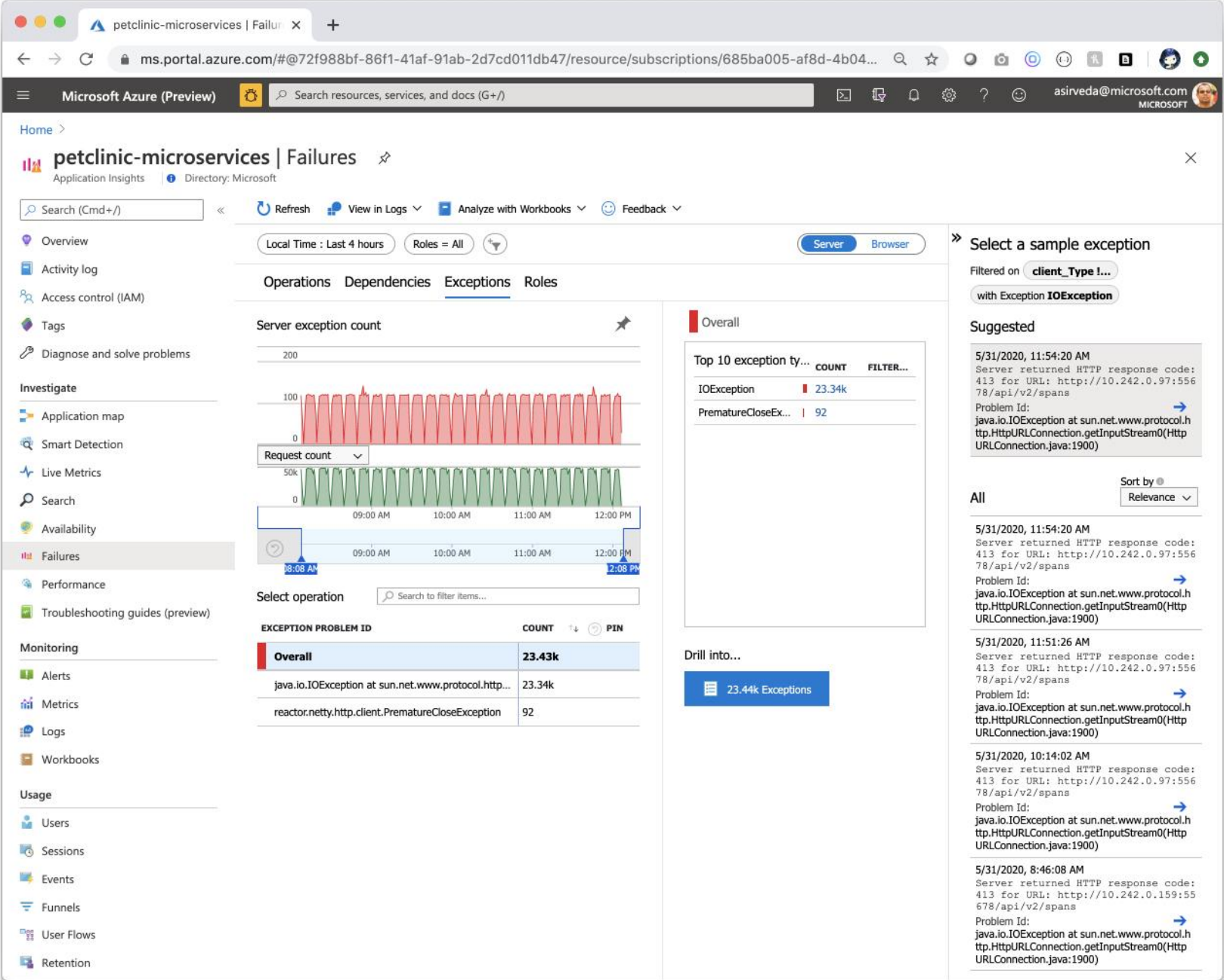
# Monitor Performance





# Monitor Performance

# Monitor Failures





# Azure Spring Cloud – Recap

# Azure Spring Cloud - Benefits



## Simplify infrastructure management

---



Run your Spring Boot apps



Scalable global infrastructure



Reduce downtime and deployment risk



## Built-in application lifecycle management

---



Spring Cloud components



Deploy source code or build artifacts



Automatically wire your app with Spring Cloud infrastructure



## Easily monitor your apps

---



Easily identify performance bottlenecks











Gain insight into app dependencies using Azure Monitor



Aggregate metrics

# Spring Azure

[cloud.spring.io/spring-cloud-azure/](https://cloud.spring.io/spring-cloud-azure/)

 <b>Spring Cloud</b>	 <b>Spring Data</b>	 <b>Spring Security</b>	 <b>Spring Resource</b>
<b>App Configuration</b> <b>Event Hubs</b> <b>Service Bus</b> <b>Storage</b> <b>Redis</b> <b>Functions</b>	<b>SQL Database</b> <b>MySQL</b> <b>PostgreSQL</b> <b>Maria DB</b> <b>Cosmos DB</b> <ul style="list-style-type: none"><li>• SQL</li><li>• MongoDB</li><li>• Cassandra</li><li>• Gremlin</li></ul>	<b>Active Directory (AAD)</b> <b>AAD B2C</b>	<b>Storage</b>
 <b>R2DBC</b>		 <b>Spring Cache</b>	 <b>Spring Messaging</b>
<b>SQL Database</b> <b>PostgreSQL</b> <b>MySQL</b>		<b>Redis Cache</b>	<b>Service Bus</b>
		 <b>Micrometer</b>	<b>Monitor (includes Log Analytics)</b>



## Get started – build your cloud-native solutions today!

- Get started with Azure Spring Cloud using quickstart: [aka.ms/azure-spring-cloud-start](https://aka.ms/azure-spring-cloud-start)
- Learn using a self-paced workshop on GitHub: [aka.ms/azure-spring-cloud-github](https://aka.ms/azure-spring-cloud-github)
- Learn about implementing solutions on Azure Spring Cloud: [aka.ms/azure-spring-cloud-docs](https://aka.ms/azure-spring-cloud-docs)
- Migrate your apps to Azure Spring Cloud
  - Spring Boot: [aka.ms/azure-spring-cloud-migrate-springboot](https://aka.ms/azure-spring-cloud-migrate-springboot)
  - Spring Cloud: [aka.ms/azure-spring-cloud-migrate-springcloud](https://aka.ms/azure-spring-cloud-migrate-springcloud)
  - Tomcat: [aka.ms/azure-spring-cloud-migrate-tomcat](https://aka.ms/azure-spring-cloud-migrate-tomcat)
- Wire Spring apps to interact with Azure services: [aka.ms/spring-integrations](https://aka.ms/spring-integrations)
- For feedback and questions, please reach out to [spring-team@microsoft.com](mailto:spring-team@microsoft.com)



LEARN

[Microsoft.com/Learn](https://Microsoft.com/Learn)