



**Hello  
FRESH**



**QUALITY TRANSFORMATION**

**CHALLENGES AND OPPORTUNITIES**



**ADAPTING AND TRANSFORMING QUALITY  
ASSURANCE AND ANALYSIS PRACTICES**

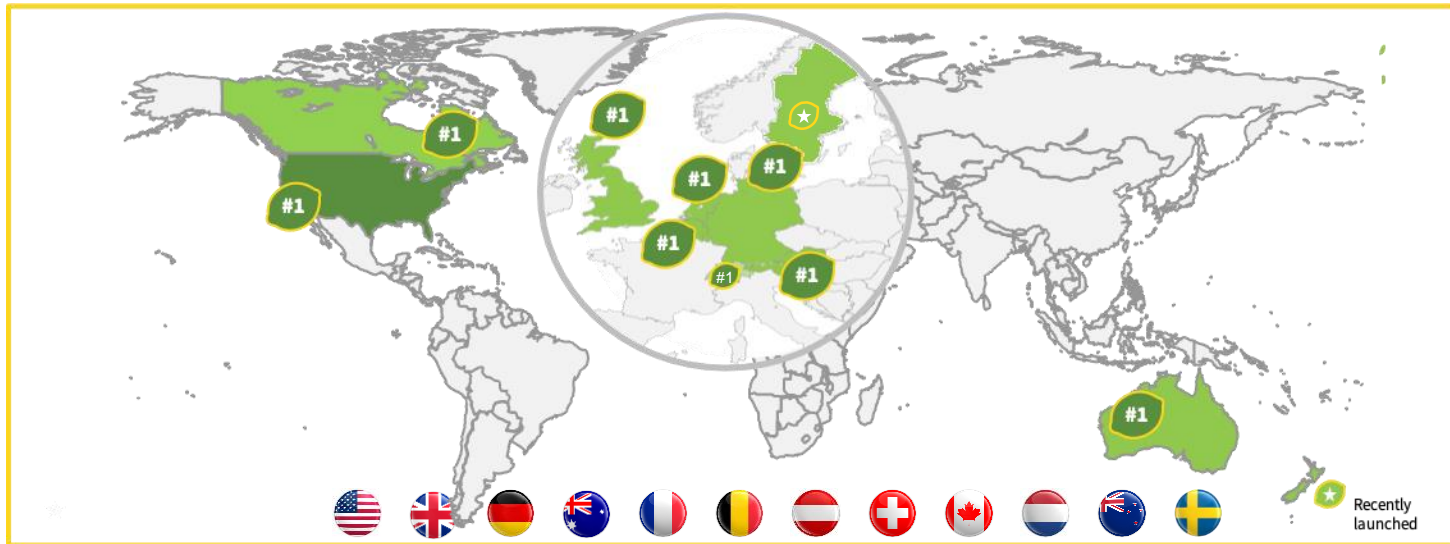


**PETER CARON  
TESTCON EUROPE 2019  
VILNIUS, 16.10.2019**



# THE LARGEST AND ONLY GLOBAL PLAYER

Expanding market share across all regions!



**67 M**  
MEALS SERVED  
IN Q2 2019

**€437 M**  
REVENUE FOR Q2 2019

**37%**  
REVENUE GROWTH FOR Q2  
2019

**5.000+**  
EMPLOYEES WORLDWIDE





# 1993

Lack of a practical working definition of what "quality" means for software

Lack of quality measurements

Lack of understanding by project management that quality is on target

Inadequate use of reviews and inspections

Inadequate defect prevention

Insufficient or careless testing

Excessive scheduling pressure leading to unwise attempts to short-cut quality control

Unstable and ambiguous user requirements

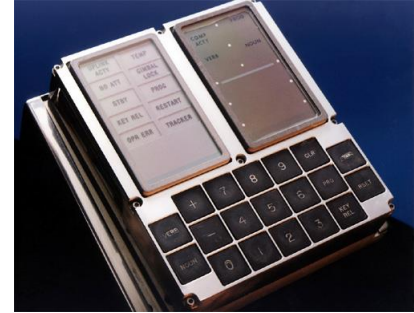
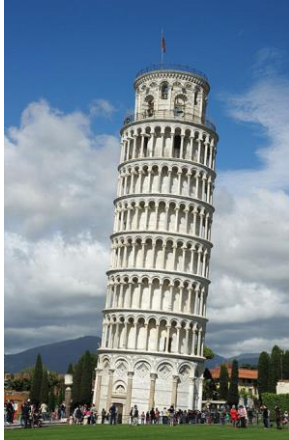
Historical Attention-Span Deficit Disorder





## WHERE DOES QUALITY BEGIN?

Design and build something close to perfect and test it mercilessly



... or build something fast and deal with quality at the end

Quality is managed from the start evaluated and improved up to and beyond delivery





## OPPORTUNITY: SPEED TO MARKET

Improving key capabilities of software development and deployment performance

**up to 100%**

**IMPROVEMENT**

**FASTER DELIVERIES OF PRODUCTS AND SERVICES**

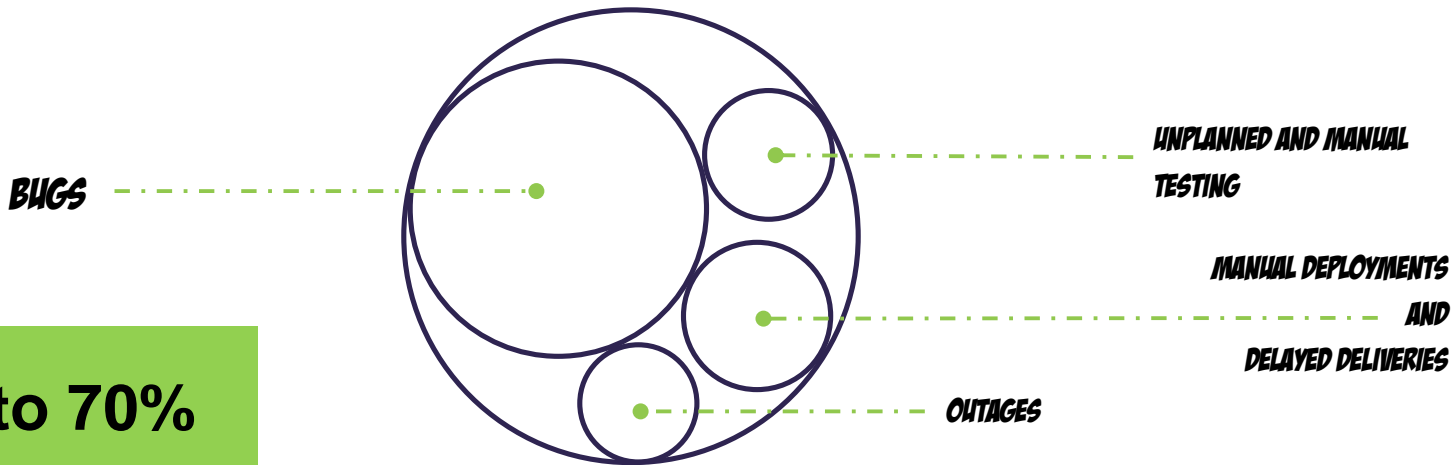
**GETTING FEATURES INTO THE HANDS OF CUSTOMERS FASTER**



	High Performers	Low Performers
Delivery Frequency	>1x / day	1x month
Lead Time to Change	< 1 hr	1x week - 1x / month
MTTR	< 1 hr	1 day – 1 week
Change Failure Rate	< 15%	31-45%



# OPPORTUNITY: OPERATIONAL COSTS IN PERSPECTIVE



**up to 70%**

**DEVELOPMENT TIME SPENT ON  
ACTIVITIES NOT RELATED TO NEW  
WORK**

Four Horsemen of the  
SDLC Apocalypse





## Defining a Scope for the Transformation



### Testing

Adapt testing strategies to event-based microservices



### SDLC

Find and eliminate inefficiencies and technical debt in processes



### Analysis

Adapt tooling and measurements to meet new challenges



### Reporting

On demand reports for development as well as production

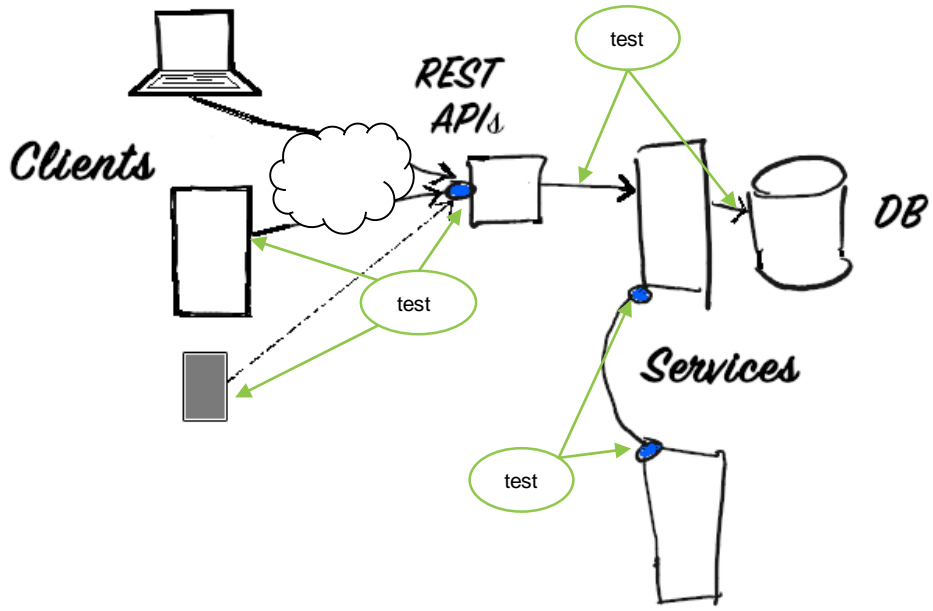


### Monitoring

Proactively find and eliminate bugs, feature failures in production



# REST APIS



Macro services  
Microliths

pet Everything about your Pets <a href="http://swagger.io">http://swagger.io</a>	
POST	/pet Add a new pet to the store
PUT	/pet Update an existing pet
GET	/pet/findByStatus Finds Pets by status
GET	/pet/findByTags Finds Pets by tags
GET	/pet/{petId} Find pet by ID
POST	/pet/{petId} Updates a pet in the store with form data
DELETE	/pet/{petId} Deletes a pet
POST	/pet/{petId}/uploadImage uploads an image

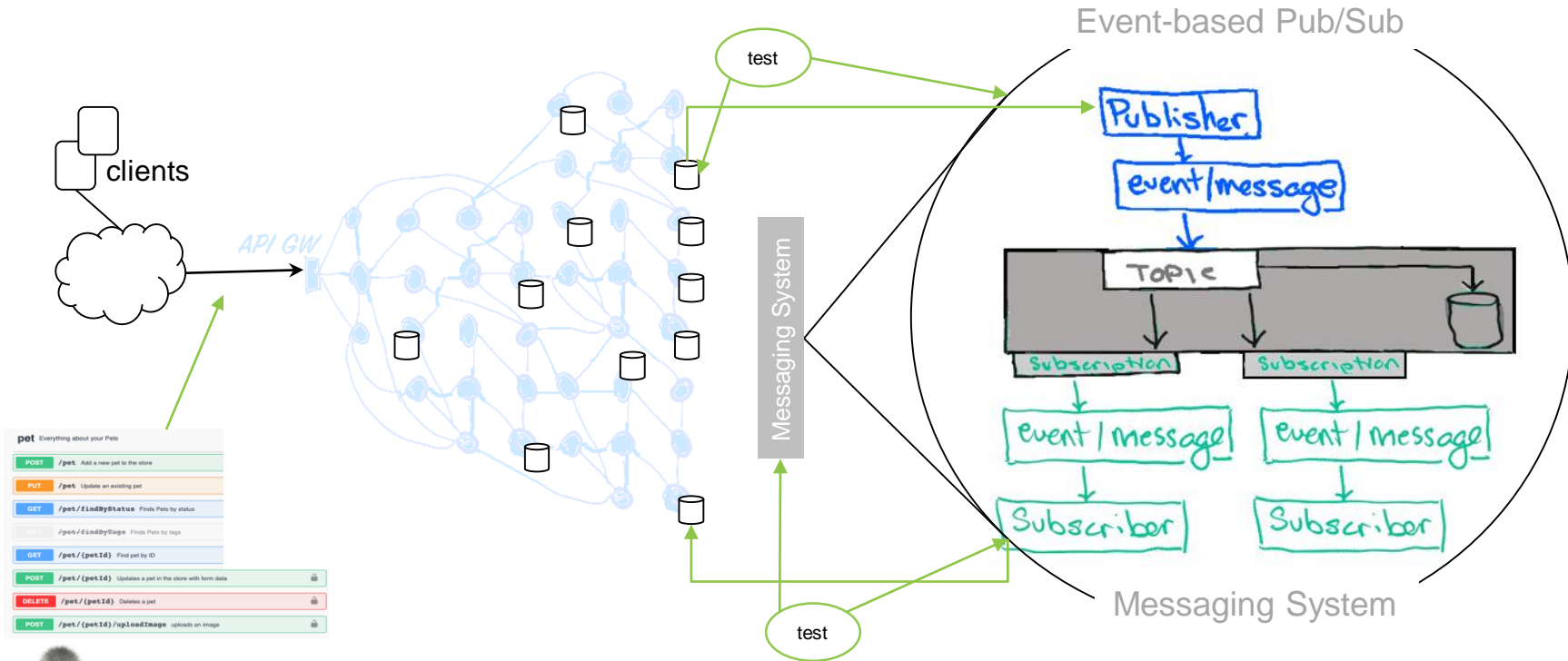






# CHALLENGE: MICROSERVICES AND DISTRIBUTED DATA

Testing  
SDLC  
Analysis  
Reporting  
Monitoring



pet Everything about your Pets	
POST	/pet Add a new pet to the store
PUT	/pet Update an existing pet
GET	/pet/findByStatus Finds Pets by status
GET	/pet/findByTags Finds Pets by tags
GET	/pet/{petId} Find pet by ID
POST	/pet/{petId} Updates a pet in the store with form data
DELETE	/pet/{petId} Deletes a pet
POST	/pet/{petId}/uploadImage uploads an image



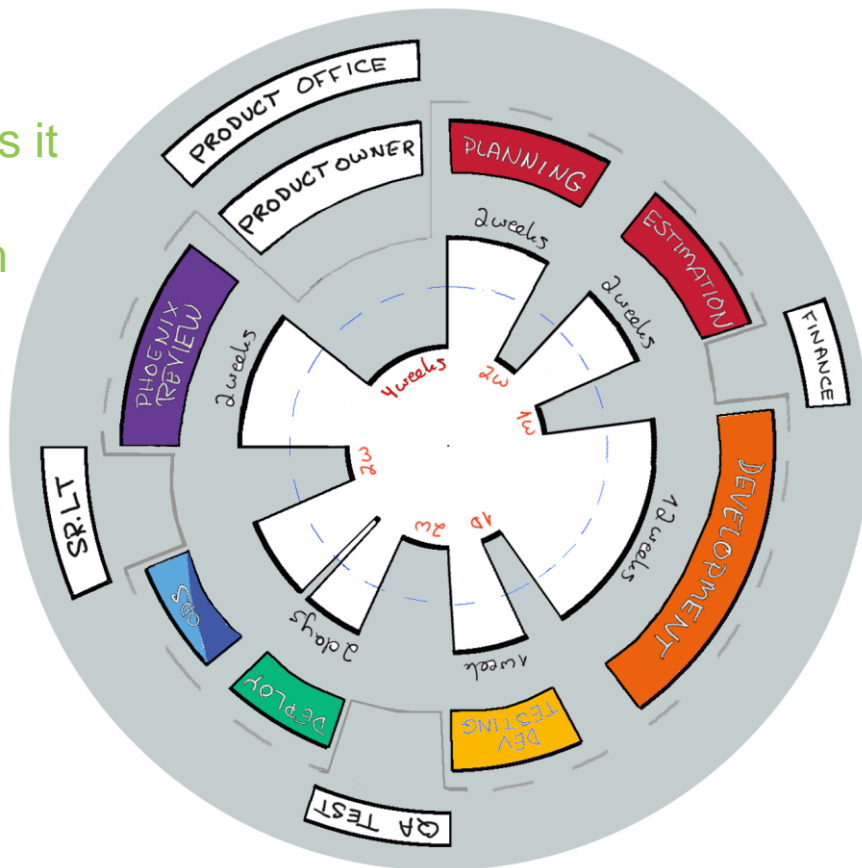
Every change to the state of an application is contained in an event. Because we can determine the state of the app at any point in time we have an effective, non-intrusive test. Events can be replayed against configured CBs and can act as ad hoc performance testing



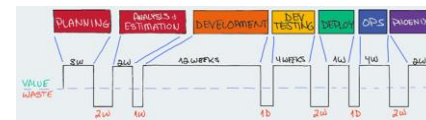
# PROCESSES

Testing  
SDLC  
Analysis  
Reporting  
Monitoring

How long does it take to get feedback from production?



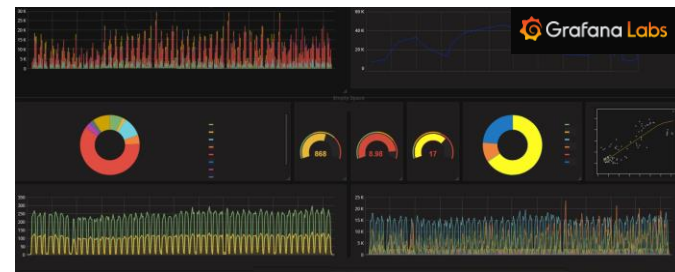
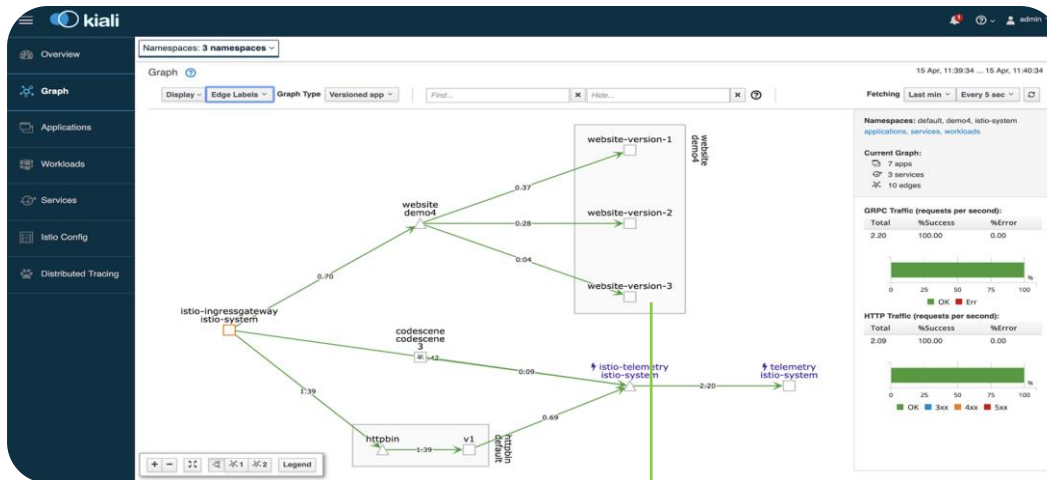
How long does it take to get a feature into production?





# TELEMETRY

Testing  
SDLC  
Analysis  
Reporting  
Monitoring



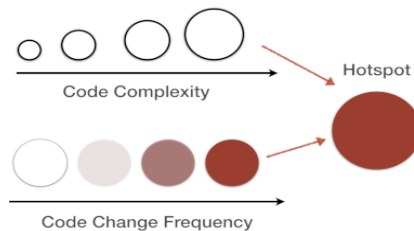
**SYNCHRONOUS EVENTS  
OUTBOUND/SENT  
INBOUND/SENT**

**ASYNCHRONOUS EVENTS  
OUTBOUND/SENT**

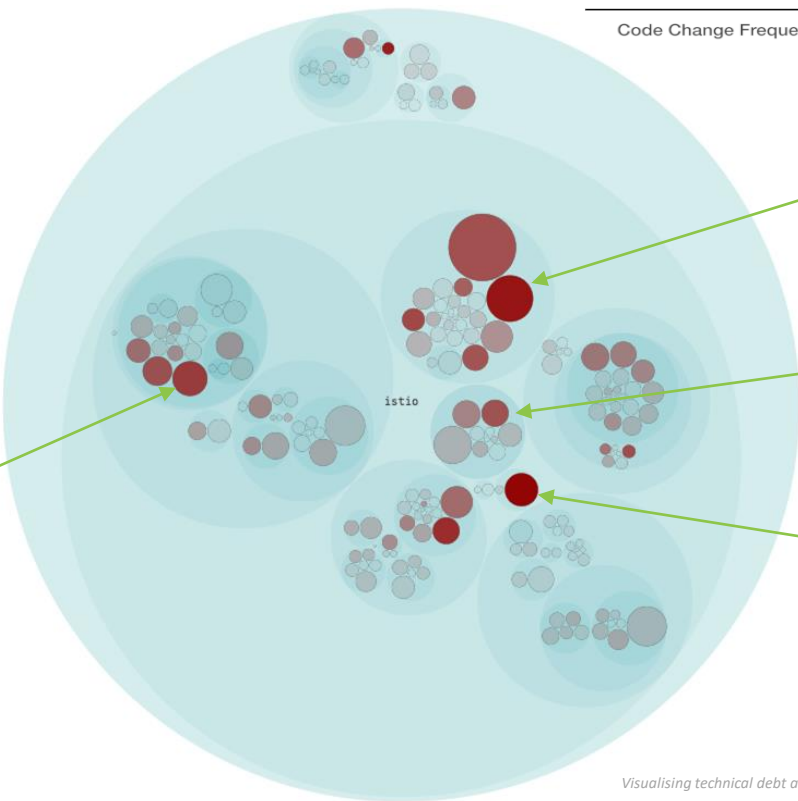




# FINDING RISK



Technical debt is **not only** a technical problem



unplanned rework needed

high risk of bugs

refactoring candidates

supplementary or exploratory testing required



Visualising technical debt as measured by code complexity and change frequency



CodeScene™ Powered by Empear

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### Istio mixer ✔

9 commits in the last month  
**Mixer**

Last analysis: 2019-03-27 13:38  
Lines of code: 178,354  
Active developers: 25

Code health

6

System mastery

100%

Delivery risk?

=

Missed goals

0/8

Report
Configuration
History
Retrospective
Analyze

### Istio pilot ✔

49 commits in the last month  
**Pilot**

Last analysis: 2019-03-27 13:41  
Lines of code: 59,818  
Active developers: 57

Code health

6

System mastery

100%

Delivery risk?

=

Missed goals

-

Report
Configuration
History
Retrospective
Analyze

### Istio Service Mesh 1.1 ✔

72 commits in the last month  
**ISTIO Service Mesh 1.1**

Last analysis: 2019-03-27 12:48  
Lines of code: 2,123,890  
Active developers: 76

Code health

5

System mastery

100%

Delivery risk?

=

Missed goals

-

Report
Configuration
History
Retrospective
Analyze

### SecureShares Demo ✔

0 commits in the last month  
**Demonstration Project OSS**

Last analysis: 2019-03-28 09:28  
Lines of code: 30,685  
Active developers: 1

Code health

10

System mastery

100%

Delivery risk?

=

Missed goals

-

Report
Configuration
History
Retrospective
Analyze



CodeScene™

Powered by Empaar

## Mixer: Architectural Code Biomarkers

Code Biomarkers aim to indicate specific properties of the code.

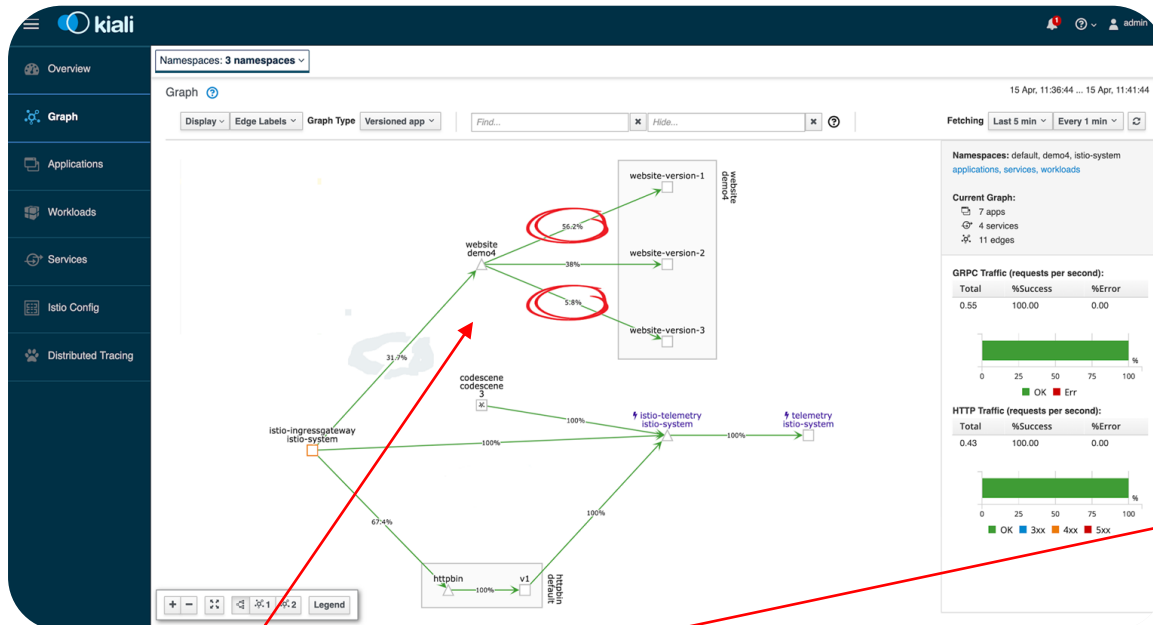
Supervision	File	Status Now	Last Month	Last Year	Details
RF	template.gen.go istio/mixer/template/	1	1	3	<ul style="list-style-type: none"> <li>High Overall Code Complexity</li> <li>Excess Data Declarations</li> <li>Brain Method Detected</li> <li>Low Cohesion</li> <li>Duplicated Function Blocks</li> </ul>
RF	template.gen.go istio/mixer/template/sample/	3	3	3	<ul style="list-style-type: none"> <li>High Overall Code Complexity</li> <li>Brain Method Detected</li> <li>Low Cohesion</li> <li>Duplicated Code</li> </ul>
SU	grpcServer_test.go istio/mixer/pkg/api/	5	5	6	<ul style="list-style-type: none"> <li>Many Conditionals</li> <li>Brain Method Detected</li> <li>Low Cohesion</li> <li>High Degree of Code Duplication</li> <li>Heavy usage of string arguments</li> </ul>
NP	template.gen_test.go istio/mixer/template/sample/	6	6	6	<ul style="list-style-type: none"> <li>Brain Method Detected</li> <li>Low Cohesion</li> <li>Heavy usage of string arguments</li> </ul>
NP	bag_test.go istio/mixer/pkg/attribute/	6	6	6	<ul style="list-style-type: none"> <li>Deeply Nested Logic</li> <li>Brain Method Detected</li> <li>Low Cohesion</li> </ul>
SU	server.go istio/mixer/pkg/server/	6	6	6	<ul style="list-style-type: none"> <li>Many Conditionals</li> <li>Brain Method Detected</li> </ul>
NP	expr.go istio/mixer/pkg/lang/ast/	6	6	6	<ul style="list-style-type: none"> <li>Many Conditionals</li> <li>Deeply Nested Logic</li> <li>Brain Method Detected</li> </ul>
NP	grpcServer.go istio/mixer/pkg/api/	7	7	8	<ul style="list-style-type: none"> <li>Deeply Nested Logic</li> <li>Brain Method Detected</li> </ul>

Figure 1 Code Biomarkers representing the most volatile, and riskiest code



# MONITORING DEPLOYMENTS

Testing  
SDLC  
Analysis  
Reporting  
Monitoring



```

apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: website-virtual-service
spec:
  hosts:
  - "test.k8s-pcconsultants.de"
  gateways:
  - website-gateway
  http:
  - match:
    - uri:
        prefix: /website
      rewrite:
        uri: /
      route:
      - destination:
          host: website
          subset: version-1
        weight: 60
      - destination:
          host: website
          subset: version-2
        weight: 30
      - destination:
          host: website
          subset: version-3
        weight: 10
  
```

Figure 1 Code Biomarkers representing the most volatile, and riskiest code



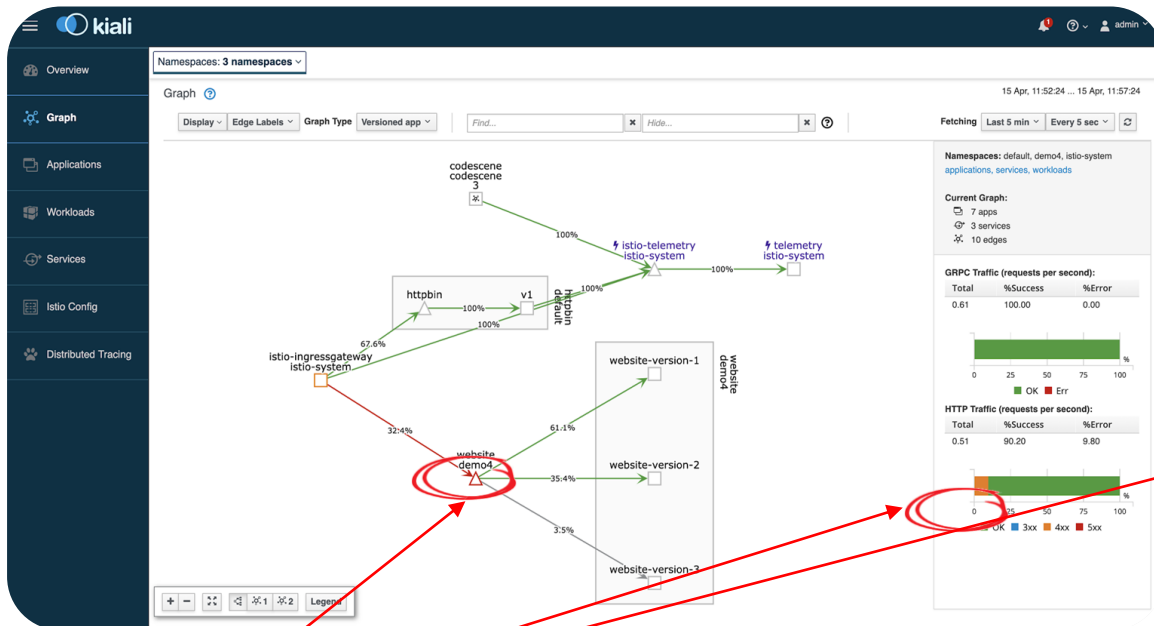
canary  
deploy

Service Discovery, Logging, Fault Tolerance, Performance Anomalies



# MONITORING IN PRODUCTION

Testing  
SDLC  
Analysis  
Reporting  
Monitoring



```

apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: website-virtual-service
spec:
  hosts:
  - "*"
  gateways:
  - website-gateway
  http:
  - match:
    - uri:
        regex: /website
      rewrite:
        uri: /
      route:
      - destination:
          host: website
            subset: version-1
          weight: 60
      - destination:
          host: website
            subset: version-2
          weight: 30
      - destination:
          host: website
            subset: version-3
          weight: 10
    fault:
      delay:
        percent: 25
        fixedDelay: 2s
        abort:
          percent: 25
          httpStatus: 400

```

Figure 1 Code Biomarkers representing the most volatile, and riskiest code

fault injection







Jaeger UI  Search Dependencies About Jaeger ▾

## istio-ingressgateway: productpage.default.svc.cluster.local:9080/productpage

Trace Start: **March 10, 2019 11:35 AM** | Duration: **35.52ms** | Services: **4** | Depth: **4** | Total Spans: **5**

Service & Operation	0ms	8.88ms	17.76ms	26.64ms	35.52ms
istio-ingressgateway productpage.default.svc.cluster.local:90...	[Timeline bar]				
details details.default.svc.cluster.local:9080/*	[Timeline bar]				
<b>details.default.svc.cluster.local:9080/*</b> Service: <b>details</b>   Duration: <b>3.46ms</b>   Start Time: <b>6.92ms</b> > Tags: component = proxy   node_id = sidecar~10.16.5.48~details-v1-589c676b6d-jd8mk.default~default.svc.cluster.local   guid:x-request-id = fd4f42c6-27bc-9c44-9817-982c1c... > Process: ip = 10.16.5.48 SpanID: 124cc3535a0cc0f5					
reviews reviews.default.svc.cluster.local:9080/*	[Timeline bar]				
<b>reviews.default.svc.cluster.local:9080/*</b> Service: <b>reviews</b>   Duration: <b>10.17ms</b>   Start Time: <b>19.94ms</b> > Tags: component = proxy   node_id = sidecar~10.16.2.57~reviews-v3-865cd5bcc5-z79v5.default~default.svc.cluster.local   guid:x-request-id = fd4f42c6-27bc-9c44-9817-982c1c... > Process: ip = 10.16.2.57 SpanID: 5d753005a6d7ea40					
reviews ratings.default.svc.cluster.local:9080/*	[Timeline bar]				
<b>ratings.default.svc.cluster.local:9080/*</b> Service: <b>ratings</b>   Duration: <b>1.57ms</b>   Start Time: <b>25.65ms</b> > Tags: component = proxy   node_id = sidecar~10.16.2.56~ratings-v1-6f7f894cd4-szsg9.default~default.svc.cluster.local   guid:x-request-id = fd4f42c6-27bc-9c44-9817-982c1cd... > Process: ip = 10.16.2.56 SpanID: 1					





# FINAL THOUGHTS

1st Conference Day (October 16)

Venue: Multikino (Drožų str. 18, LT-02443 Vilnius, Lithuania)

Time	Hall 5	Hall 6	Hall 1	Hall 2
08:00 - 09:00	Registration			
09:00 - 09:05	<b>OPENING KEYNOTE</b> Quality Transformation Peter Cavan PCSoftware CEO (Hall 5)			
09:10 - 09:55	Strategic TDD Stavrosas Strazauskas TDD 4x4x4	Testing Offshore First Andreas Knebel Use Reacting Mobile Testing	Verifying Code Testing Parallel Behavior Applicat Context Testing Complex Chains Contract Intercept Success	Strategic QA TDD Contract Testing Mobile Automation Test Automation
10:55 - 11:20	Morning Break			
11:20 - 12:05	Butler Continuous Testing in DevOps Parthiv Continuous Testing DevOps Test Automation	Family Crush QA At Scale Alexander Andelbovcs AI Machine Learning	Extreme Contracting The Evolution of Second Form Test Automation Contract Testing Agile	Contract Testing Mobile Automation Test Automation
12:20 - 13:05	Automated Performance Testing With WebDriver Christian Brumann Sura Jaki Frontend Performance	Reporting Bugs From QA to Dev Lessons Learned Peter Sahay Full Time QA Bug Reporting Common Problems Lessons Learned	QA Contract Testing Mobile Automation Test Automation	Contract Testing Mobile Automation Test Automation
13:20 - 14:05	Evolution of QA to QA The Service QA Sibi Bhatia Service QA End-to-End Testing Test Automation	Break your QA Surrender Eric Dries Ana Banaji Service QA Penetration Testing Testing Reverse Engineering	QA Contract Testing Mobile Automation Test Automation	Contract Testing Mobile Automation Test Automation
14:20 - 15:05	How to Practice Test Automation Yourself in the Field Service Engineers Amit Shrivastava TDD	My Journey to Automated Testing From I Marilyn Thomas QA/Shift Approach 4.7 Accessibility Testing	QA Contract Testing Mobile Automation Test Automation	Contract Testing Mobile Automation Test Automation
15:15 - 16:00	Over 100 Test Cases per Hour Daily around 100 Test Automation Test Automation	TBA	Test Coaching Patrick Alexander QA/Shift Complex Development Coaching	Contract Testing Mobile Automation Test Automation
16:00 - 16:25	Afternoon Break			
16:25 - 17:15	If the Users Can't Use It, It's Broken Balf Matlich Usability Testing User Experience	Automated End-to- End Tests with Robot Andrew Salasnik Test Automation End-to-End Testing	Performance Testing in Agile and DevOps Sagor Bhatnagar Performance Testing Agile DevOps	Agile QA as a Service Automated QA Agile QA as a Service
17:20 - 20:20	Special movie session for TestCon Europe community Getcon Man			



2nd Conference Day (October 17)

Venue: Multikino (Drožų str. 18, LT-02443 Vilnius, Lithuania)

Time	Hall 5	Hall 6	Hall 1	Hall 2
08:00 - 09:00	Registration			
09:00 - 09:05	<b>OPENING KEYNOTE</b> You Can't Be Agile if Your Testing Practices Suck Peter Glander Beyond Agile Gears (Hall 5)			
09:10 - 09:55	How AI is Transforming Test Sara Jaki Sara Jaki	Help! We Have a QA Problem Nikola Mijatovic QA Migration D. Mijatovic Optimizing Delivery Time Lims	Finding Security Issues in Open Source Alexander Fedorov After FICO Security Testing Open Source	DevOps: Teaching the Fundamentals of Mobile Automation Viktorija Suprutka Mobile Automation JavaScript React Native
10:55 - 11:20	Morning Break			
11:20 - 12:05	The Joy of Record and Replay Louise Gibbs Mariusz Dzieni Test Automation Record and Playback	Design Decisions for Mobile Developer Michael Bodnar Michael Bodnar JavaScript, Node.js Cypress, Selenium	Salon Skills for QA Rajesh Mariusz Dzieni Michael Bodnar	Salon Skills for QA Rajesh Mariusz Dzieni Michael Bodnar
12:20 - 13:05	Mobile Testing - Cool Factor Ewa Marchwinska PCKP	Usability Testing User Experience	Lunch Break	
13:20 - 14:05	How to Organize Your QA System as an Organization Michael Bruch Approach Solutions Ethical Integrity QA Roles	Lunch Break		How to Organize Your QA System as an Organization Michael Bruch Approach Solutions Ethical Integrity QA Roles
14:20 - 15:05	From Waterfall to Agile Transformation Test Organization Tomasz Skarba Agile Agile Administration and Agile Administration Agile Organization Transformation	Deploying Security Toolchains for Transformation Arpan Vasiah Security Testing Test Design	The Challenges of Security in Agile Development Video Streaming Microservices	The Challenges of Security in Agile Development Video Streaming Microservices
15:15 - 16:00	Why Testing is Fundamentally Different in Single Page Apps Peter Glander Beyond Agile Gears Peter Glander Nikola Mijatovic	Why Testing is Fundamentally Different in Single Page Apps Peter Glander Beyond Agile Gears Peter Glander Nikola Mijatovic	TBA	TBA
16:00 - 16:25	Afternoon Break			
16:25 - 16:50	<b>TestCon Challenge</b> powered by WU.com			
16:50 - 17:35	<b>CLOSING KEYNOTE</b> Reassess Skills and Software Testing Andrew Brown Exper (Hall 5)			

How do these innovative ideas and methodologies help you manage risk?



Thank

You!

PETER CARON

[PCAR@HELLOFRESH.COM](mailto:PCAR@HELLOFRESH.COM)

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[HTTPS://MARTINFOWLER.COM/ARTICLES/MICROSERVICE-TESTING/#TESTING-INTEGRATION-DIAGRAM](https://martinfowler.com/articles/microservice-testing/#testing-integration-diagram)



**Microservice Patterns:**  
With examples in Java  
by Chris Richardson | 19 Nov 2018



**The Tao of Microservices**  
by Richard Rodger | 31 Dec 2017



**Designing Data-Intensive Applications:**  
The Big Ideas Behind Reliable, Scalable,  
and Maintainable Systems  
Kleppmann, Martin



**Production-Ready Microservices**  
By Susan J. Fowler  
Publisher: O'Reilly Media  
Release Date: November 2016  
Language: English



**Building Data Streaming Applications with Apache Kafka**  
By Manish Kumar, Chanchal Singh  
Publisher: Packt Publishing  
Release Date: August 2017



**Testing Java Microservices**  
by Soto Bueno, Alex,  
Jason Porter, et al. | 31 Aug 2018



**Software Design X-Rays: Fix Technical Debt with Behavioral Code Analysis**

Tornhill, Adam, O'Reilly UK Ltd.



**Kafka: The Definitive Guide**

By Gwen Shapira, Neha Narkhede, Todd Palino  
Publisher: O'Reilly Media  
Release Date: August 2017

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