



Microservices

In Practices with Java Technology





Somkiat Puisungnoen

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Intro

Software Craftsmanship

Software Practitioner at สยามชั่นนาคุกิจ พ.ศ. 2556

Agile Practitioner and Technical at SPRINT3r

Somkiat Puisungnoen 15 mins · Bangkok ·

Java and Bigdata



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Agenda Day 1

1. Cloud Native Application
2. Microservices fundamental
3. The architecture of Microservices
4. How to model Microservices
5. Integrating multiple Microservices
6. Developing Microservices with Java
7. Workshop



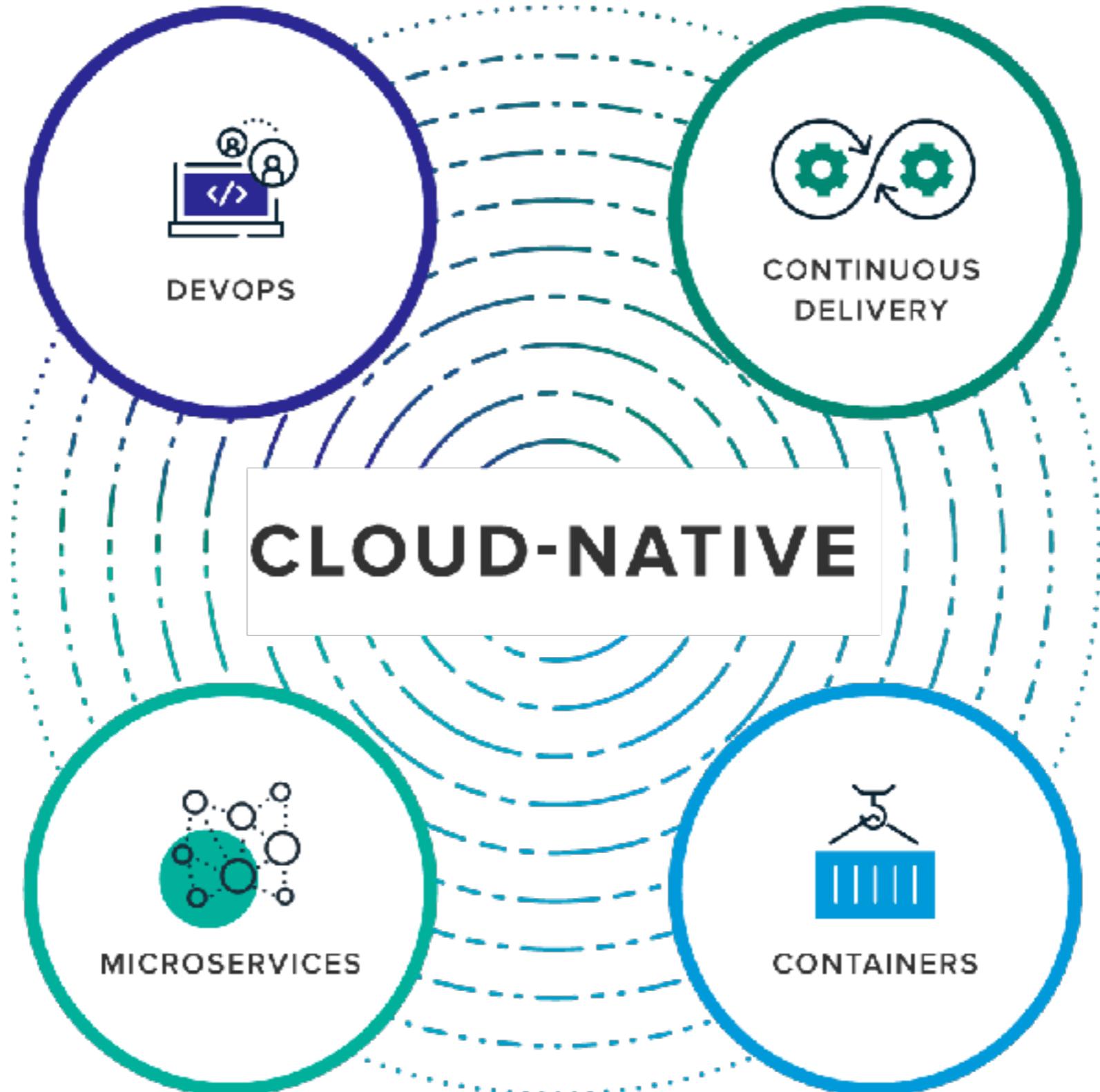
Agenda Day 2

1. Testing Microservices
2. Deploying Microservices
3. Maintaining healthy Microservices
4. Monitoring Microservices
5. Scaling up your Microservices
6. Workshop
7. Agile model



<https://github.com/up1/course-microservice>





<https://pivotal.io/cloud-native>

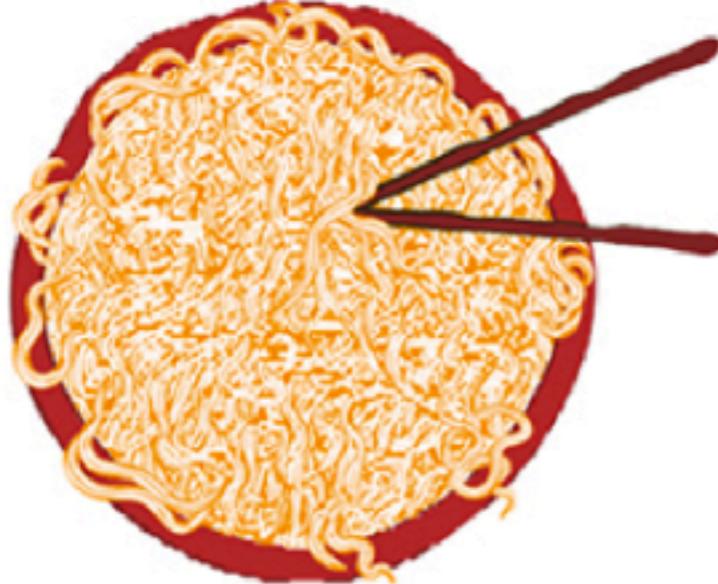


Evolution of Architecture



1990s and earlier

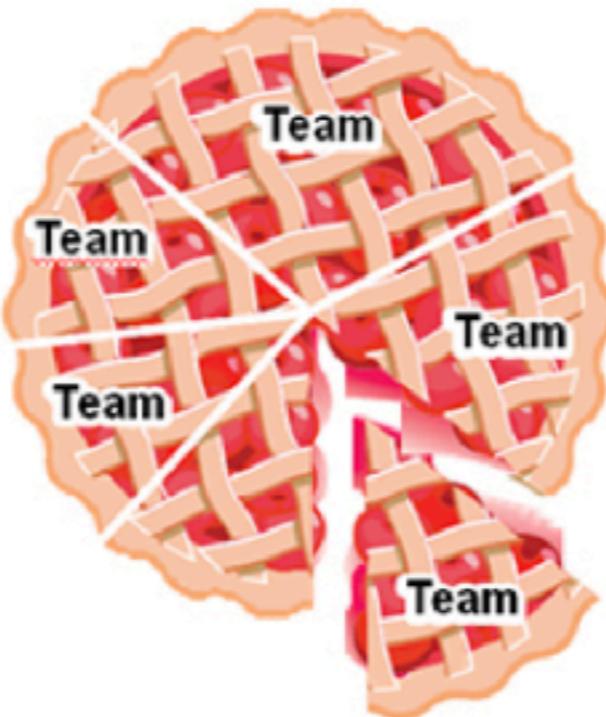
Pre-SOA (monolithic)
Tight coupling



For a monolith to change, all must agree on each change. Each change has unanticipated effects requiring careful testing beforehand.

2000s

Traditional SOA
Looser coupling



Elements in SOA are developed more autonomously but must be coordinated with others to fit into the overall design.

2010s

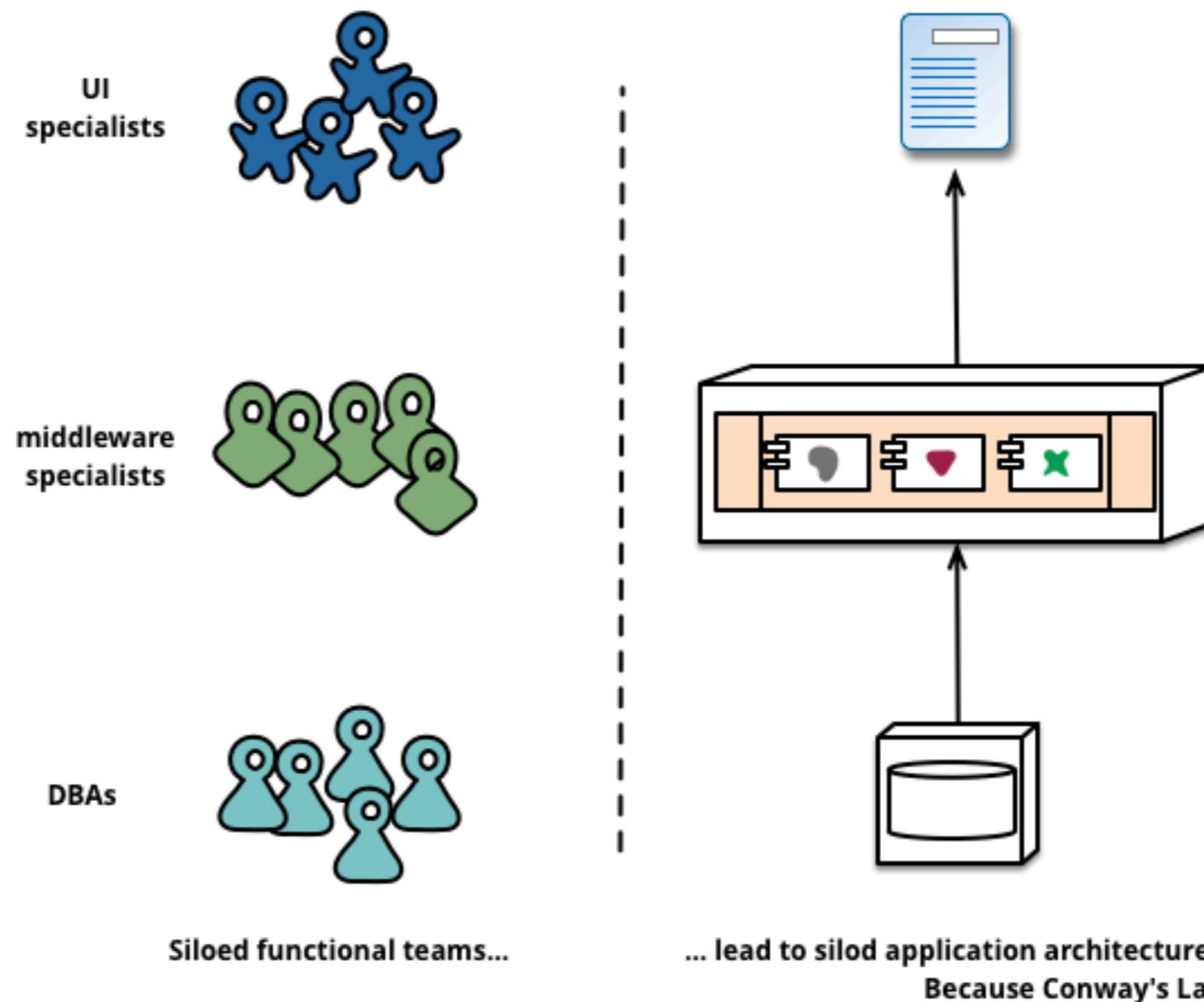
Microservices
Decoupled



Developers can create and activate new microservices without prior coordination with others. Their adherence to MSA principles makes continuous delivery of new or modified services possible.



Conway's Law



Microservices

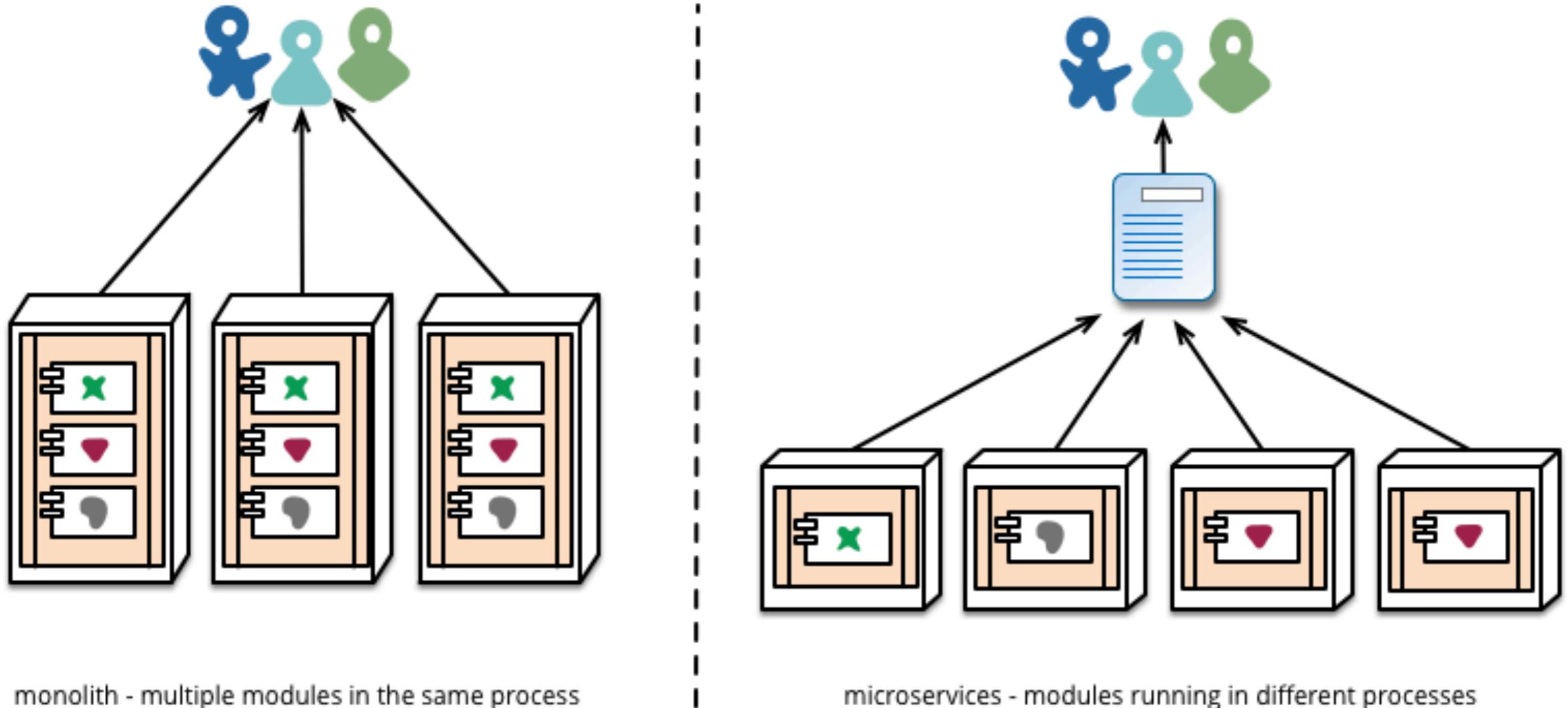


Microservices

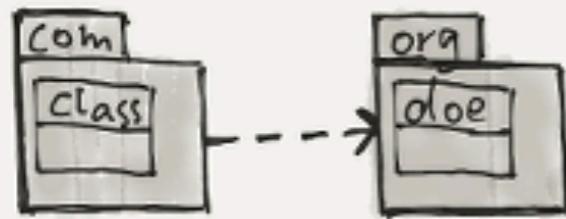
Small, Do one thing
Modular
Easy to deploy
Scale independently



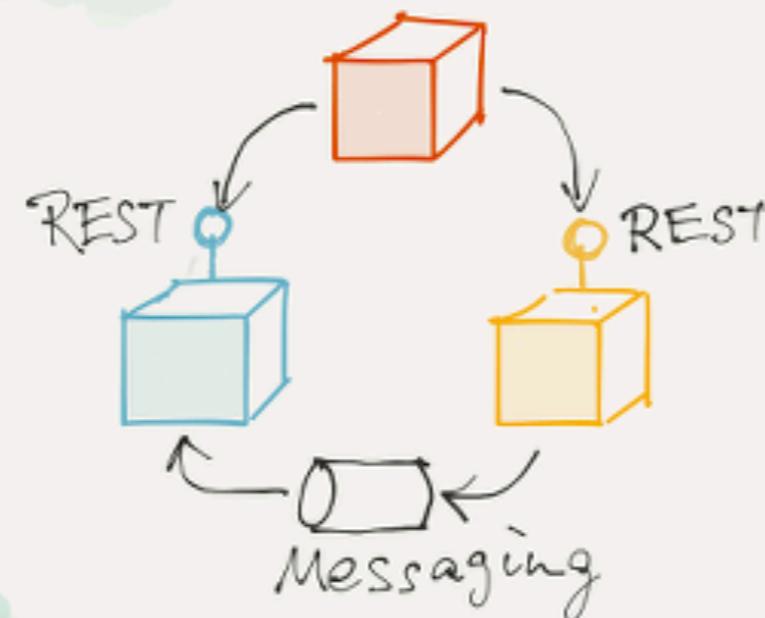
Conway's Law



Architecture



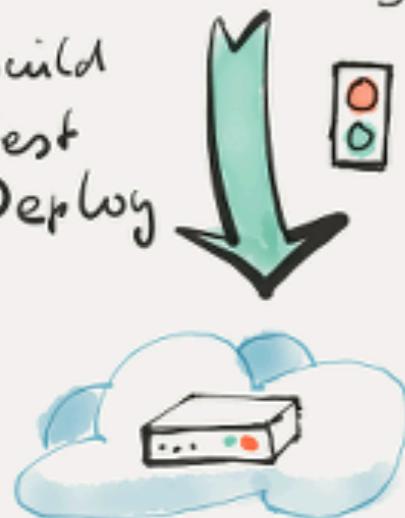
Microservices



Deployment

Continuous Delivery

`{ var i=1; }`
Build
Test
Deploy



Infrastructure

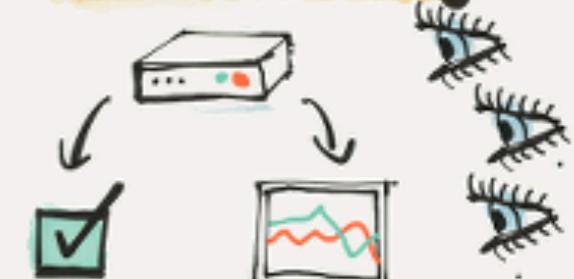


People & Teams



Communication
Collaboration

Monitoring



Features & Technology

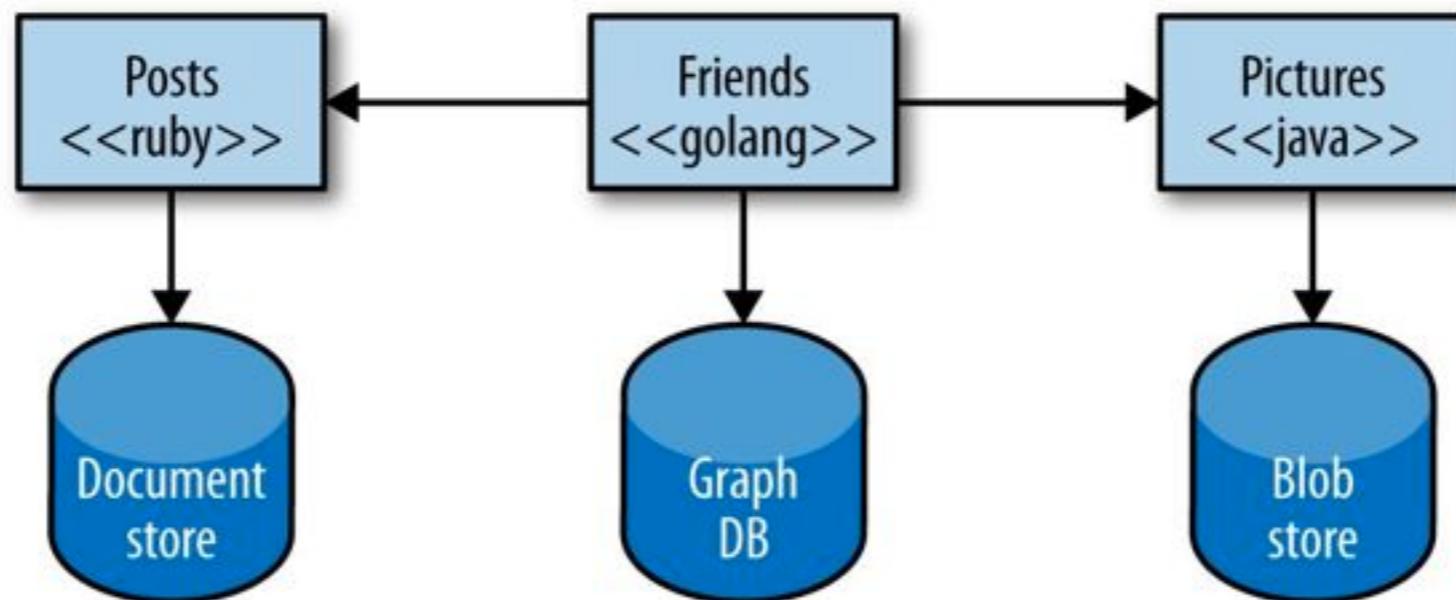


Key Benefits

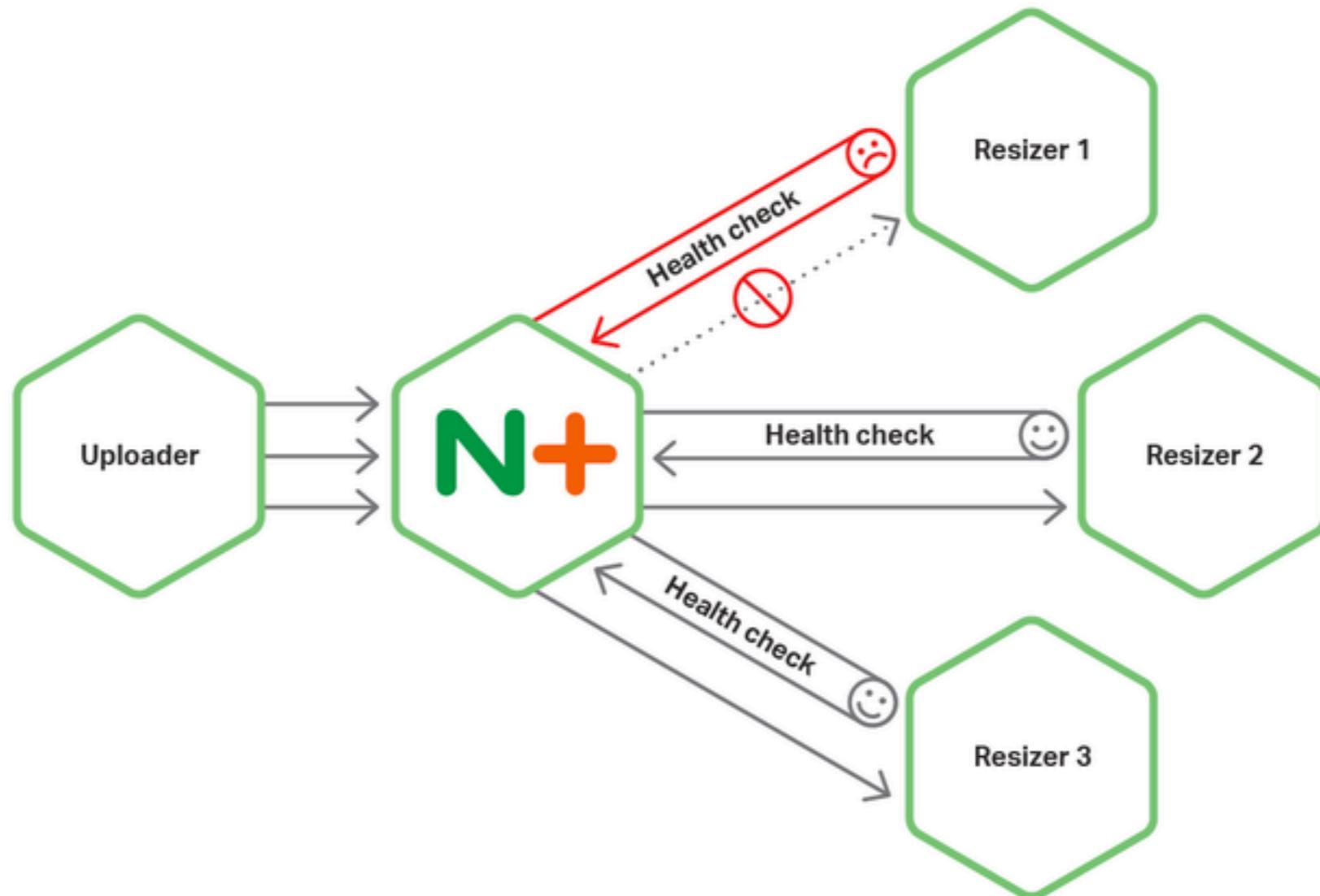


1. Technology heterogeneity

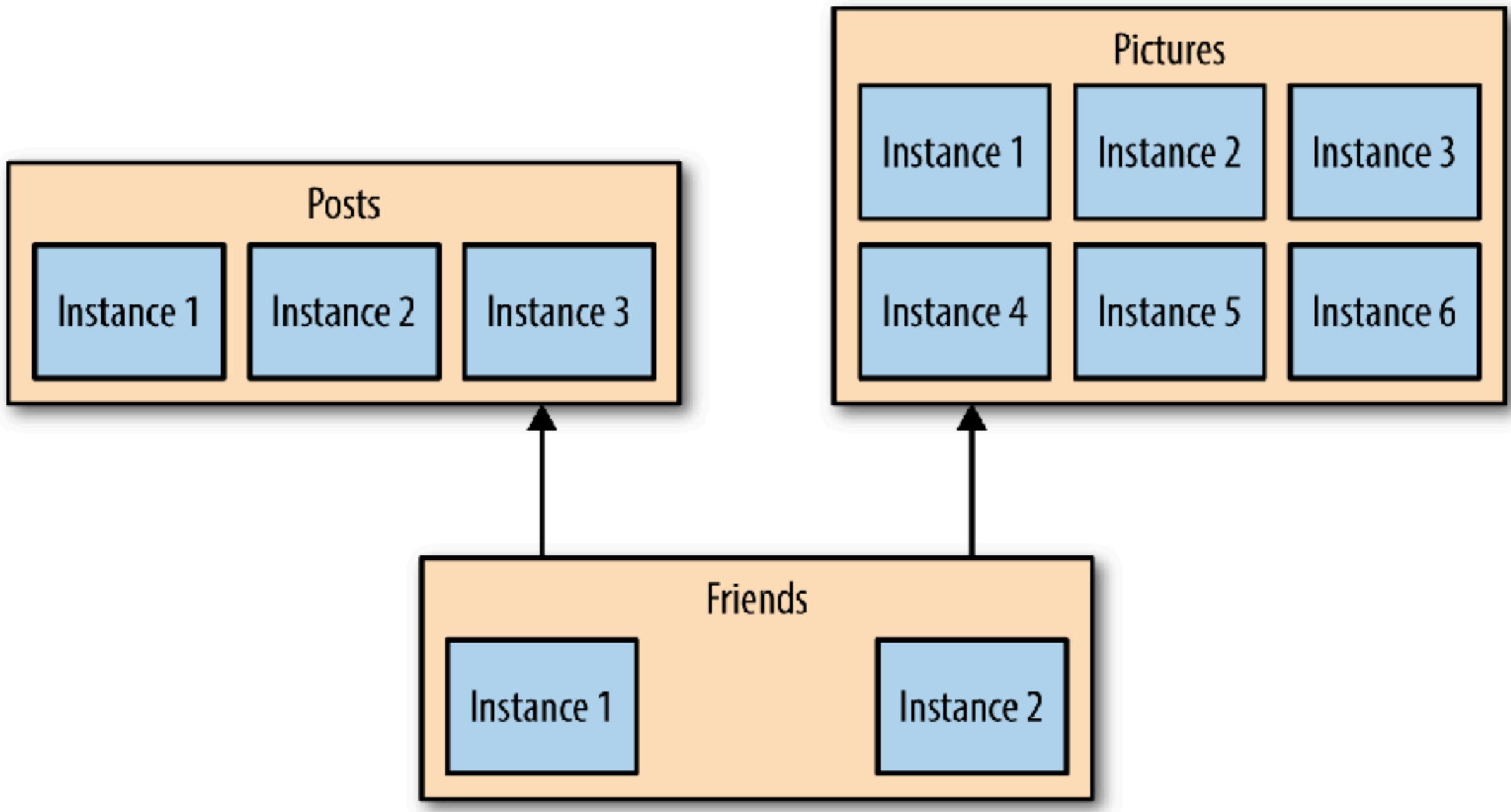
The right tool for each job



2. Resilience

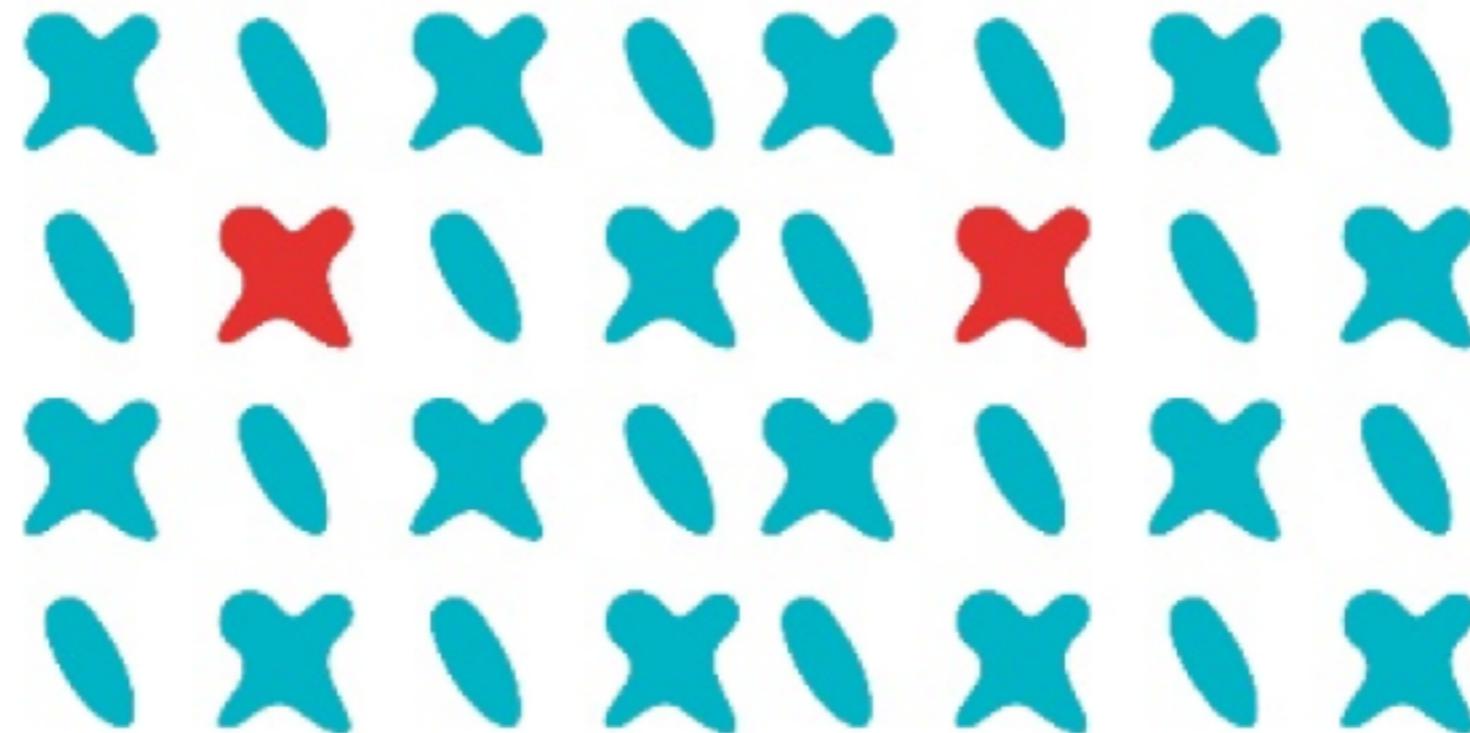


3. Scaling



4. Ease of deployment

Deploys are faster, independent and problems can be isolated more easily

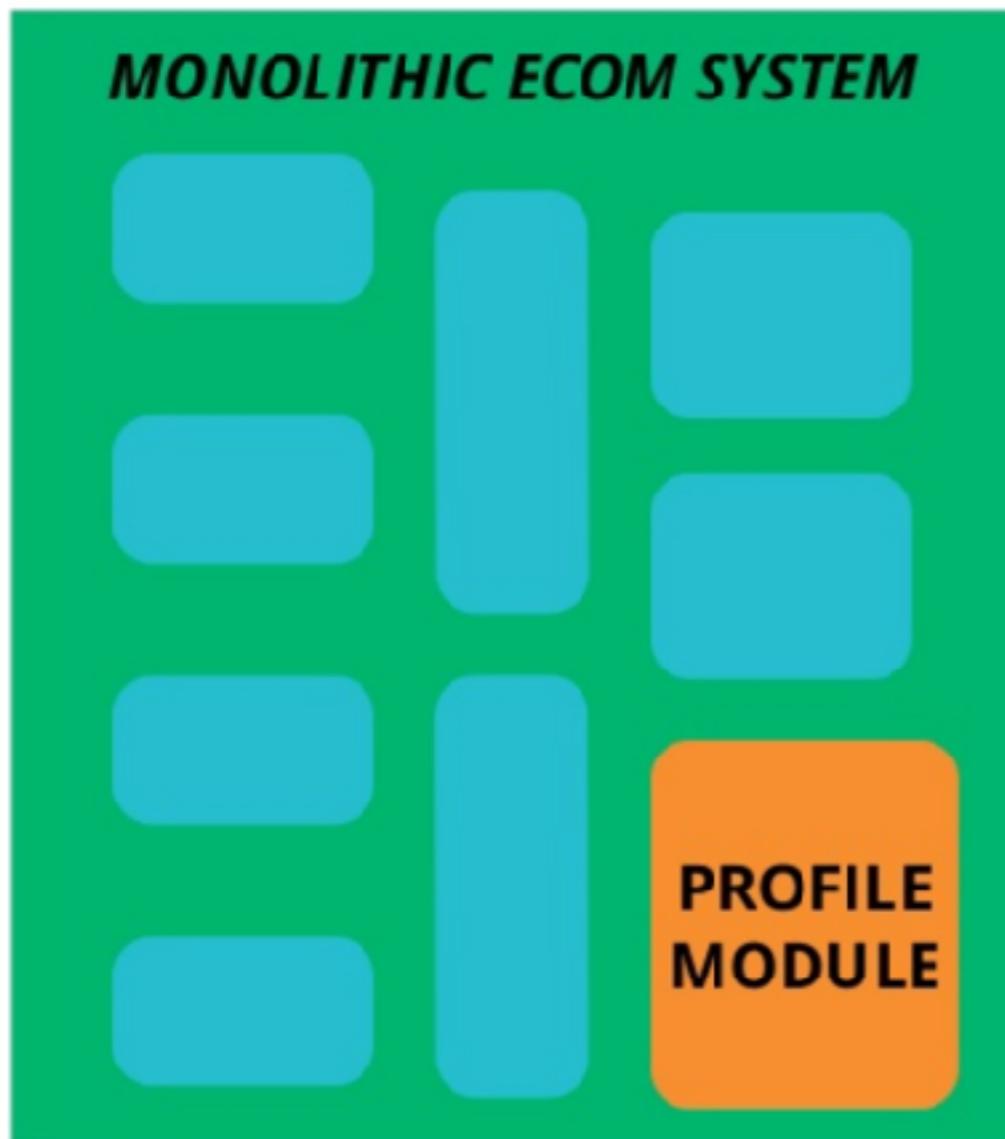


5. Organization alignment

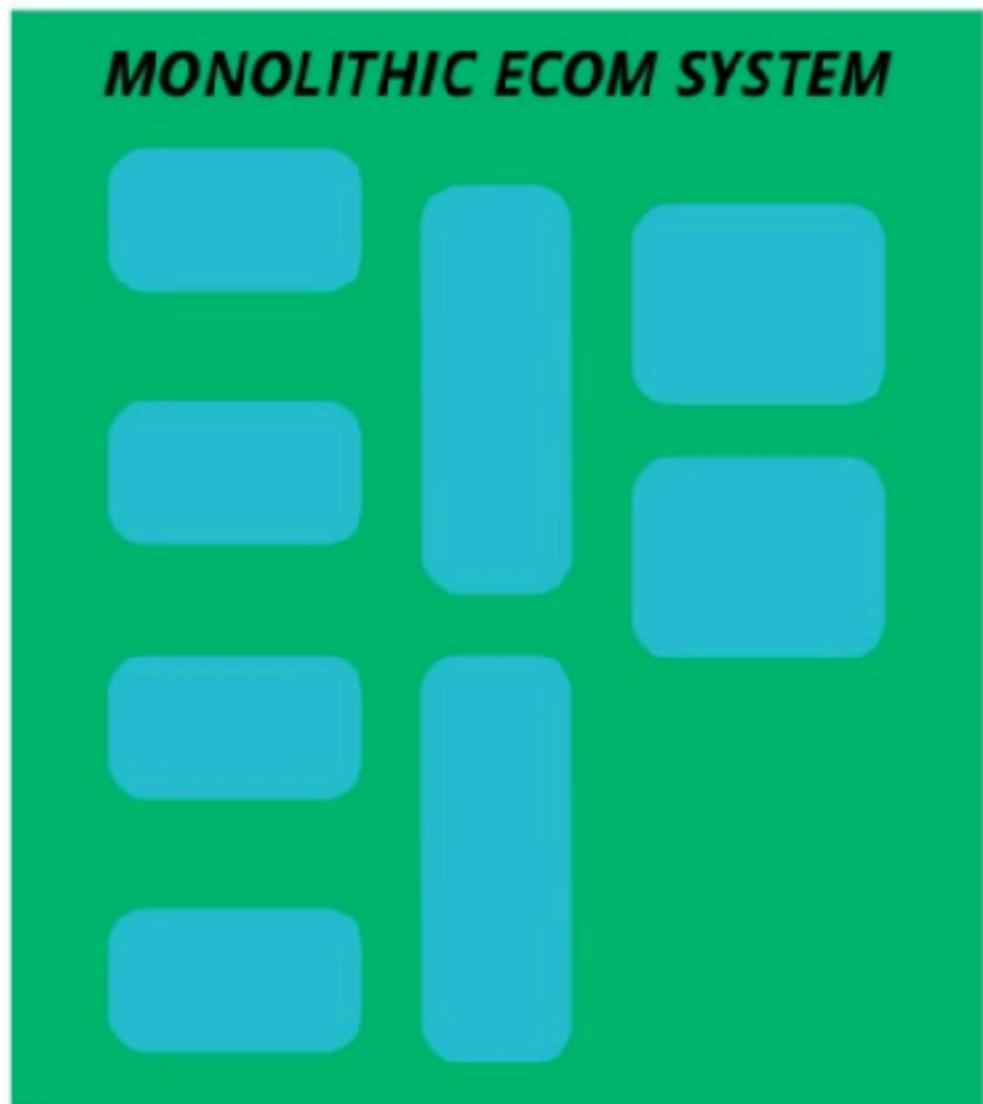
Small teams and smaller codebases



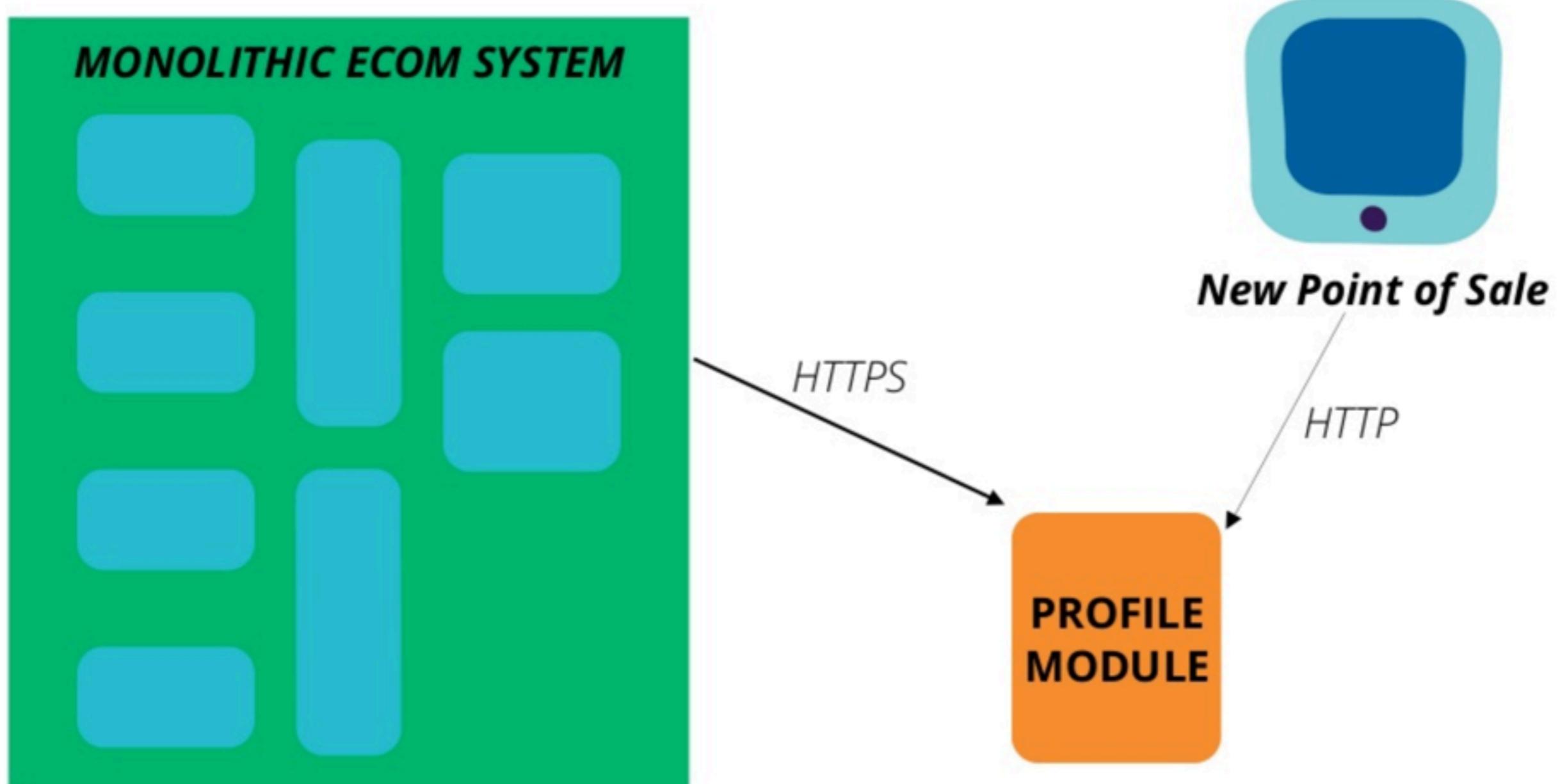
6. Composability and replaceability



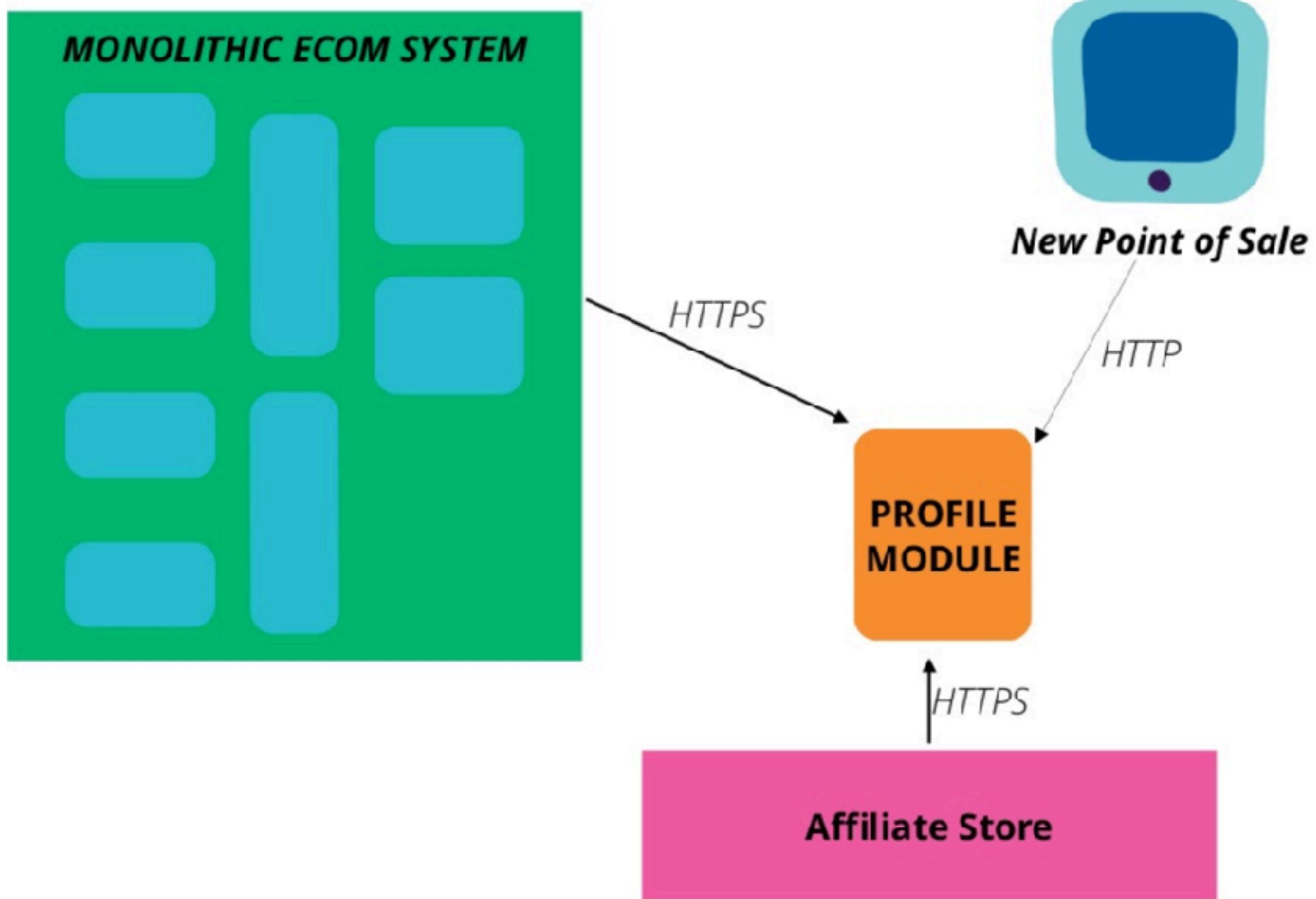
6. Composability and replaceability



6. Composability and replaceability



6. Composability and replaceability



Characteristics



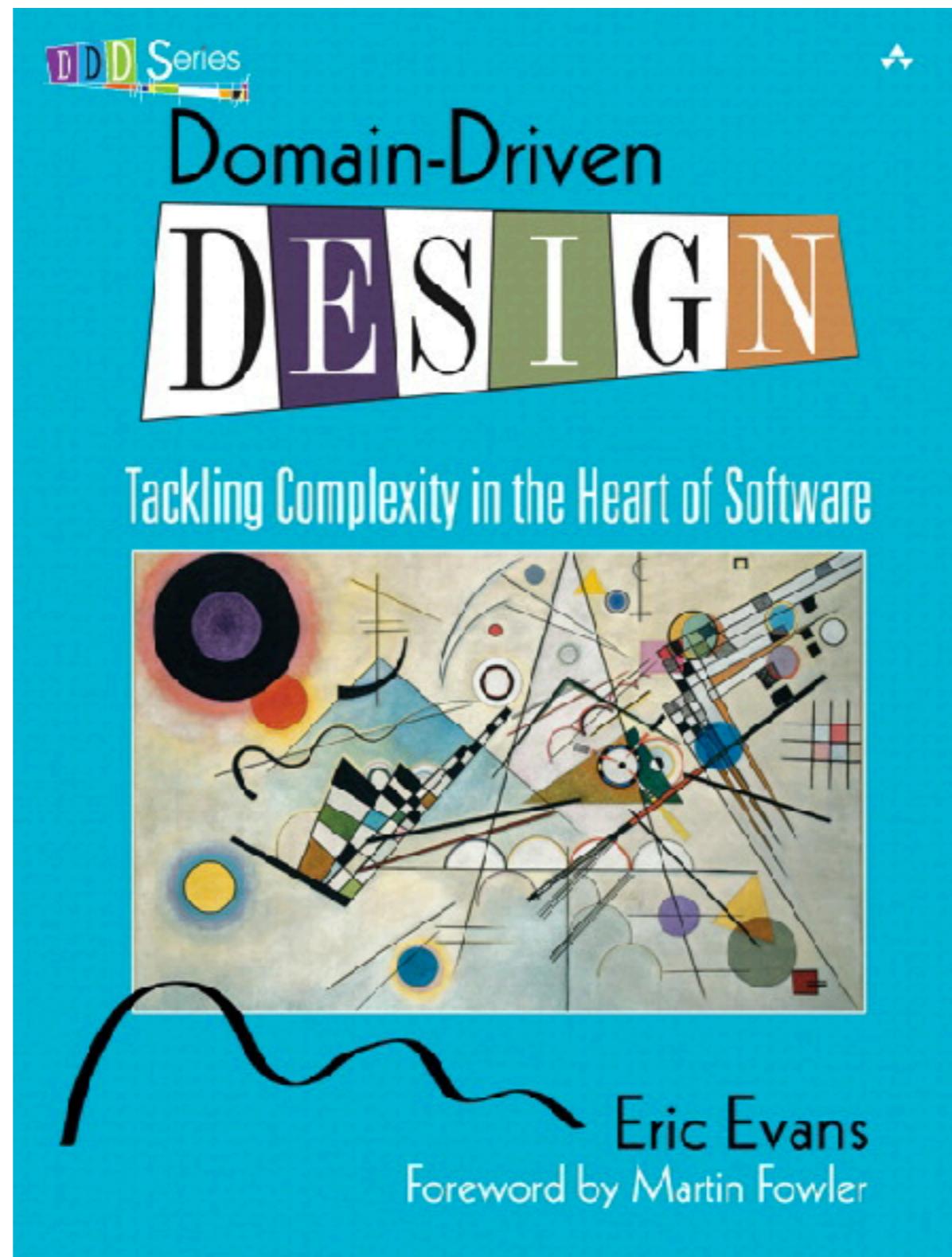
1. Responsible for a single capability



Types of capabilities

Business capability
Technical capability





2. Individually deployable



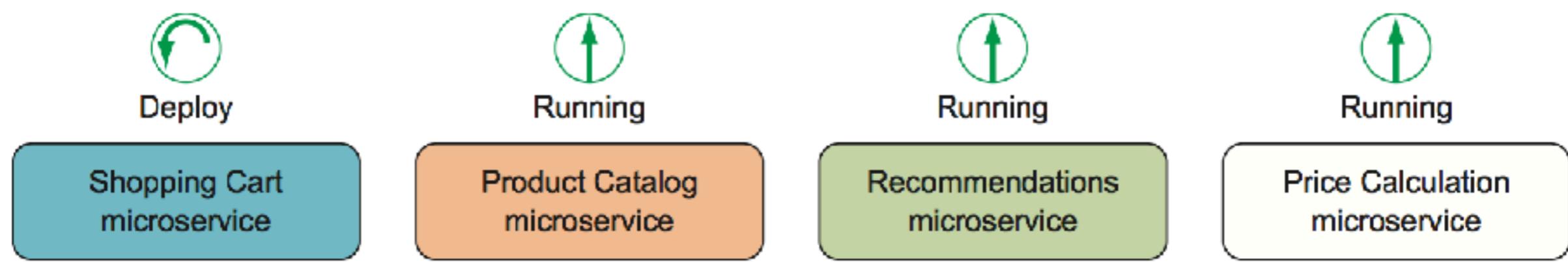


Figure 1.2 Other microservices continue to run while the Shopping Cart microservice is being deployed.



3. Consists of one or more processes



**Problematic process boundary.
Microservices should run in separate
processes to avoid coupling.**

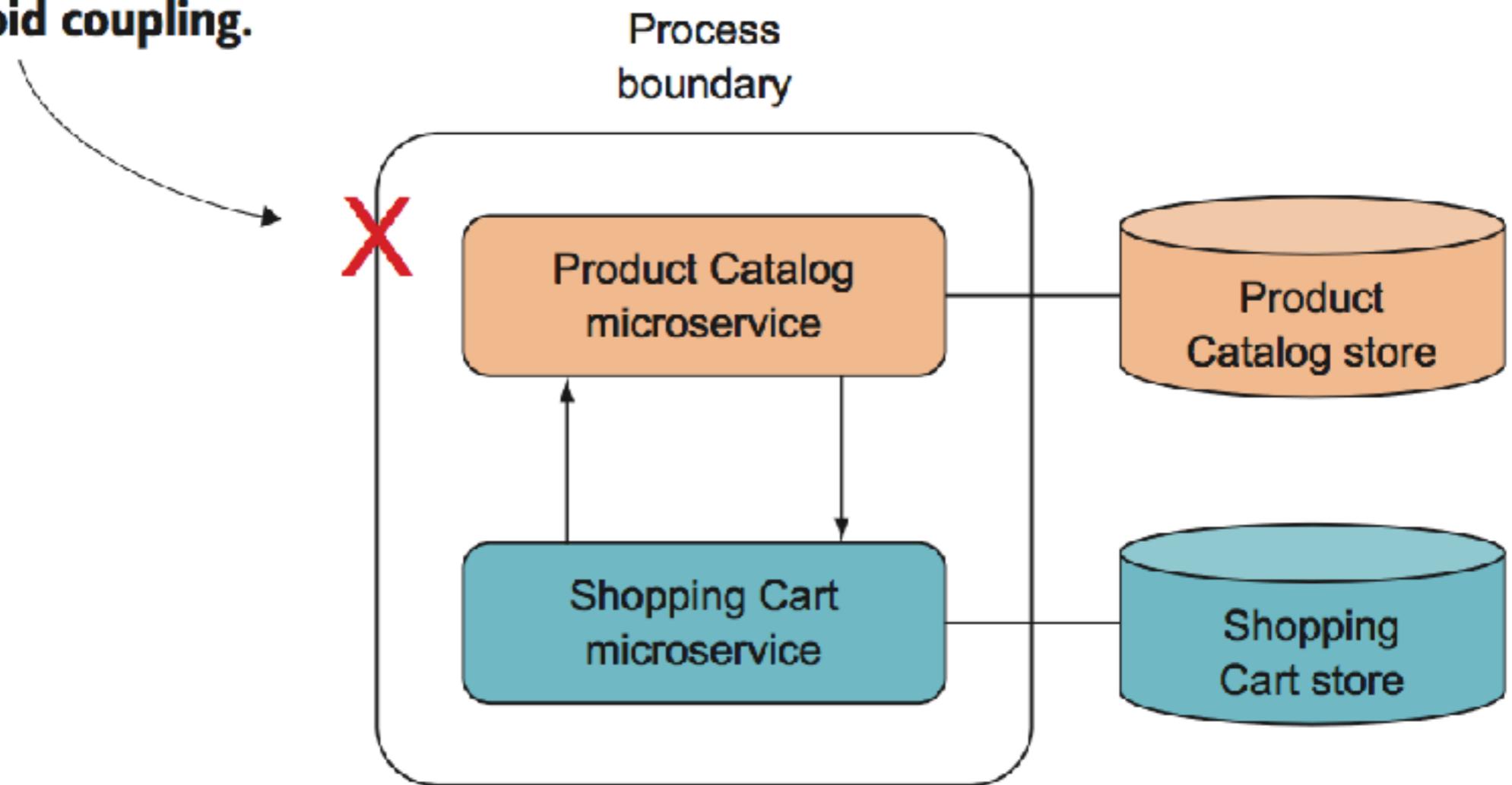


Figure 1.3 Running more than one microservice within a process leads to high coupling.



4. Own data store



All communication with the Product Catalog microservice must go through the public API.

Direct access to the Product Catalog store is not allowed. The Product Catalog microservice owns the Product Catalog store.

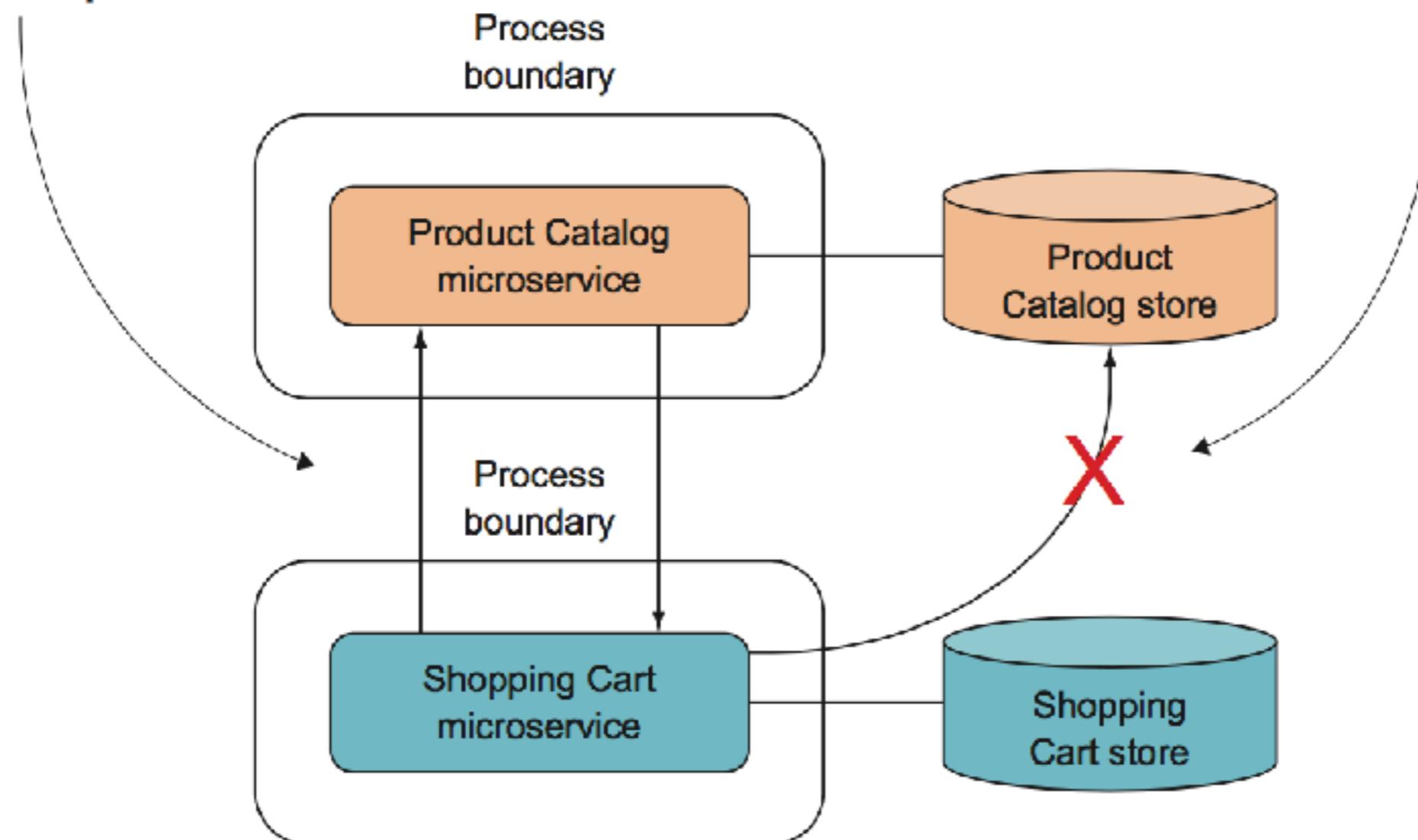


Figure 1.4 One microservice can't access another's data store.



5. Small team can maintain



6. Replaceable



Enabled system

Flexible
Scalable
Resilient



Challenges with Microservices ?



1. How to define the boundaries of each microservices ?



2. How to create queries that retrieve data from several microservices ?



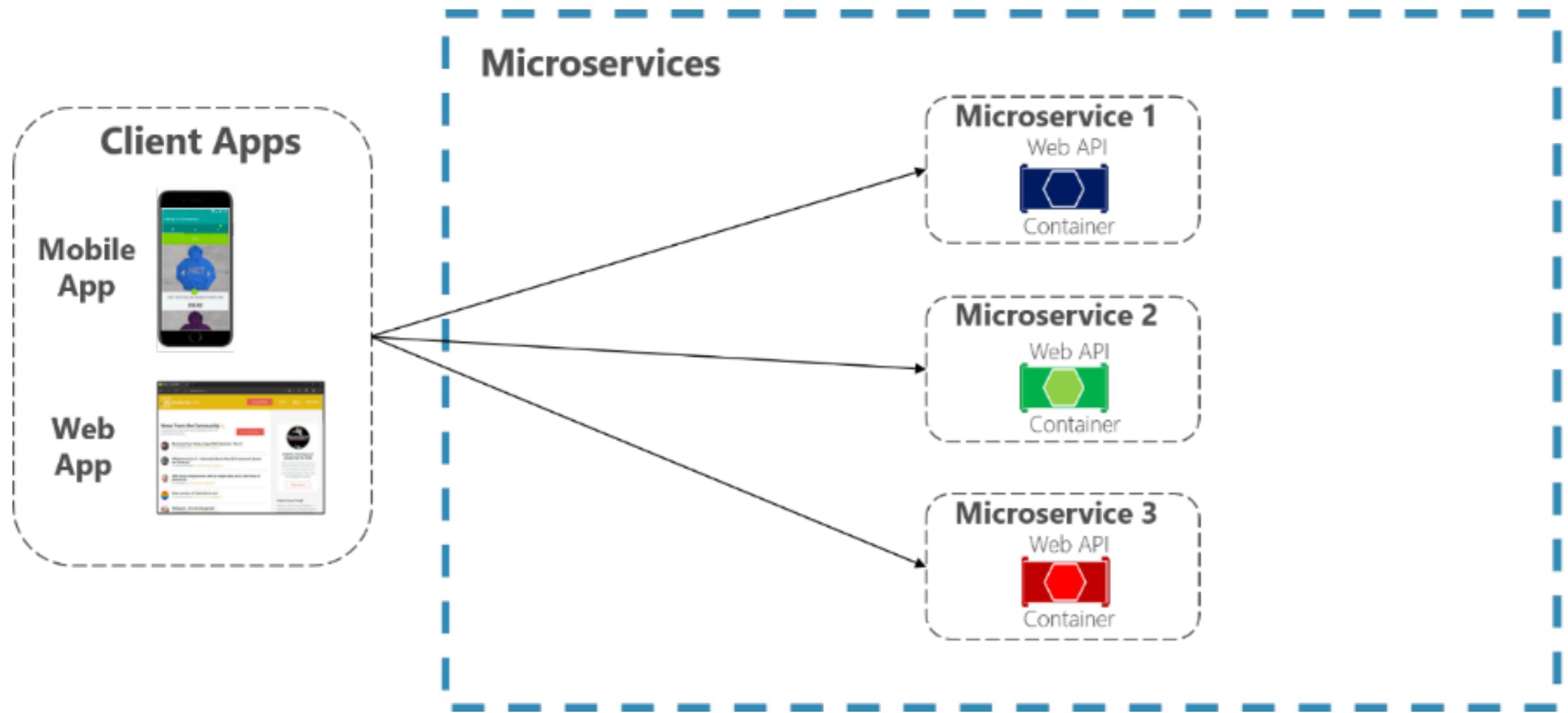
Popular solutions

API Gateway
CORS with query/read tables
Cold data in centralize database

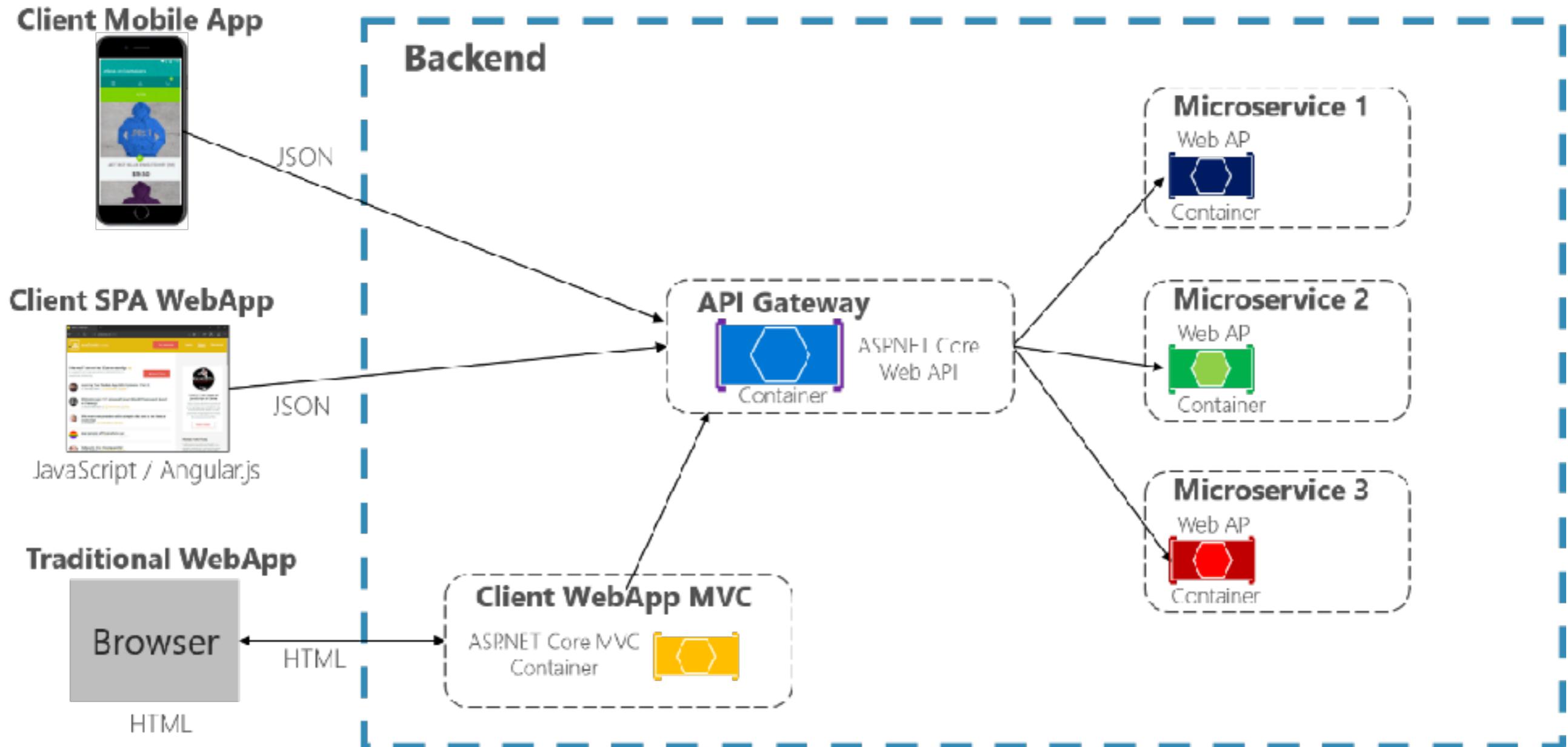


Direct Client-To-Microservice communication

Architecture

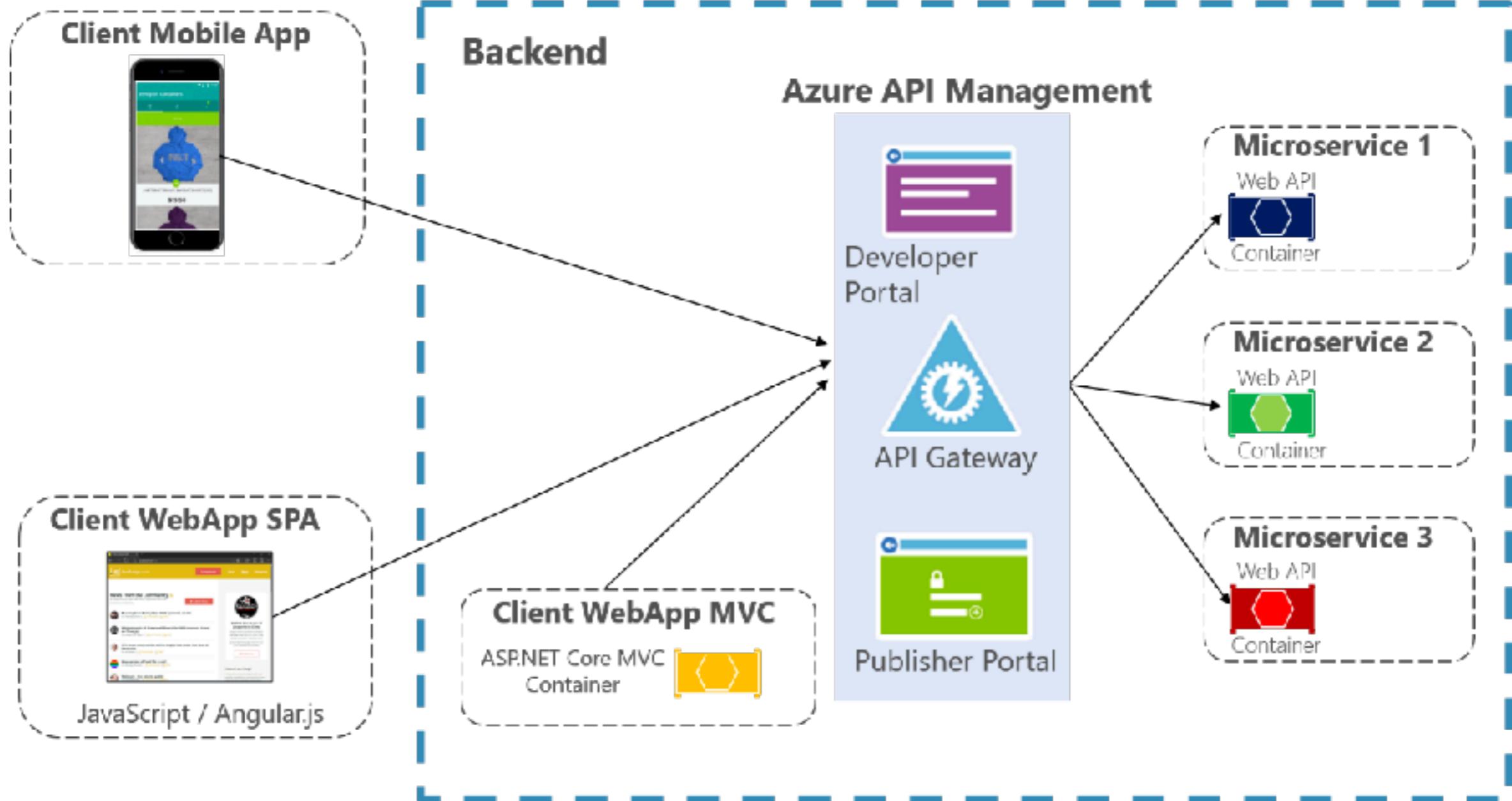


Using the API Gateway Service



API Gateway with Azure API Management

Architecture



3. How to achieve consistency across multiple microservices ?



Ordering microservice

Ordering API



ID	Quantity	ProductID

OrderItems Table
in Ordering-DB
(Remote SQL)

Catalog microservice

Catalog.API



ID	Stock	Name

Products Table
in Catalog-DB
(Remote SQL)

Don't

Databases are private per microservice

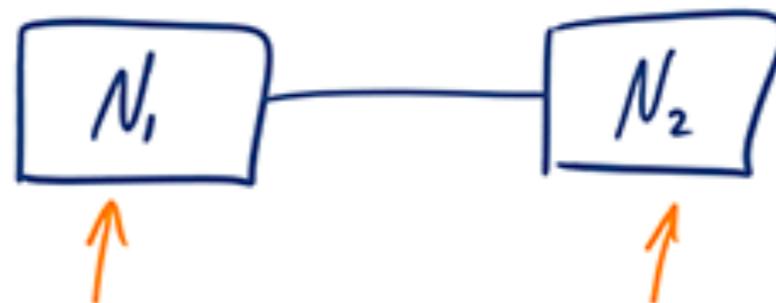


CAP Theorem

Consistency



Availability



Partition Tolerance



<http://robertgreiner.com/2014/08/cap-theorem-revisited/>



Microservices

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4. How to design communication across microservices boundaries ?



Protocols

HTTP and REST
AMQP
Messaging



Communication

Request-Response model
Observer model

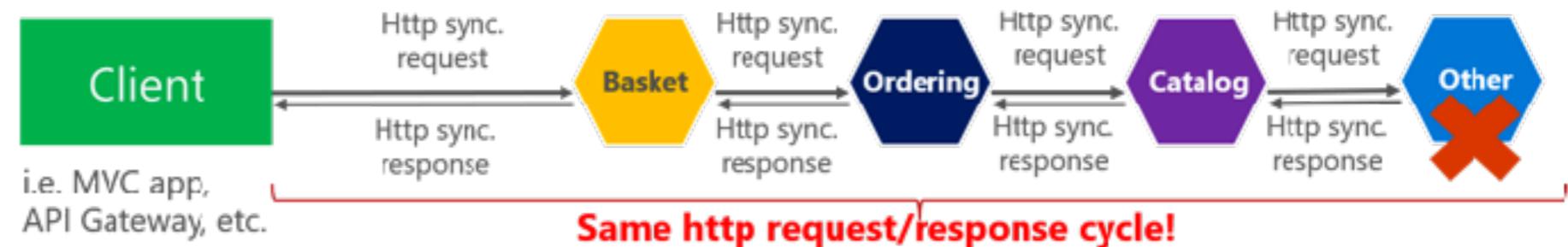


Communication

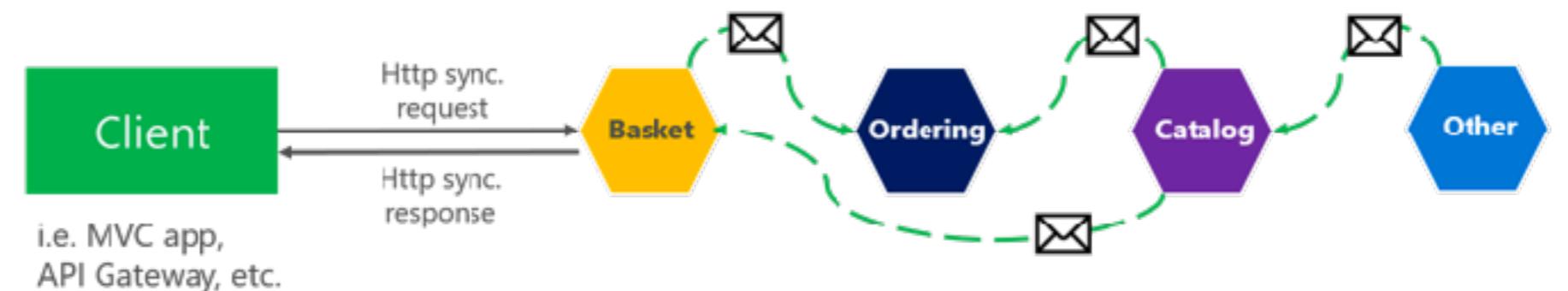
Synchronous vs. async communication across microservices

Anti-pattern

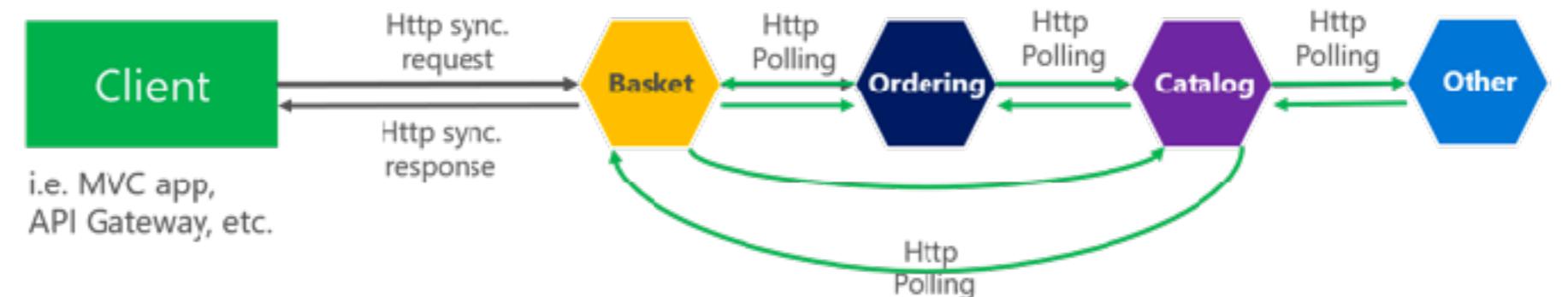
Synchronous
all req./resp. cycle



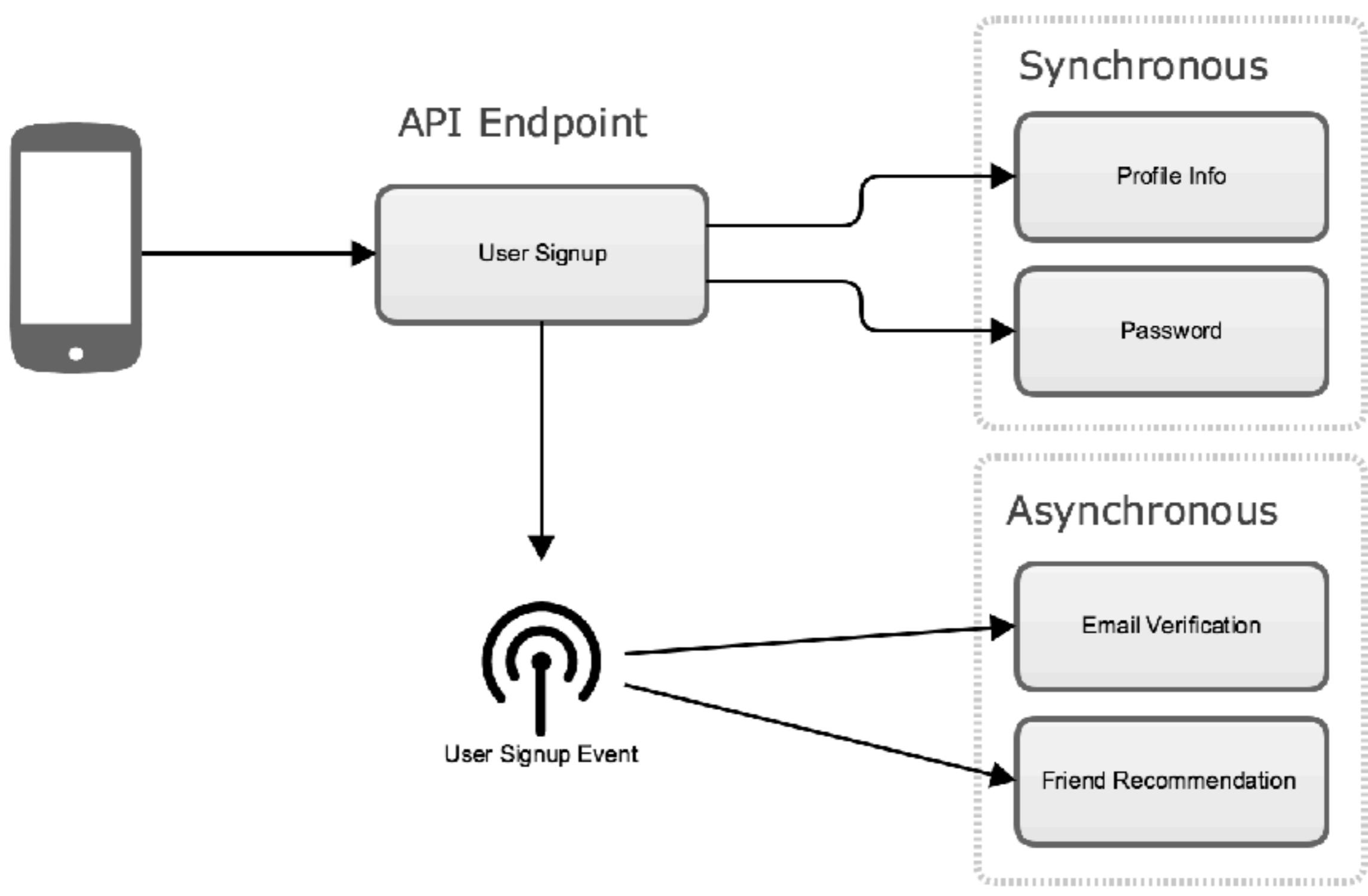
Asynchronous
Comm. across
internal microservices
(EventBus: i.e. **AMQP**)



"Asynchronous"
Comm. across
internal microservices
(Polling: **Http**)

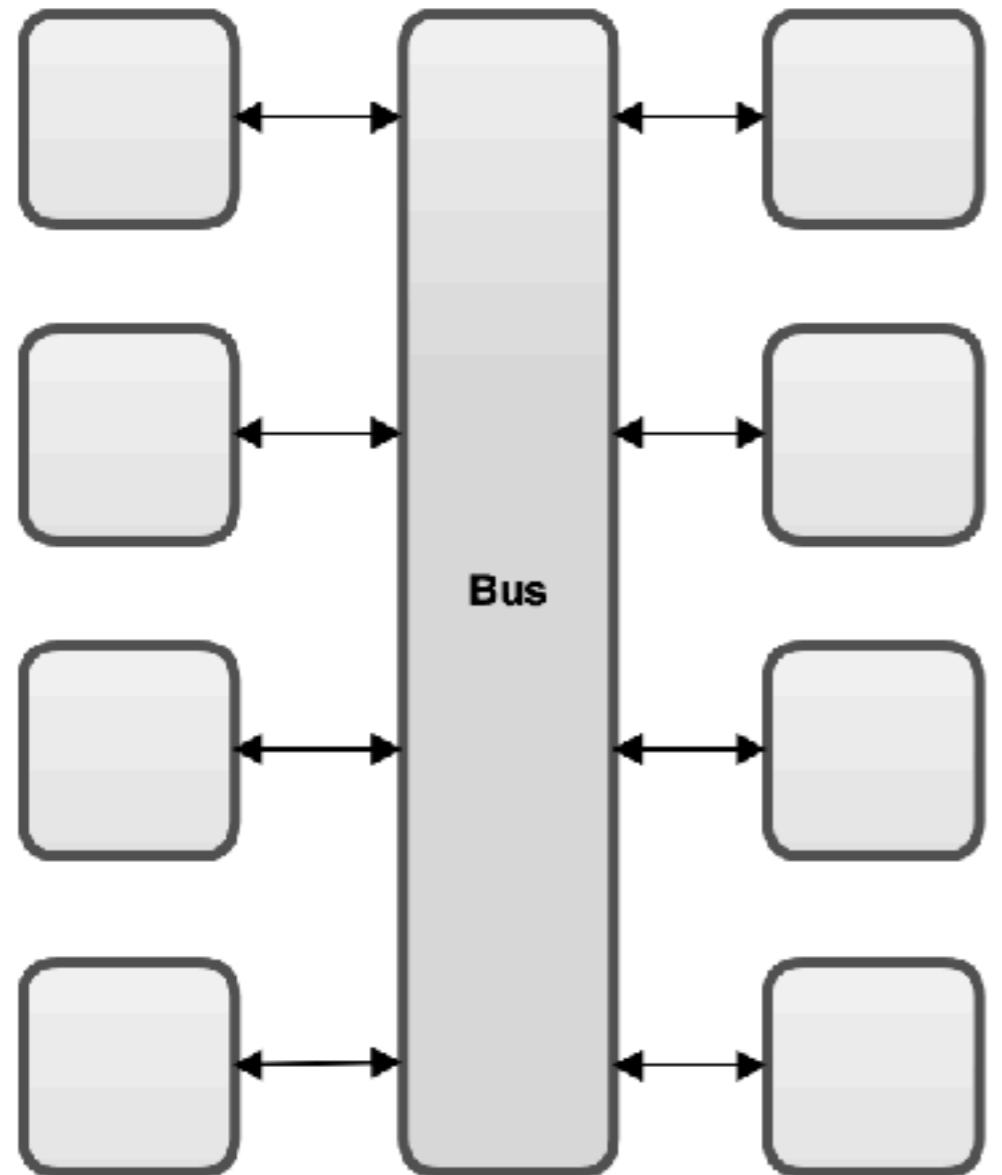


Communication

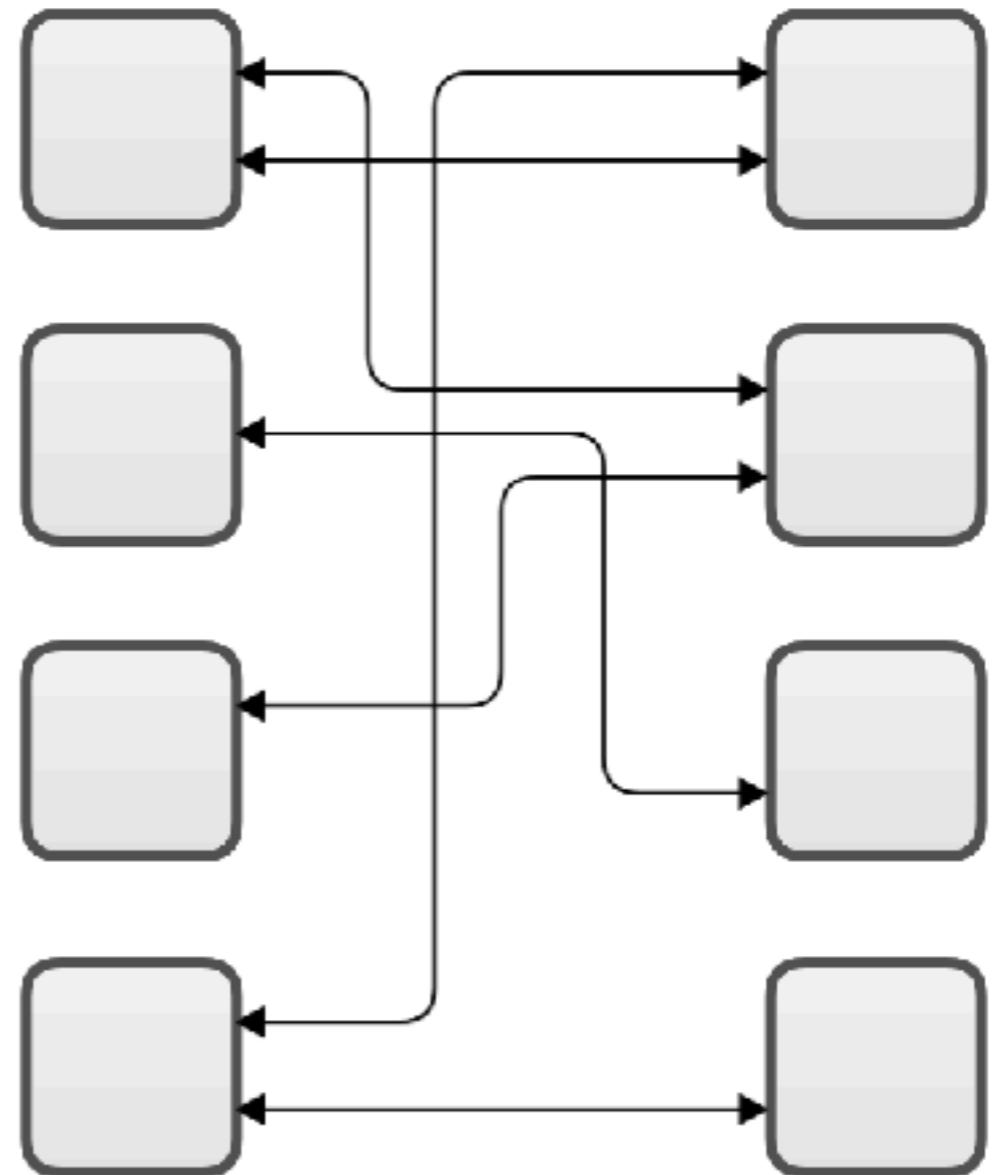


Anti-pattern :: centralize bus service

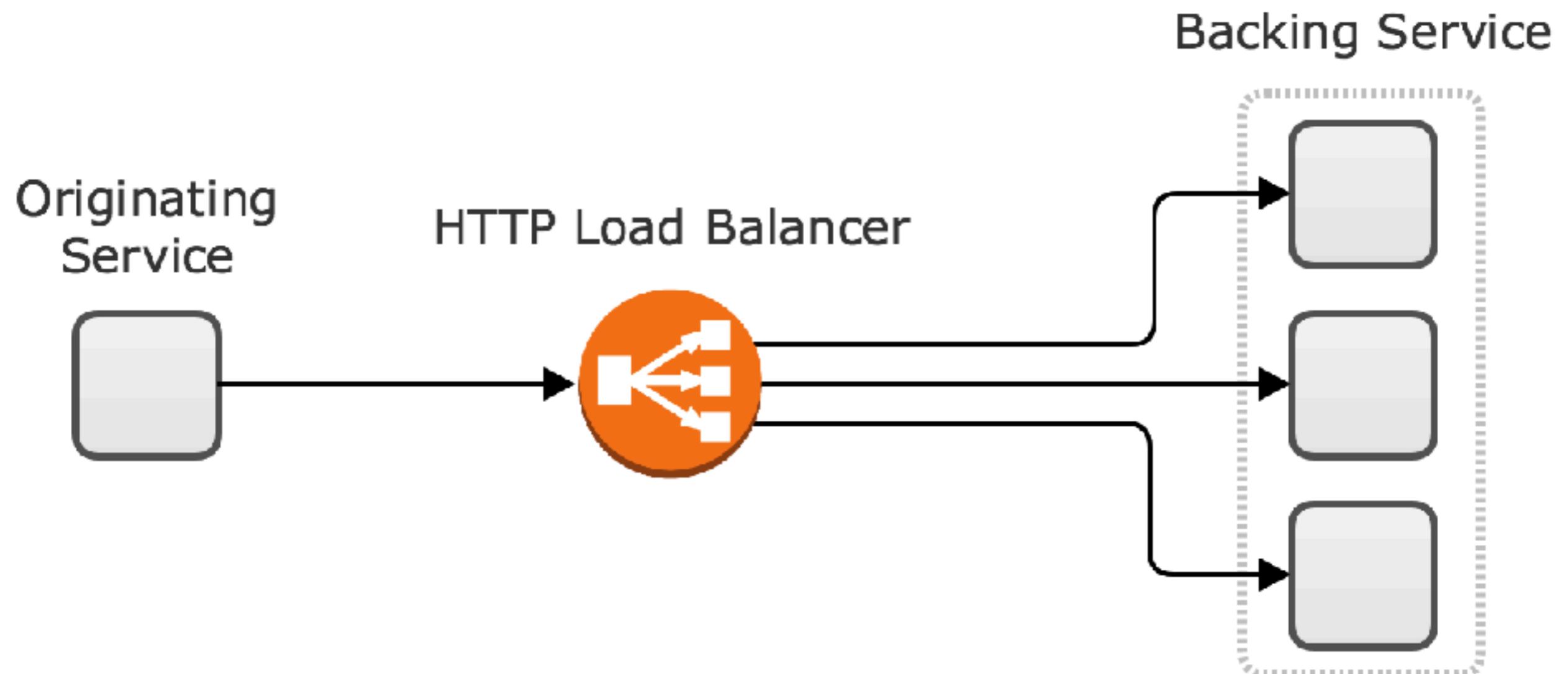
Central Bus



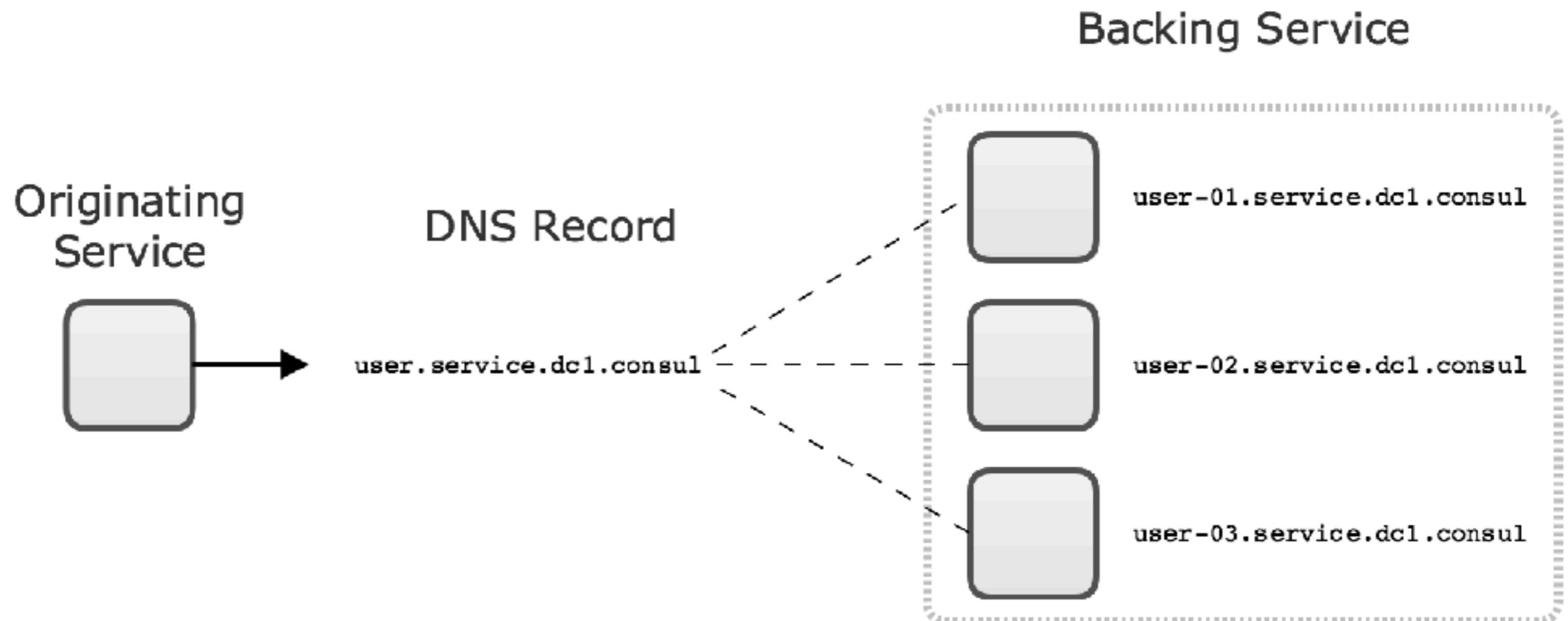
Decentralized



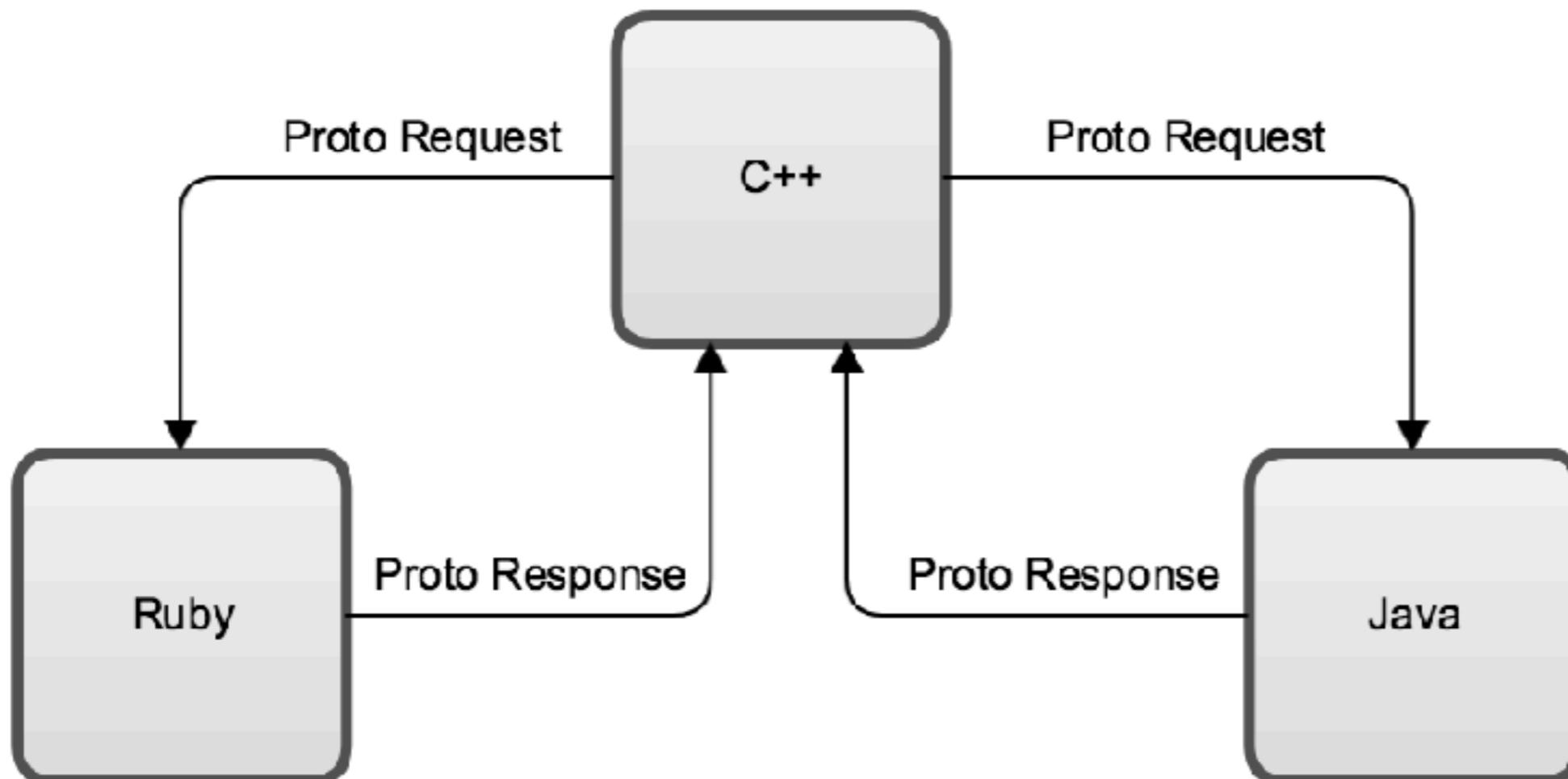
Request-response model



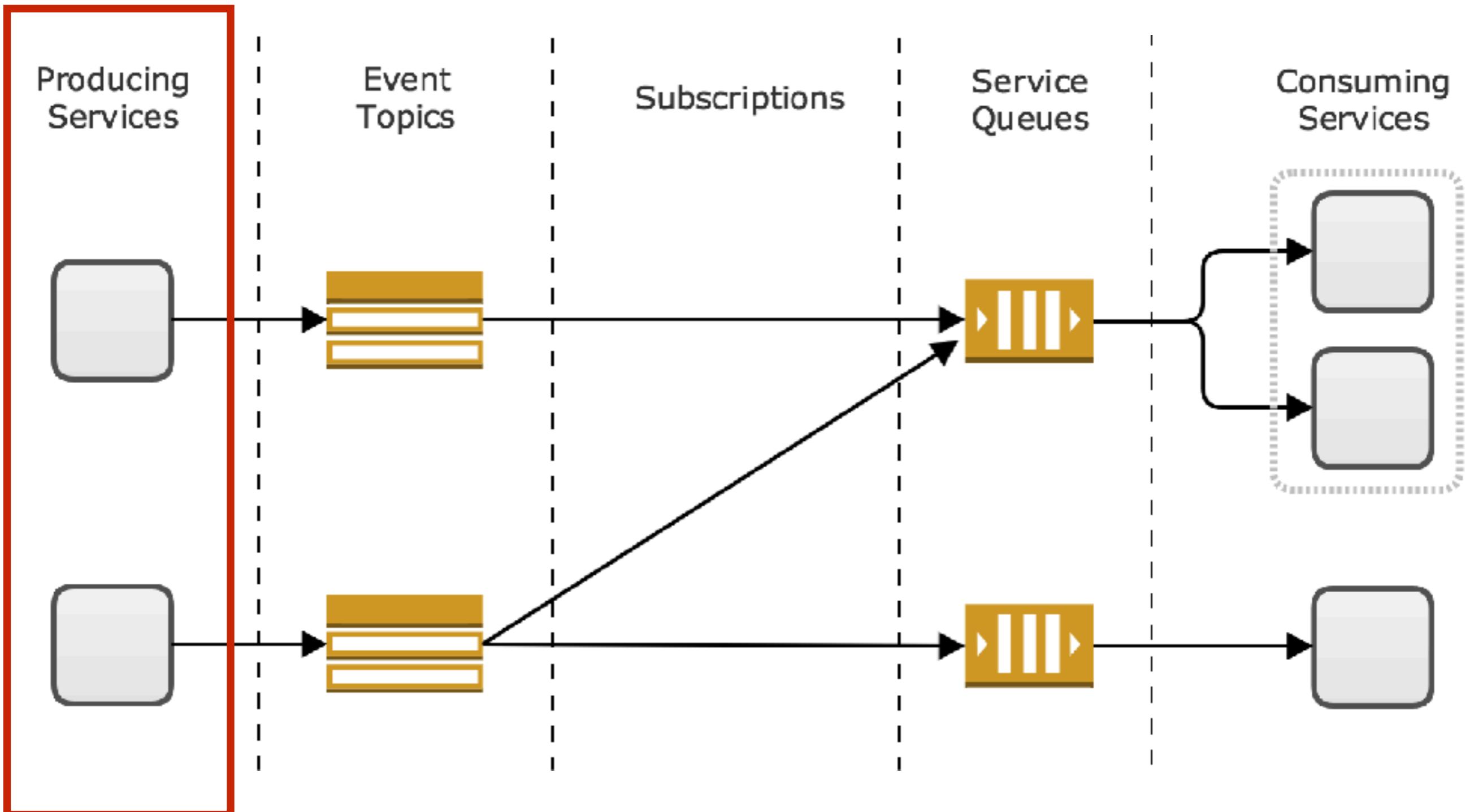
Request-response model



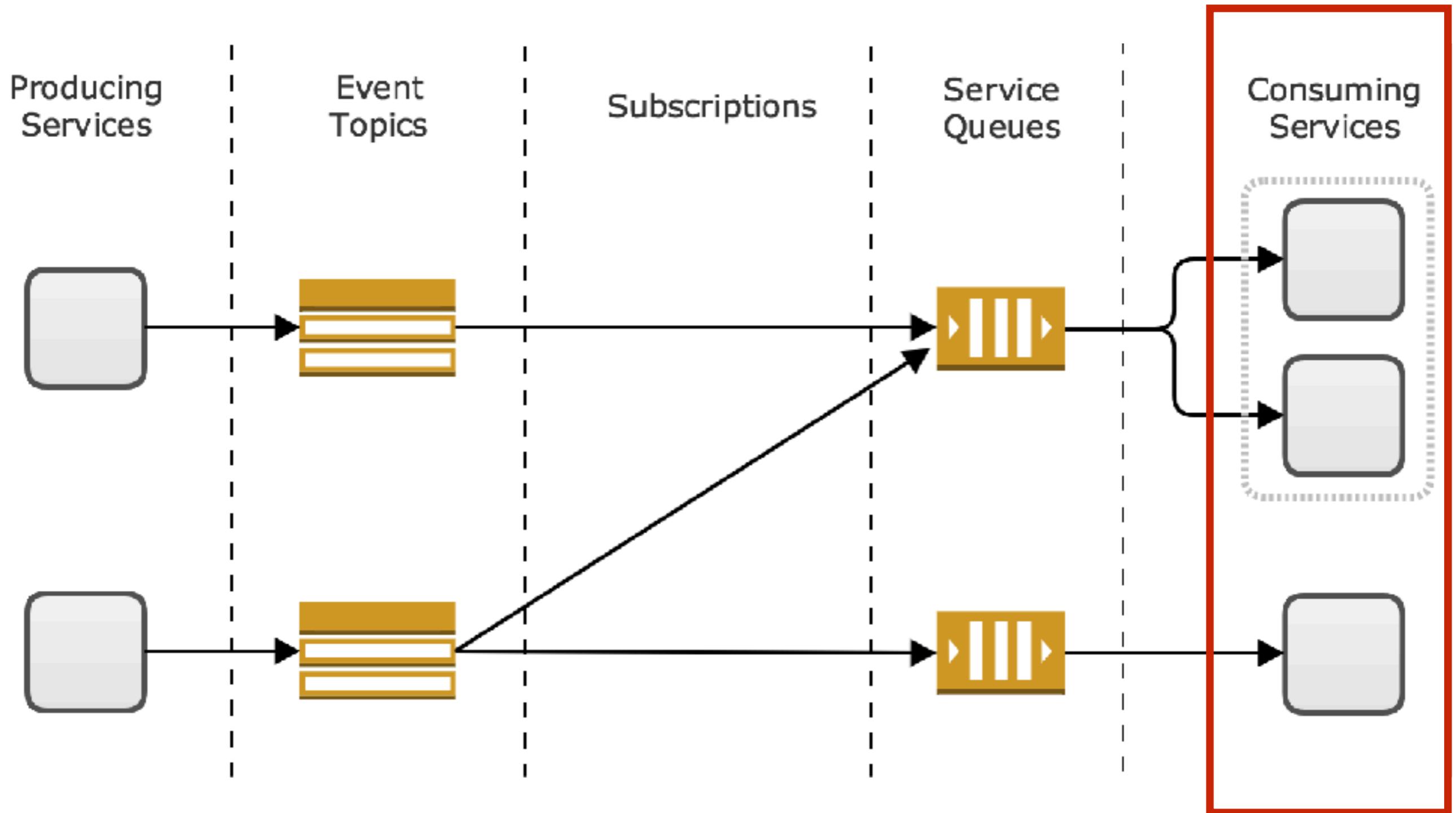
Request-response model



Observer model



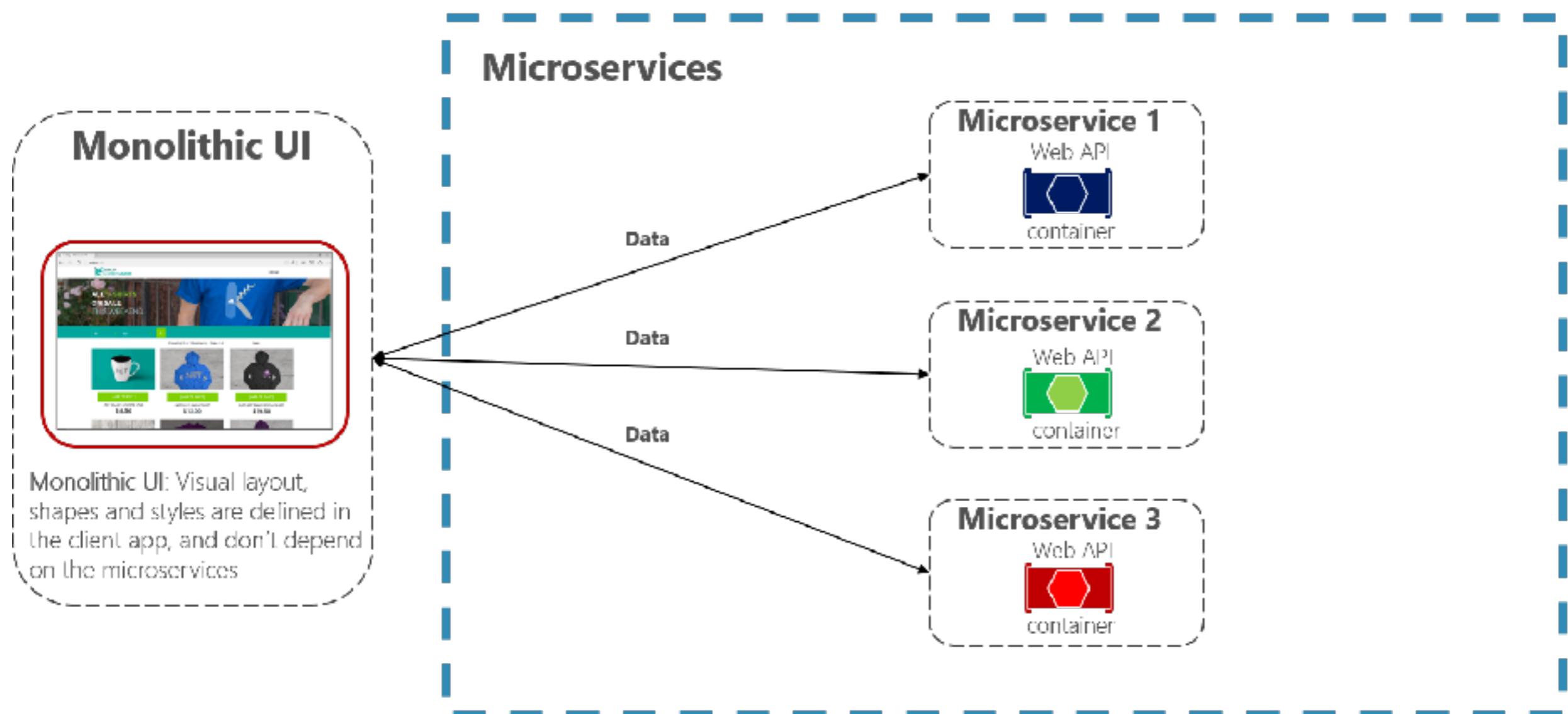
Observer model



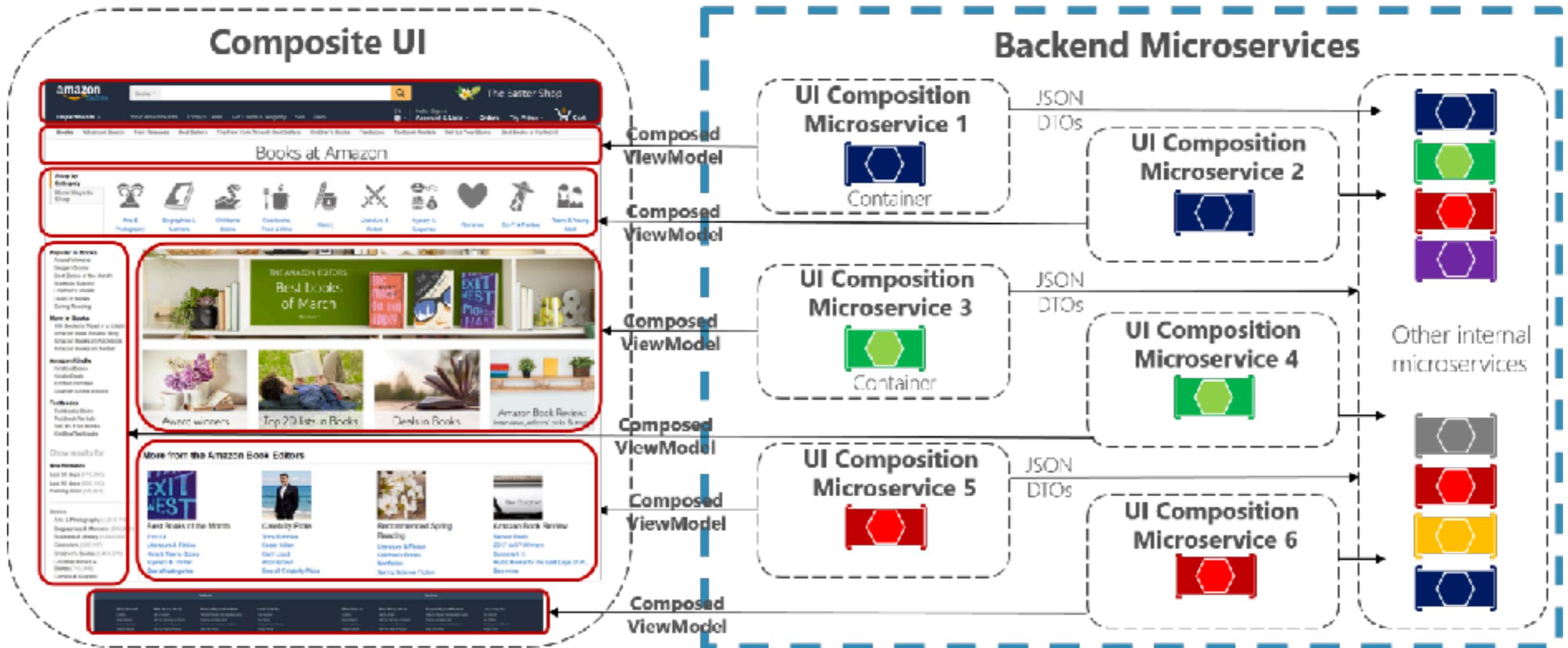
Integrate with User Interface

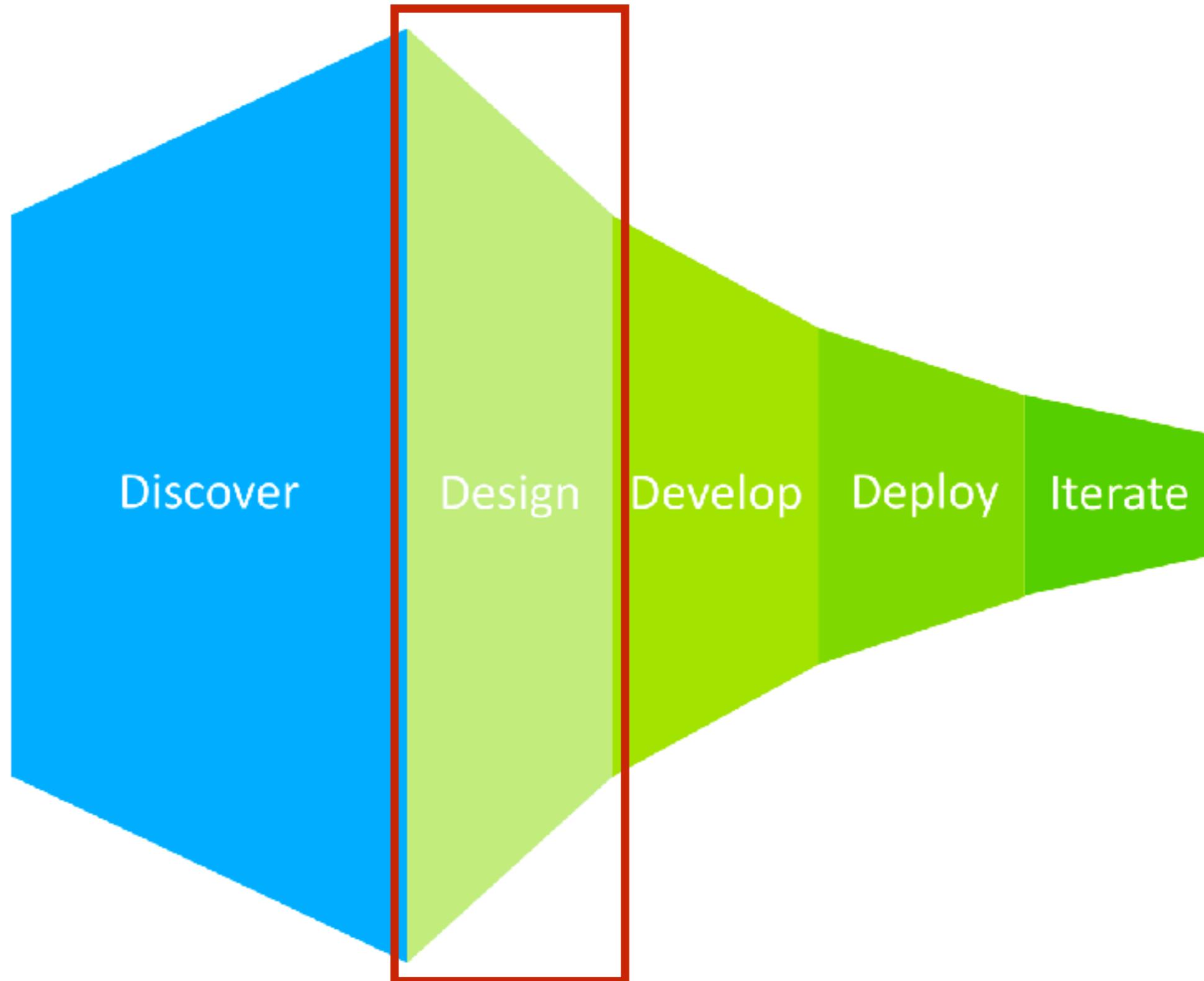


Monolithic UI consuming microservices



Composite UI generated by microservices





Let's workshop with Design



E-commerce system



1. Search product by name

Adidas NMD

350 ค้นพบสินค้าสำหรับ "Adidas NMD"

เรียงตาม: ความเป็นที่นิยม

จำนวนคณิต:

Adidas Yeezy Boost 350 V2 Beluga 2.0 (AH2203)	฿28,900.00	฿30,000.00 -28%	รายละเอียด
Adidas NMD R1 Primeknit Core Black / Core Black...	฿9,900.00	฿15,000.00 -34%	รายละเอียด
Adidas NMD R1 PK Japan Triple Black (BZ0220)	฿12,900.00	฿15,000.00 -14%	รายละเอียด
POCA SHOE NMD Sneakers Fashion รองเท้า ลำลอง ผ้าใบ ...	฿399.00	฿1,000.00 -79%	รายละเอียด
Adidas NMD R1 Color Core Black/Icey Blue (BY9951)	฿7,990.00	฿12,000.00 -33%	รายละเอียด



2. Choose a product

Adidas NMD

🔍 ⚒ ร้านค้า ทางการ ⚒ Taobao คอลเลกชัน ⚒ ไฟฟ์สไตร์ & เติมเงิน ⚒ สโตร์ดี สตอร์เพิม

350 ค้นพบสินค้าสำหรับ "Adidas NMD"

เรียงตาม: ความเป็นที่นิยม

จำนวนคณิต:

Adidas Yeezy Boost 350 V2 Beluga 2.0 (AH2203) ฿28,900.00 ฿30,000.00 -28%	Adidas NMD R1 Pimeknit Core Black / Core Black... ฿9,900.00 ฿15,000.00 -34%	Adidas NMD R1 PK Japan Triple Black (BZ0220) ฿12,900.00 ฿15,000.00 -14%	POCA SHOE NMD Sneakers Fashion รองเท้า ลำลอง ผ้าใบ ... ฿399.00 ฿1,000.00 -79% 🔥 ★★★★★ (70) ลูกค้าป้าราก	Adidas NMD R1 Color Core Black/Icey Blue (BY9951) ฿7,990.00 ฿12,000.00 -33% ★★★★★ (1) ลูกค้าป้าราก



3. Show product detail

POCA SHOE NMD Sneakers Fashion รองเท้า ลำลอง ผ้าใบ ผู้หญิง-ผู้ชาย แฟชั่น
ราคาถูกswyฯ Sport Unisex รุ่น PSN-Black/White

★★★ (70) แสดงความคิดเห็น
ชื่อ Poca Shoes | เพิ่มเติม สุภาพบุรุษ จาก Poca Shoes



2 Weeks Warranty by Seller [เพิ่มเติม](#)

- สวมใส่สบาย
- [เพิ่มเติม](#)

เลือก ขนาด

ขนาด [เลือก](#)

399 บาท

ราคาปกติ 1,900 บาท,
ประหยัดทันที 79%
ราคาโปรโมชั่นสามารถใช้ได้กับ 25/2/2018

เลือกกร้า

← [วิธีการสั่งซื้อ](#)



4. Add product to basket

POCA SHOE NMD Sneakers Fashion รองเท้า ลำลอง ผ้าใบ ผู้หญิง-ผู้ชาย แฟชั่น
ราคาถูกswyxy Sport Unisex รุ่น PSN-Black/White

★★★★ (70) แสดงความคิดเห็น

ชื่อ Poca Shoes | เพิ่มเติม สุภาพบุรุษ จาก Poca Shoes



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- สวมใส่สบาย [เพิ่มเติม](#)

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ขนาด [เปลี่ยน](#)

399 บาท

ราคาปกติ 1,900 บาท,
ประหยัดทันที 79%
ราคาโปรโมชั่นสามารถใช้ได้กับ 25/2/2018

ใส่ตะกร้า



วิธีการสั่งซื้อ



Microservices

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5. Show data in basket

✓ สินค้า 1 ชิ้น ได้ถูกเพิ่มเข้าไปยังตะกร้าสินค้าของคุณ



POCA SHOE NMD Sneakers
Fashion รองเท้า ล่าสุด ผ้าใบ ผู้หญิง-ผู้ชาย แฟชั่น ราคาถูกswy Sport
Unisex รุ่น PSN-Black/White

ไซส์: EU:40

Poca Shoes

399 บาท

1,900 บาท 79% ลด

ตะกร้าสินค้าของคุณ (1 สินค้า)

มูลค่าสินค้า: **399 บาท**

ยอดสุทธิ รวมภาษีมูลค่าเพิ่ม (จำนวน): **399 บาท**

[เลือกชื่อสินค้าต่อ](#)

[ชำระค่าสินค้า](#)

People Who Bought This Item Also Bought



กางเกงสแลคขายาว Hopper Progress พั้ยิด ทรงเข้ารูป

900 บาท

67% ลด

299 บาท



6. Checkout

✓ สินค้า 1 ชิ้น ได้ถูกเพิ่มเข้าไปยังตะกร้าสินค้าของคุณ



POCA SHOE NMD Sneakers
Fashion รองเท้า ล่าสุด ผ้าใบ ผู้หญิง-ผู้ชาย แฟชั่น ราคาถูกswy Sport
Unisex รุ่น PSN-Black/White

ไซส์: EU:40

Poca Shoes

399 บาท

1,900 บาท 79% ลด

ตะกร้าสินค้าของคุณ (1 สินค้า)

มูลค่าสินค้า: **399 บาท**

ยอดสุทธิ รวมภาษีมูลค่าเพิ่ม (จำนวน): **399 บาท**

เลือกชื่อสินค้าต่อ

ชำระค่าสินค้า

People Who Bought This Item Also Bought



กางเกงสแลคขาขวาง Hopper Progress ผ้ายืด ทรงเข้ารูป

900 บาท

67% ลด

299 บาท



Microservices

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7. Shipping

LAZADA
CO-TH

1. คำสั่งซื้อ

2. ชำระเงิน

ที่อยู่ที่จะจัดส่ง

Login for speedy checkout

ชื่อและนามสกุล

ที่อยู่

รหัสไปรษณีย์

เมือง

จังหวัด

โทรศัพท์มือถือ

ทางเราจะทำการตรวจสอบเนื้องและจังหวัดของคุณ

เพื่อให้แน่ใจว่าทำการจัดส่งได้

ท่องเที่ยวในประเทศ/ในกำกันภาษี - กรุณาเดือนของการขอข้อมูลเพื่อทำการขอในกำกันภาษี

ข้อมูลการส่งเงินค้า

ชั่งแบบธรรมชาติ: พีวี

Get it วันอังคาร, 27 ก.พ. - วันจันทร์, 5 มี.ค. 2018

ค่าจัดส่ง

สูปภารสั่งซื้อ (1 items)

สินค้า	จำนวน	ราคาร
POCA SHOE NMD Sneakers Fashion รองเท้า ลั่นลง แนวใหม่ สีดำ-สีขาว แฟชั่น ราคาถูกสุดๆ Sport Unisex รุ่น PSN-Black/White ขนาด: EU:40	1	399
มูลค่าสินค้า		399 บาท
ยอดสุทธิ		399 บาท
รายการรวมภาษีมูลค่าเพิ่ม (ถ้ามี)		

 คุ้มครองสูงสุด 100%





8. Payment

LAZADA
.CO.TH

✓ 1. ค่าซื้อขั้นต่ำ

2. ชำระเงิน

เลือกคัวเลือกสำหรับการชำระเงิน

บัตรเดบิตหรือ เทิร์บเงินปลายทาง	ชำระเงินผ่าน เดบิตหรือ	PayPal/Amex	มอนชาร์	LINE Pay	หักบัญชีธนาคาร/ ห้องทางATM
					
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

หมายเหตุบัตร 

ชื่อบนบัตร

วันที่บัตรหมดอายุ CCV / CVV 

ข้อมูลใบสำคัญไม่สามารถเปลี่ยนแปลงได้หลังการสั่งซื้อสินค้า

🔒 สั่งซื้อสินค้า

✓ สมัครรับข่าวสารกับลาก้าเพื่อรับส่วนลดและข้อเสนอสุดพิเศษ

โดยการร่วมค้ำประกันของคุณ, คุณยอมรับข้อกำหนดของทางลาก้า [ในการซื้อสินค้าทางช่องทางที่กำหนดให้ และร้ออกกฎหมายที่เกี่ยวข้อง](#)



ส่งที่ 

Somkiat Puisungnoen
122/64 , Soi Phahonyothin 2, Phahonyothin Road Prom Condo กรุงเทพมหานคร/ Bangkok - พญาไท/ Phaya Thai - 10400 โทรศัพท์: 0868696209

สรุปการสั่งซื้อ (1 items)

สินค้า	จำนวน	ราคาร
POCA SHOE NMD Sneakers Fashion รองเท้า ลั่วสังฆ่าใน ผู้หญิง-ผู้ชาย แฟชั่น ราคาถูกสุดๆ Scott Unisex รุ่น PSN-Black/White ขนาด: EU:40	1 	399 บาท
สั่งแบบธรรมด้า		
วันอัจฉริยา, 27 ก.พ. - วันเสาร์, 3 มี.ค. 2018		

กรอกคุณส่วนลดที่มี  **ขึ้นชั้น**

มูลค่าสินค้า **399 บาท**
ค่าซื้อขั้นต่ำ 

ยอดสุทธิ **399 บาท**
รวมภาษีมูลค่าเพิ่ม (มีภาษี)

 **ทุมแพร่องค้า 100%**





9. Confirm to order

LAZADA
.CO.TH

✓ 1. ค่าซื้อขั้นต่ำ

2. ชำระเงิน

เลือกตัวเลือกสำหรับการชำระเงิน

บัตรเดบิตหรือ เทิร์บเงินปลายทาง	ชำระเงินผ่าน เดบิตหรือ	PayPal/Amex	มอนชาร์บ	LINE Pay	หักบัญชีธนาคาร/ ห้องทางATM

หมายเหตุบัตร

ชื่อบนบัตร Somkiat Puisungnoen

วันที่บัตรหมดอายุ mm yy CCV / CVV ?

ข้อมูลใบกำกับภาษีไม่สามารถเปลี่ยนแปลงได้หลังการสั่งซื้อสินค้า

ล็อก สั่งซื้อสินค้า

สมควรระบุรายละเอียดตามสัมภาระเพื่อป้องกันความเสี่ยงทางกฎหมาย

ส่งที่ แก้ไข

Somkiat Puisungnoen
122/64 , Sci Phahonyothin 2, Phahonyothin Road Prom Condo กรุงเทพมหานคร/ Bangkok - พญาไท/ Phaya Thai - 10400 โทรศัพท์: 0868696209

สรุปการสั่งซื้อ (1 items)

สินค้า	จำนวน	ราคา
POCA SHOE NMD Sneakers Fashion รองเท้า ลำลอง ถ้าใบ ผู้หญิง-ผู้ชาย แฟชั่น ราคาถูกสุดๆ Scott Unisex รุ่น PSN-Black/White ขนาด: EU:40	1	399
ส่งแบบธรรมดา วันอังคาร, 27 ก.พ. - วันเสาร์, 3 มี.ค. 2018		

กรอกคุณปวงส่วนลดที่นี่ **ขึ้นชั้น**

มูลค่าสินค้า **399 บาท**
ค่าซื้อขั้นต่ำ

ยอดสุทธิ **399 บาท**
รวมภาษีมูลค่าเพิ่ม (มีภาษี)

ทุมแพร่องค์กร 100%

Lazada Security Approved JUN-2016



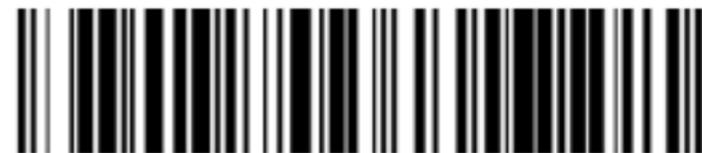
10. Summary



ใบแจ้งการชำระเงิน(PaySlip)

Counter Service Co., Ltd.

เลขที่ใบแจ้ง สินค้า/Invoice No:	3779254692
ผู้ชำระ เงิน/Payer:	Somkiat Puisungnoen
วันที่รายการ / Transaction Date:	25/02/2018 23:33
กำหนดชำระเงิน / Expired Date:	27/02/2018 23:33
เพื่อเข้าบัญชี / Payee:	www.lazada.co.th Tel: 020180000
รายละเอียด / Detail:	Lazada



806010855864737

จำนวนเงินที่ชำระ / Amount:

399.00 บาท /THB

* ไม่รวมค่าธรรมเนียมของเดนเน็คอร์เซอร์วิส
(Excluding service fees at Counter Service)

คลิกปุ่ม "Print" พิมพ์ใบแจ้งการชำระเงิน
หรือ

กด "รหัส 15 หลักใต้بارك็อก" เพื่อเข้าไป
ชำระเงินที่
Press "Print" button or write down
paycode 15 digits for pay in cash at
counter service(7-11)



[Back to merchant](#)

[Print](#)

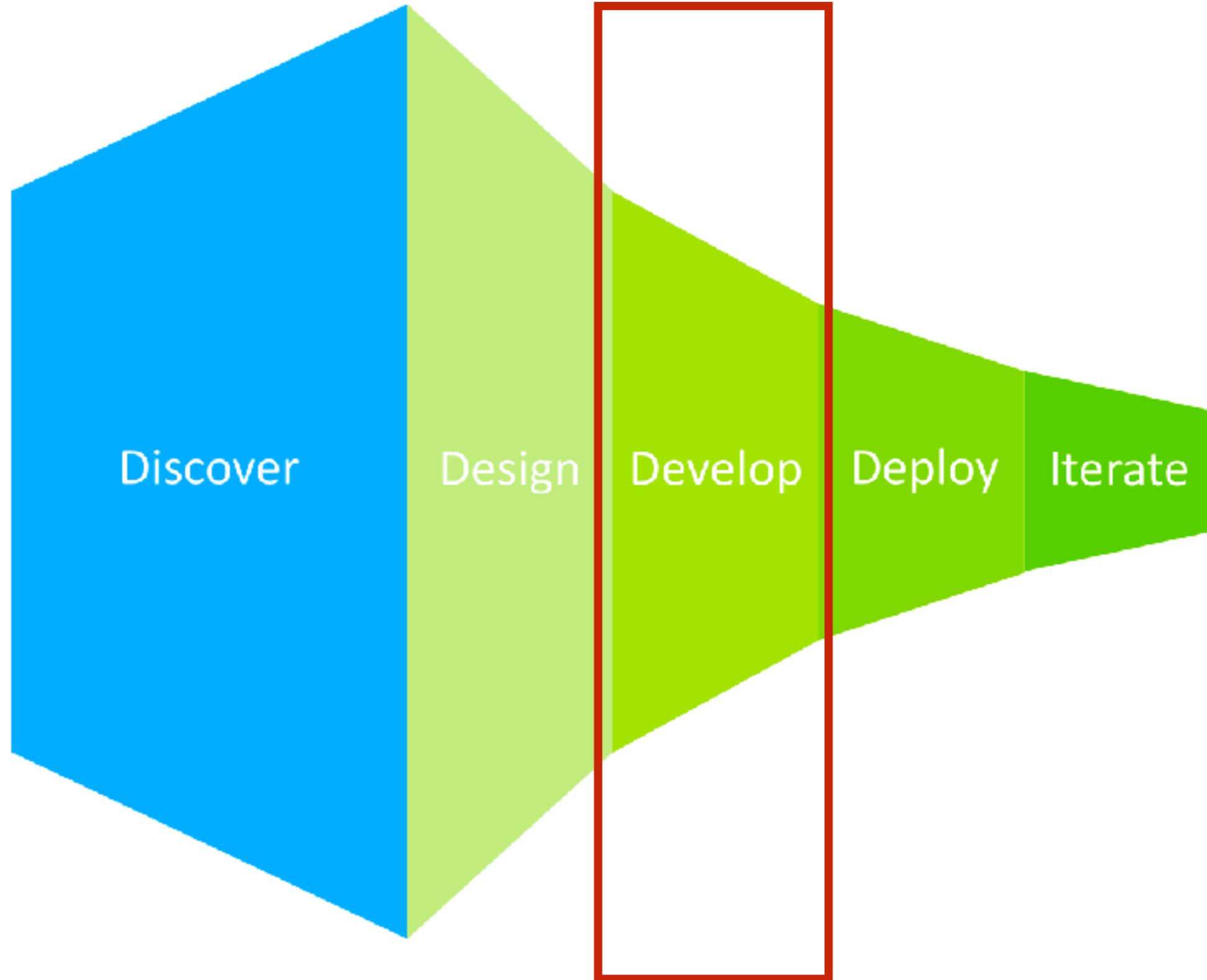


Microservices

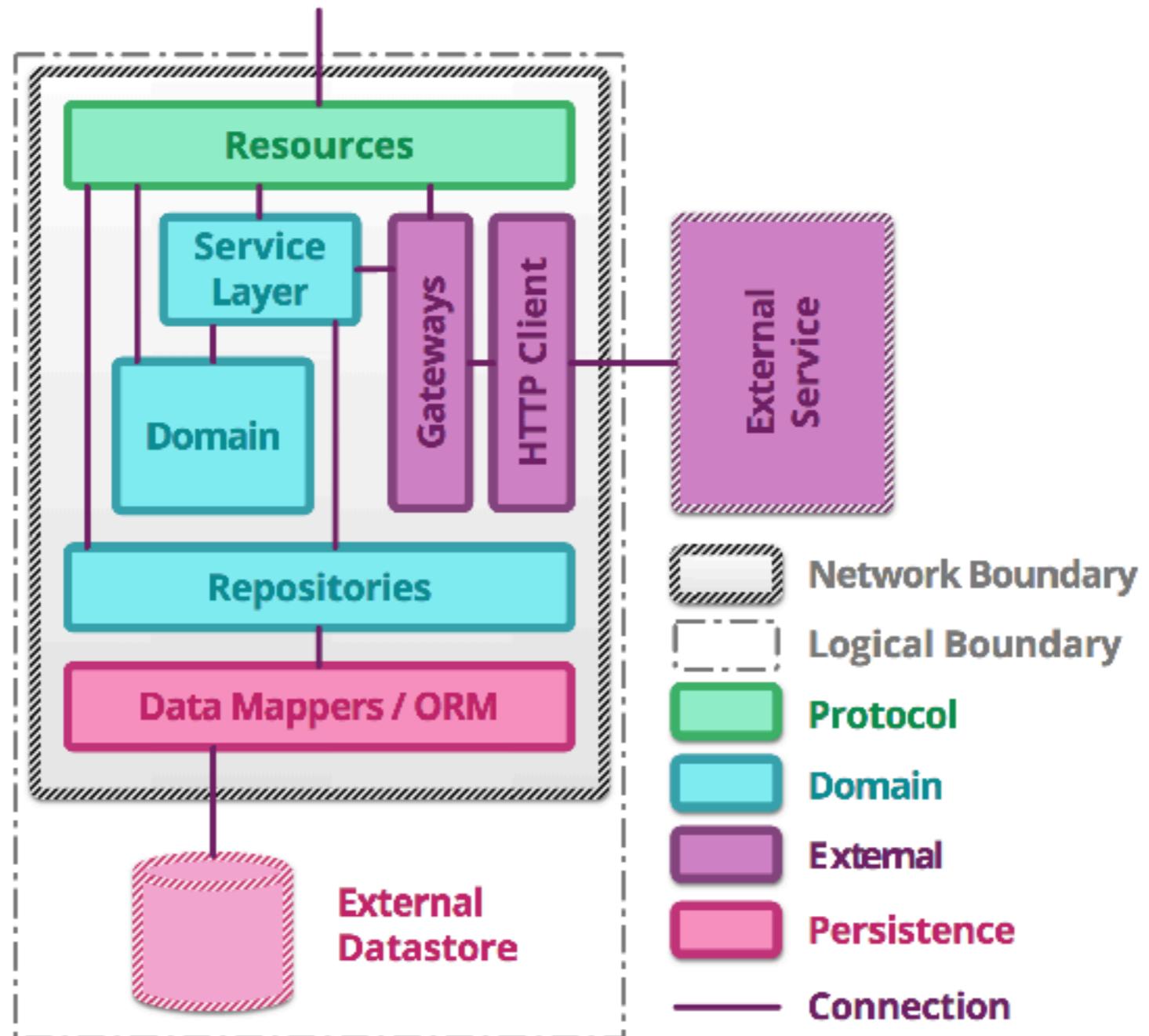
© 2017 - 2018 Siam Chamnankit Company Limited. All rights reserved.

Try to design system





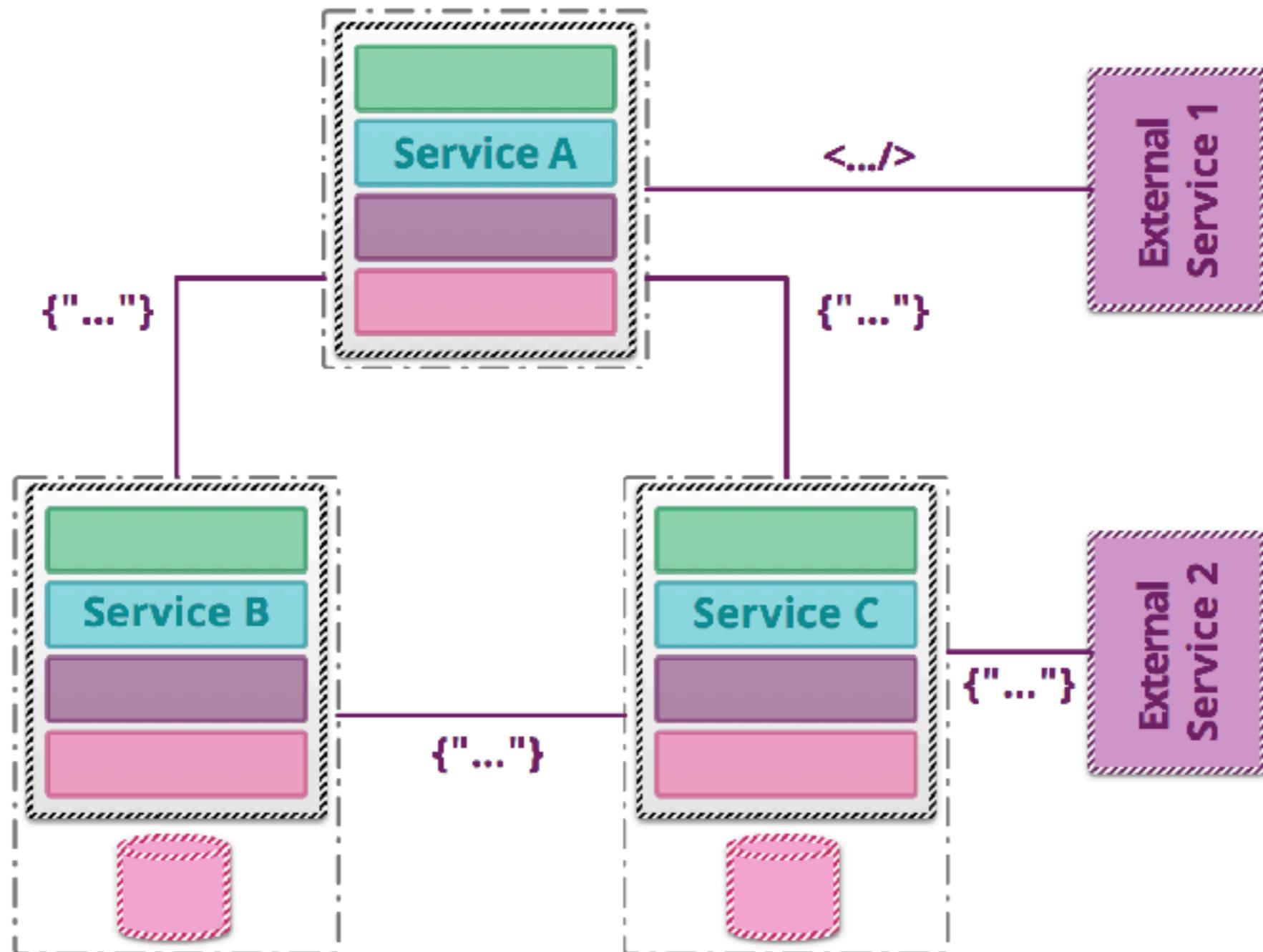
Service structure



<https://martinfowler.com/articles/microservice-testing>



Multiple services

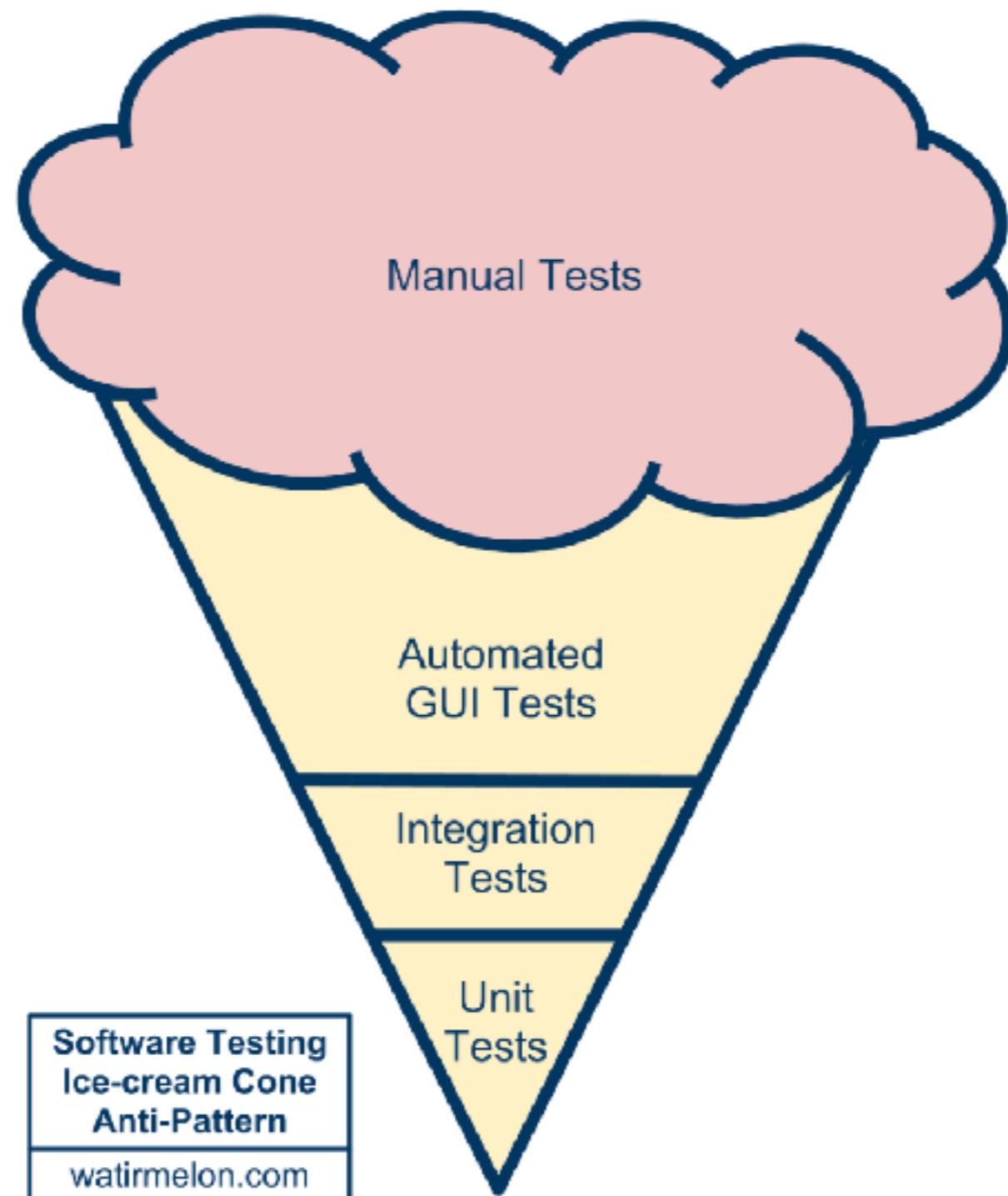


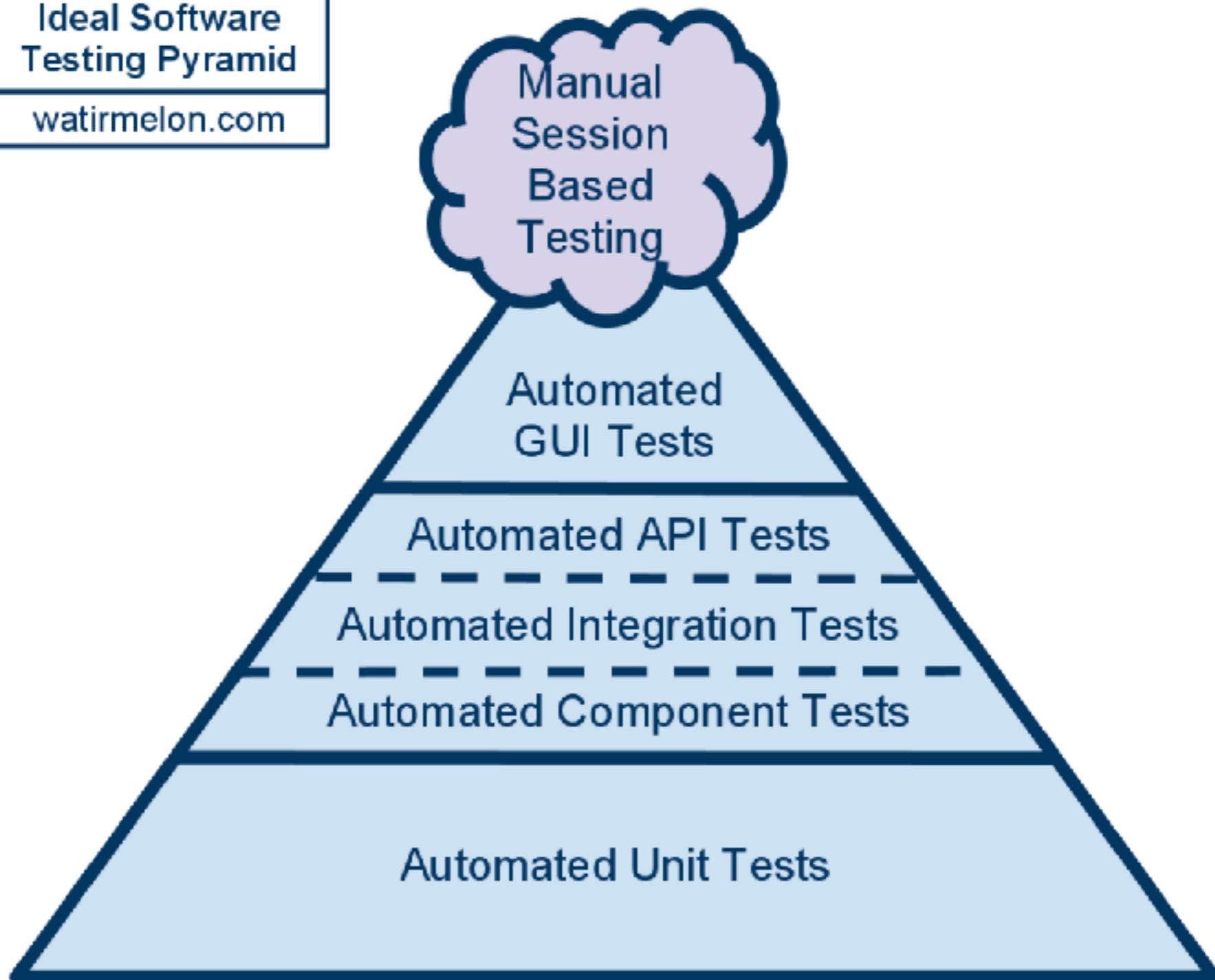
<https://martinfowler.com/articles/microservice-testing>

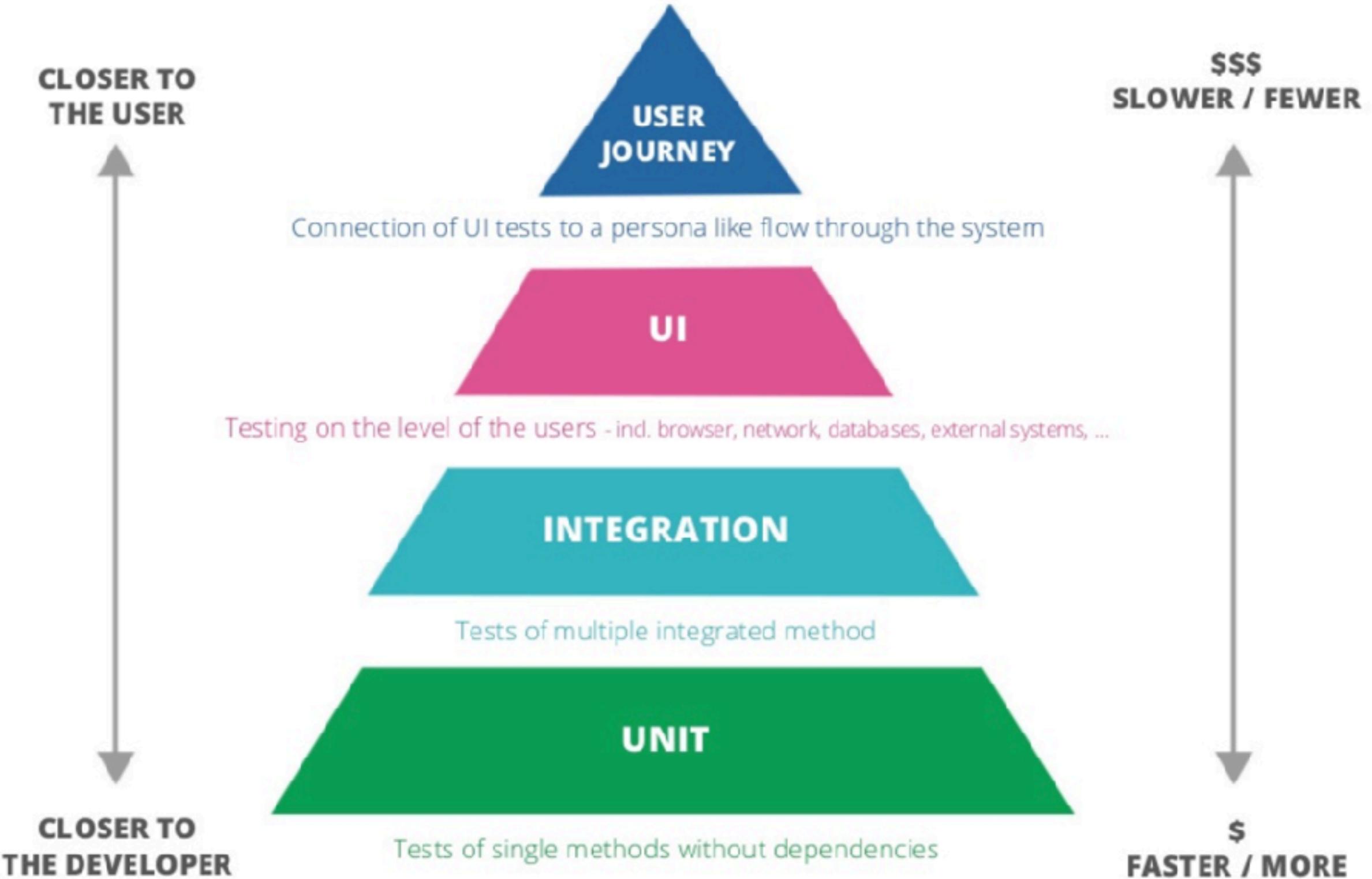


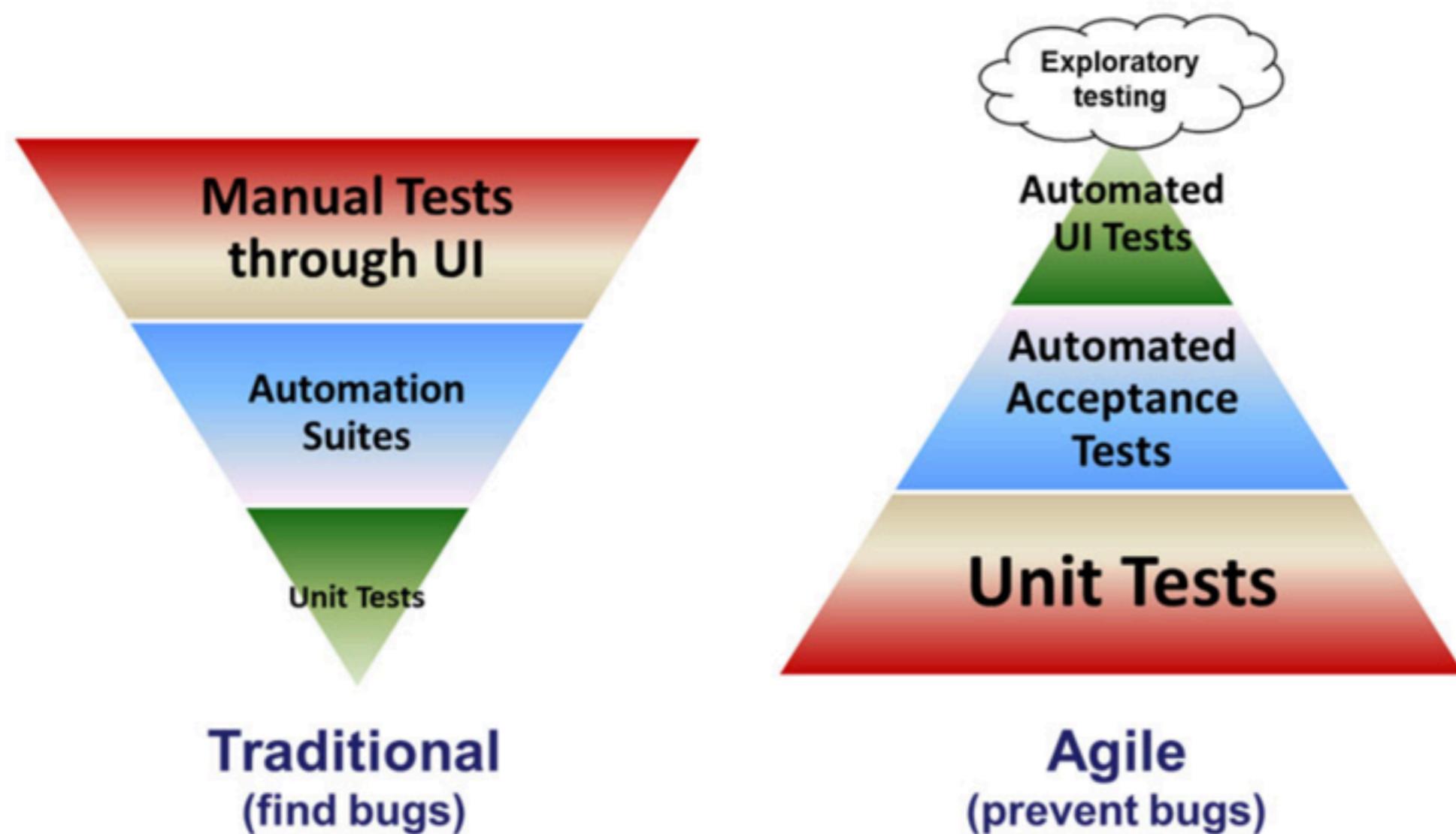
Microservice Testing

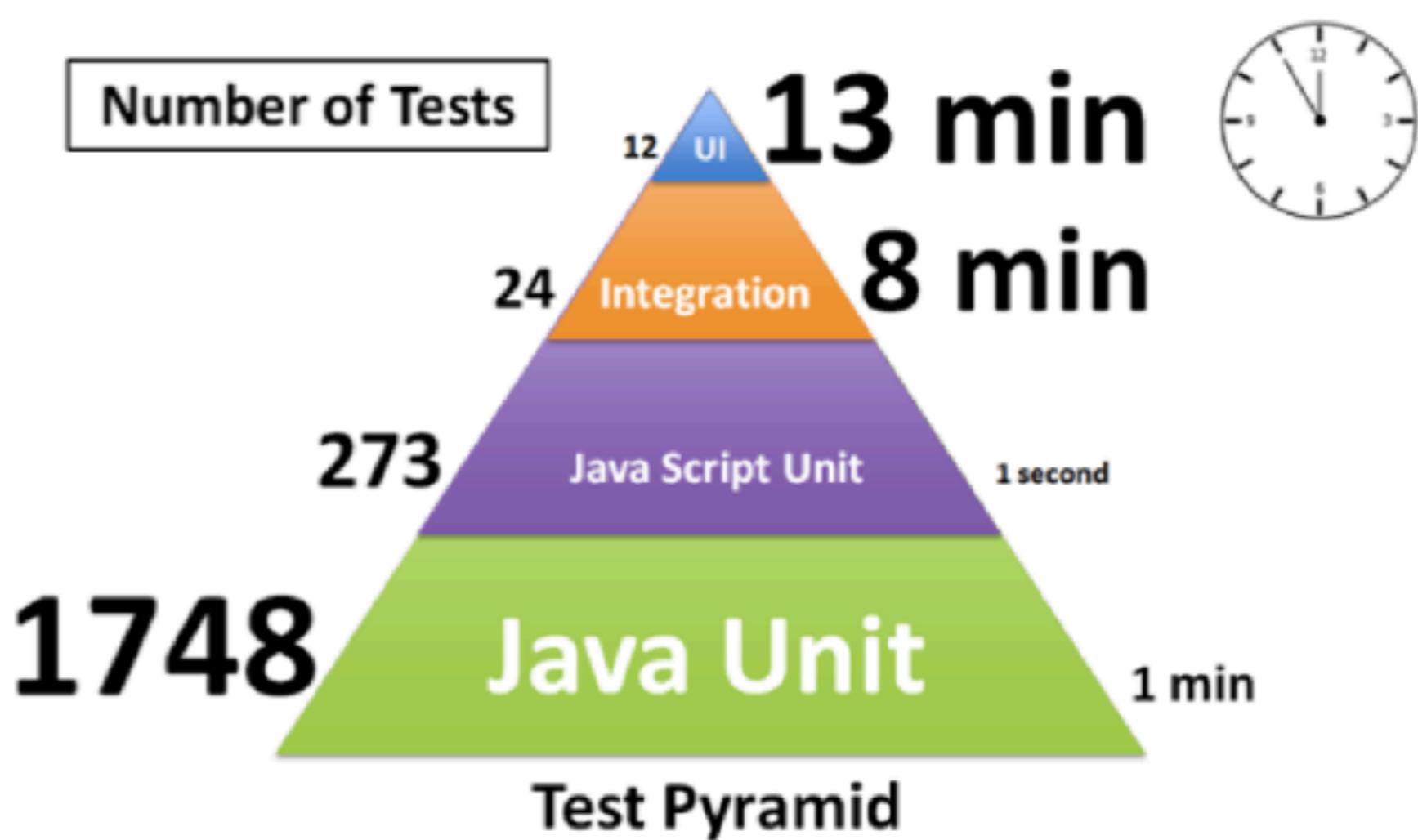






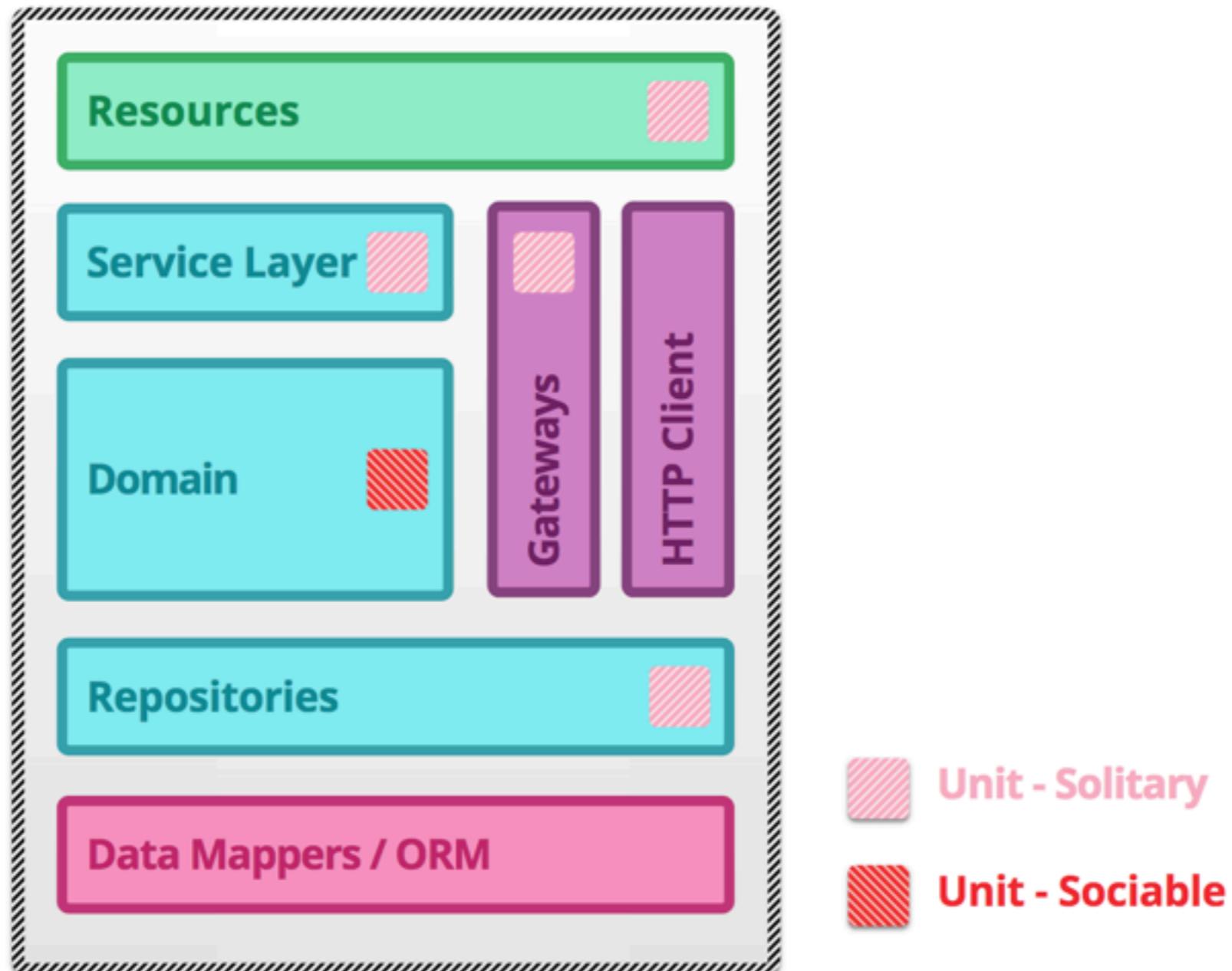




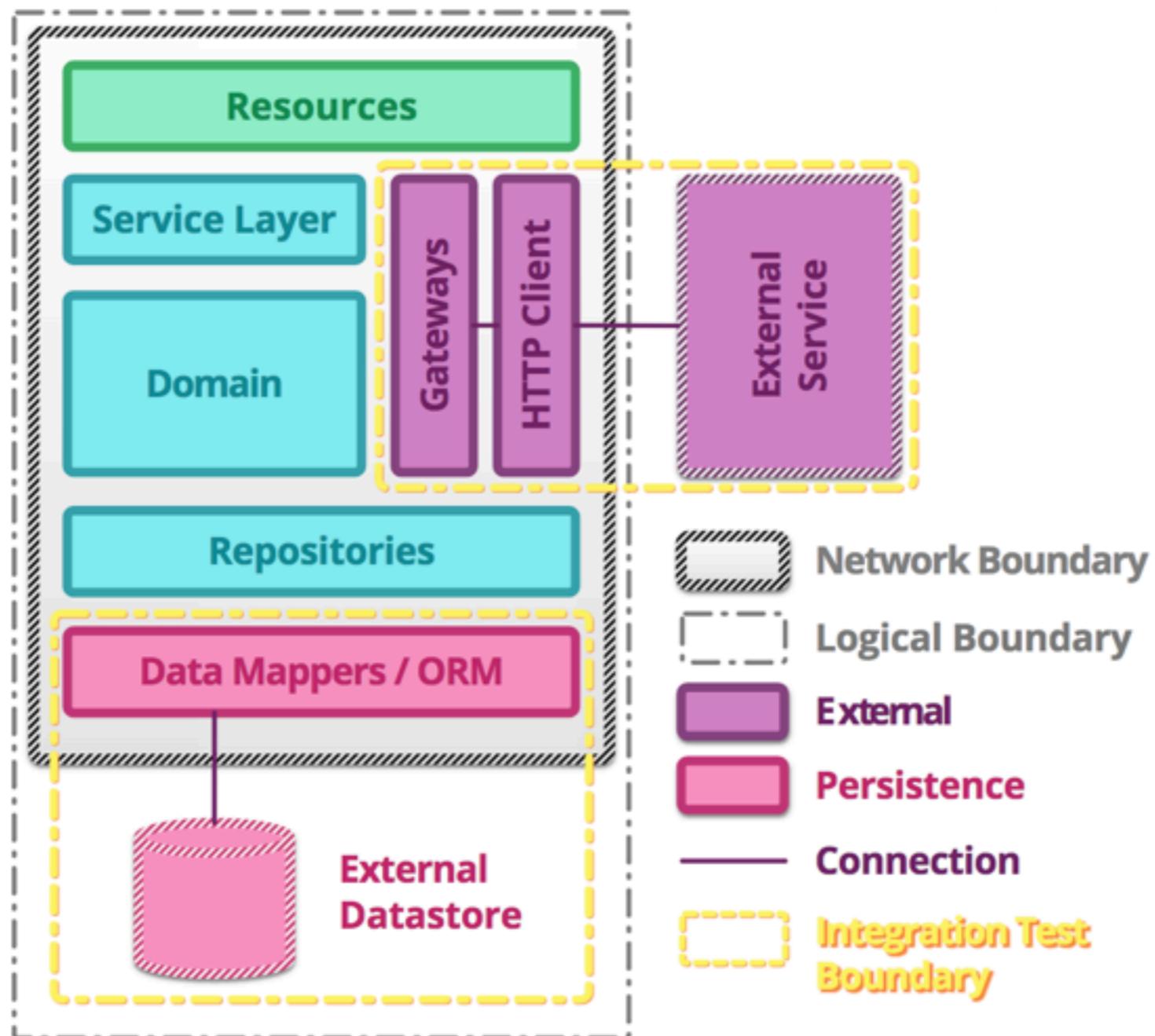




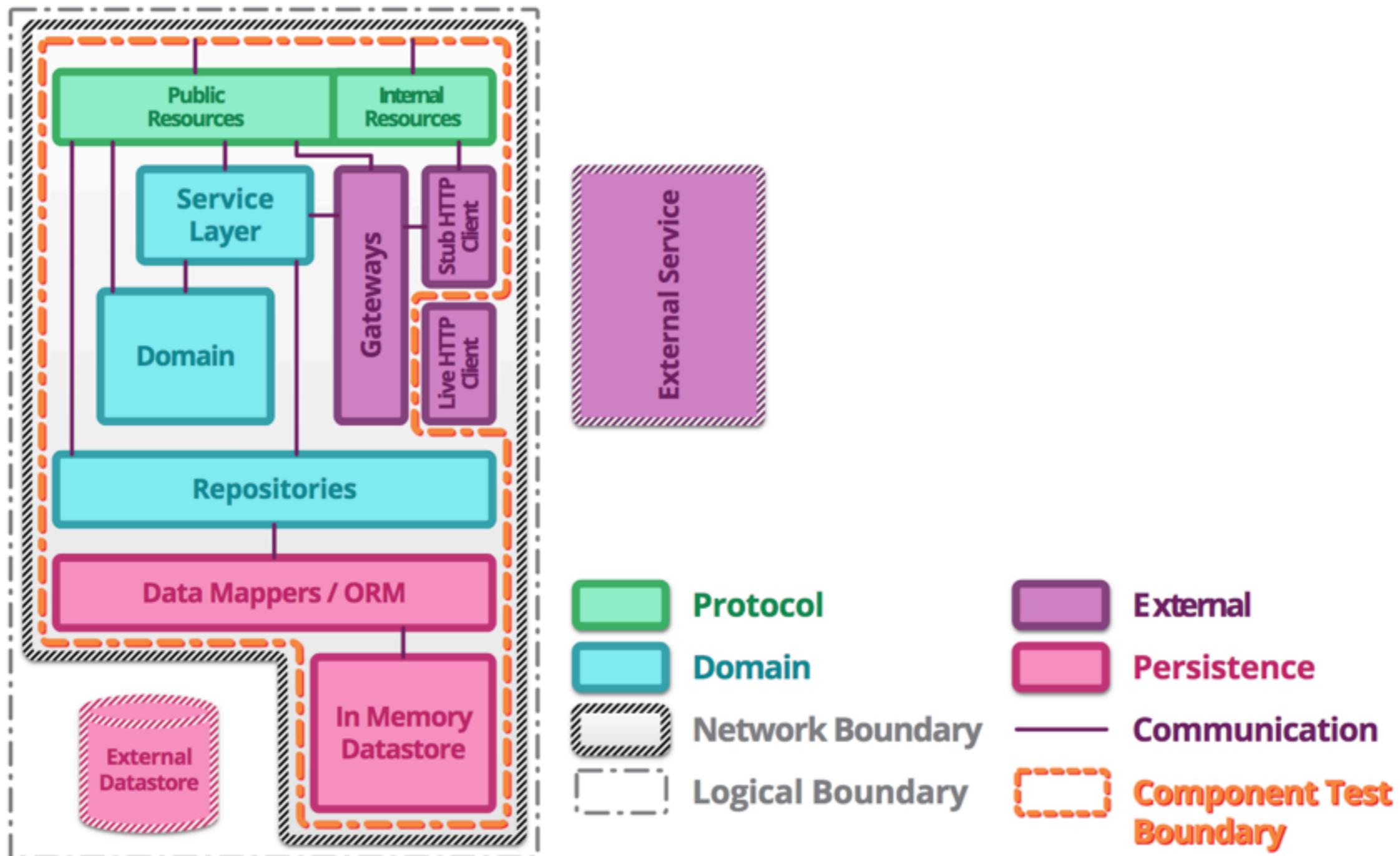
Unit testing



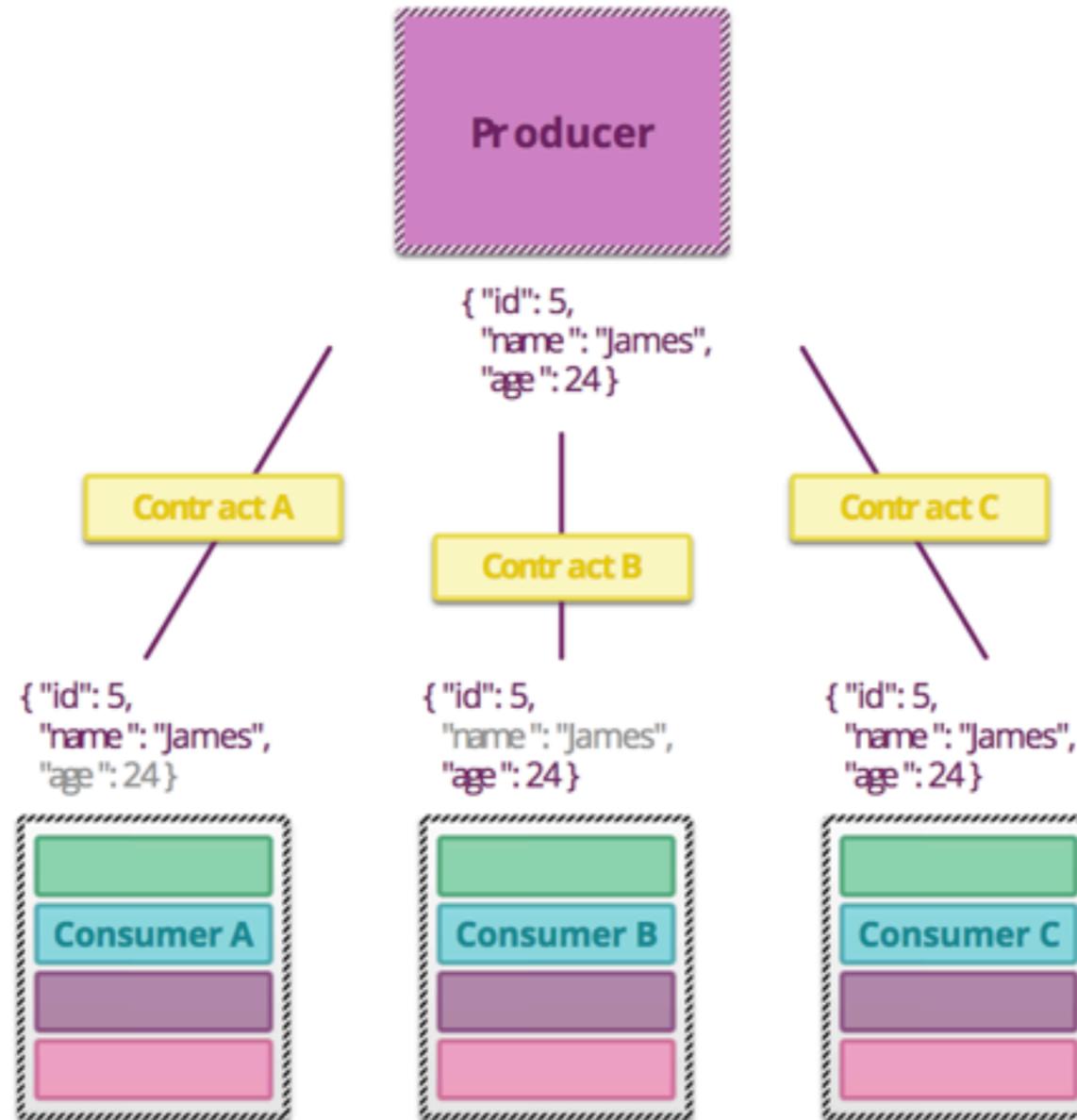
Integration testing



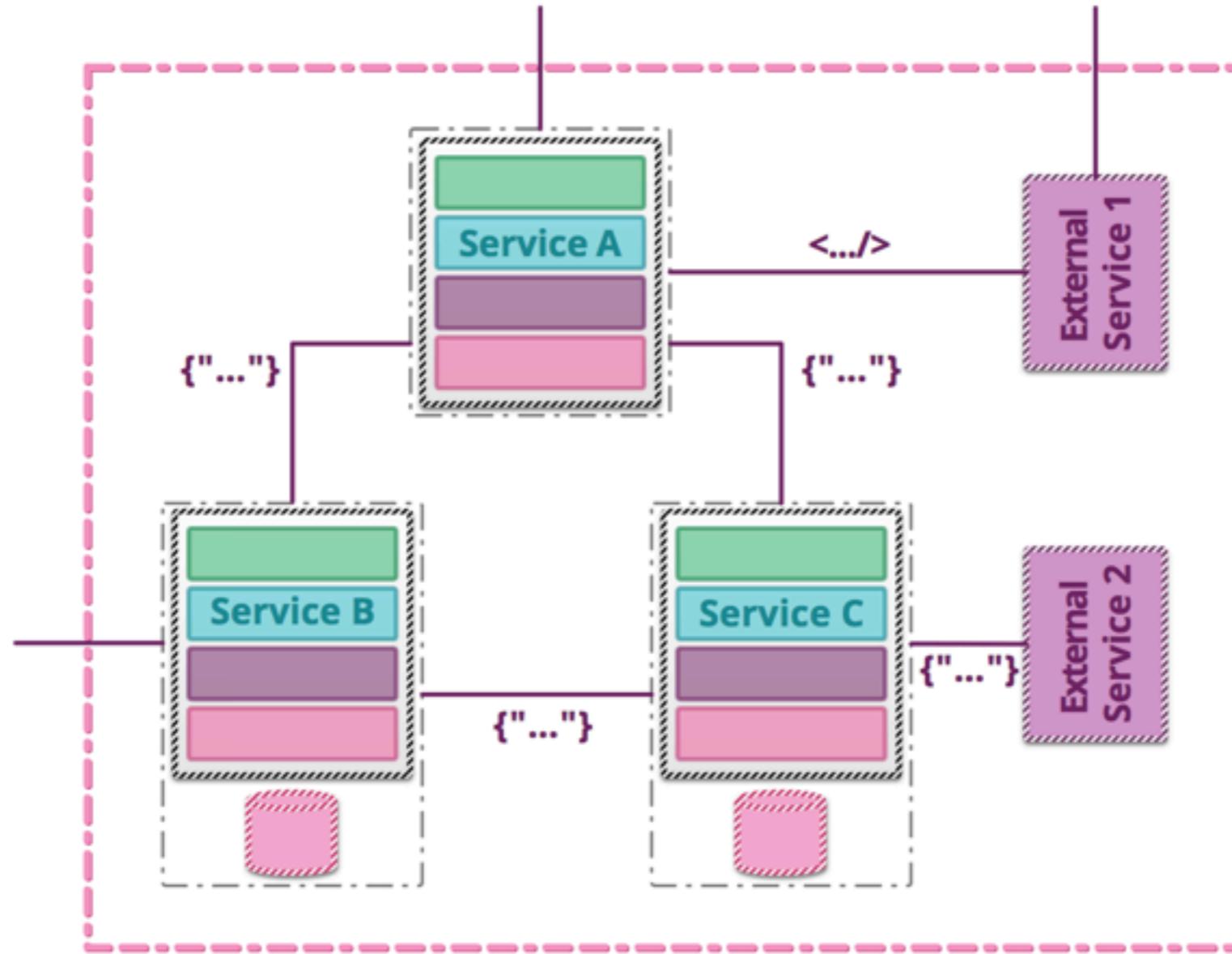
Component testing



Contract testing



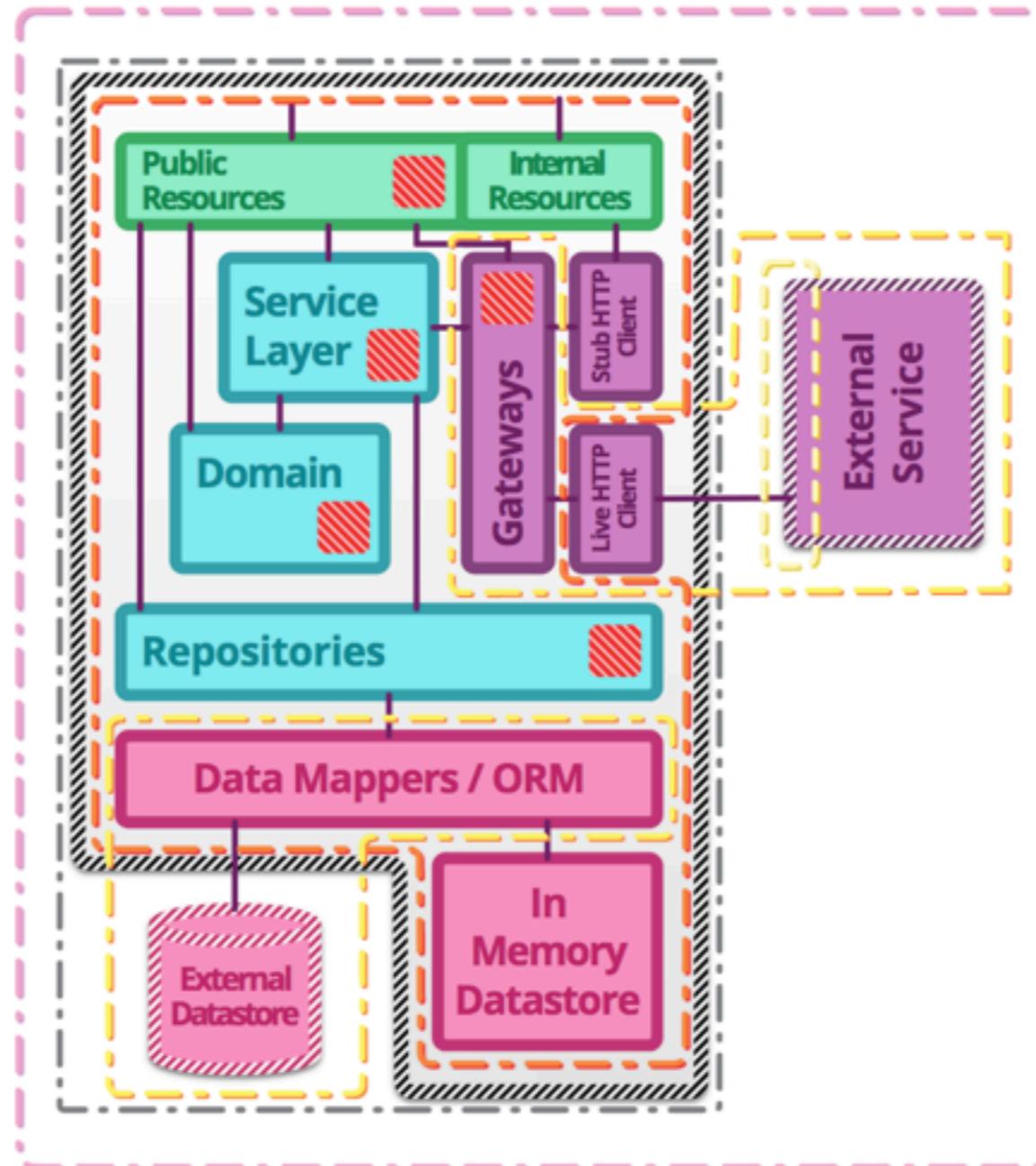
End-to-End testing



Summary

 **Unit tests** : exercise the smallest pieces of testable software in the application to determine whether they behave as expected.

 **Integration tests** : verify the communication paths and interactions between components to detect interface defects.



 **Component tests** : limit the scope of the exercised software to a portion of the system under test, manipulating the system through internal code interfaces and using test doubles to isolate the code under test from other components.

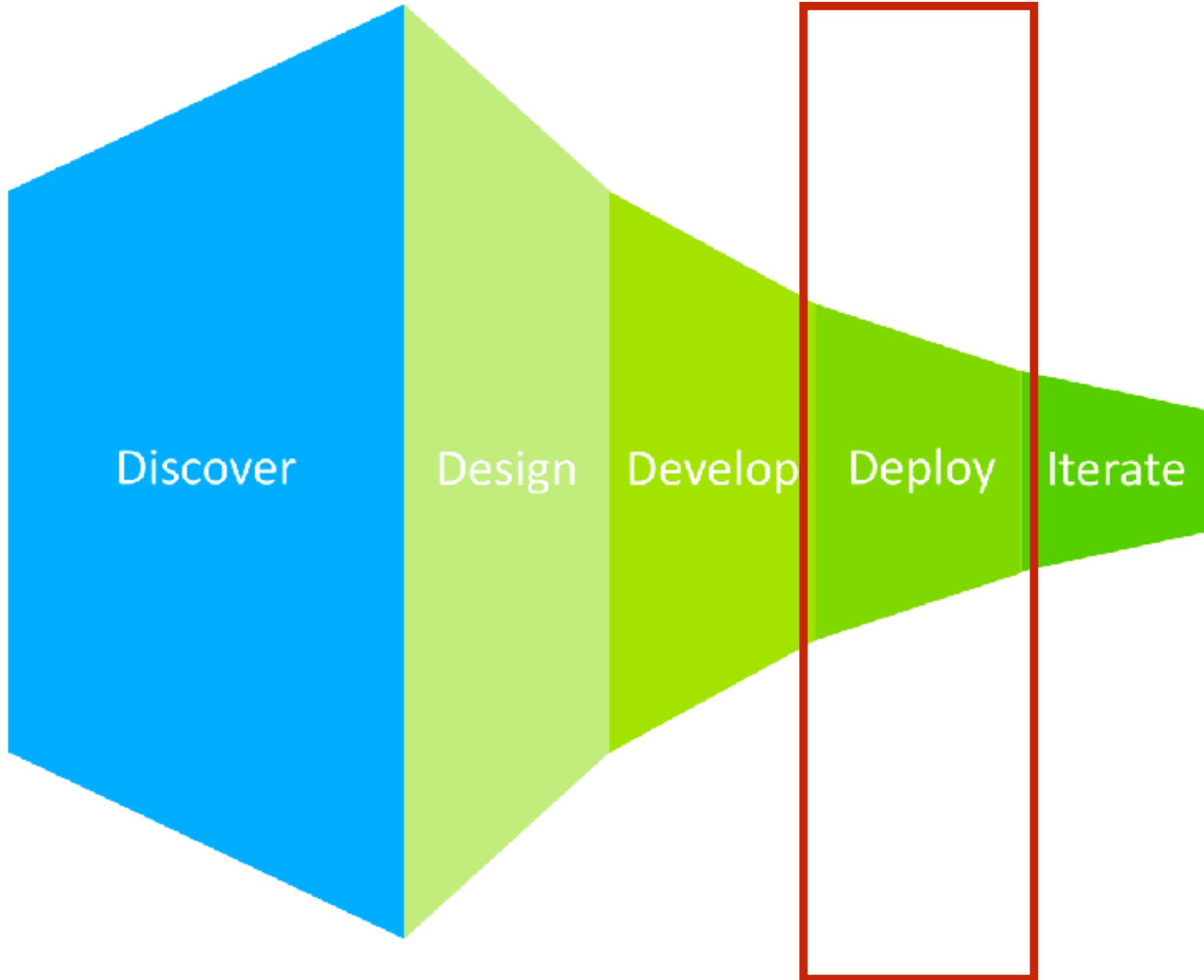
 **Contract tests** : verify interactions at the boundary of an external service asserting that it meets the contract expected by a consuming service.

 **End-to-end tests** : verify that a system meets external requirements and achieves its goals, testing the entire system, from end to end.



What is your testing strategy ?





Deployment





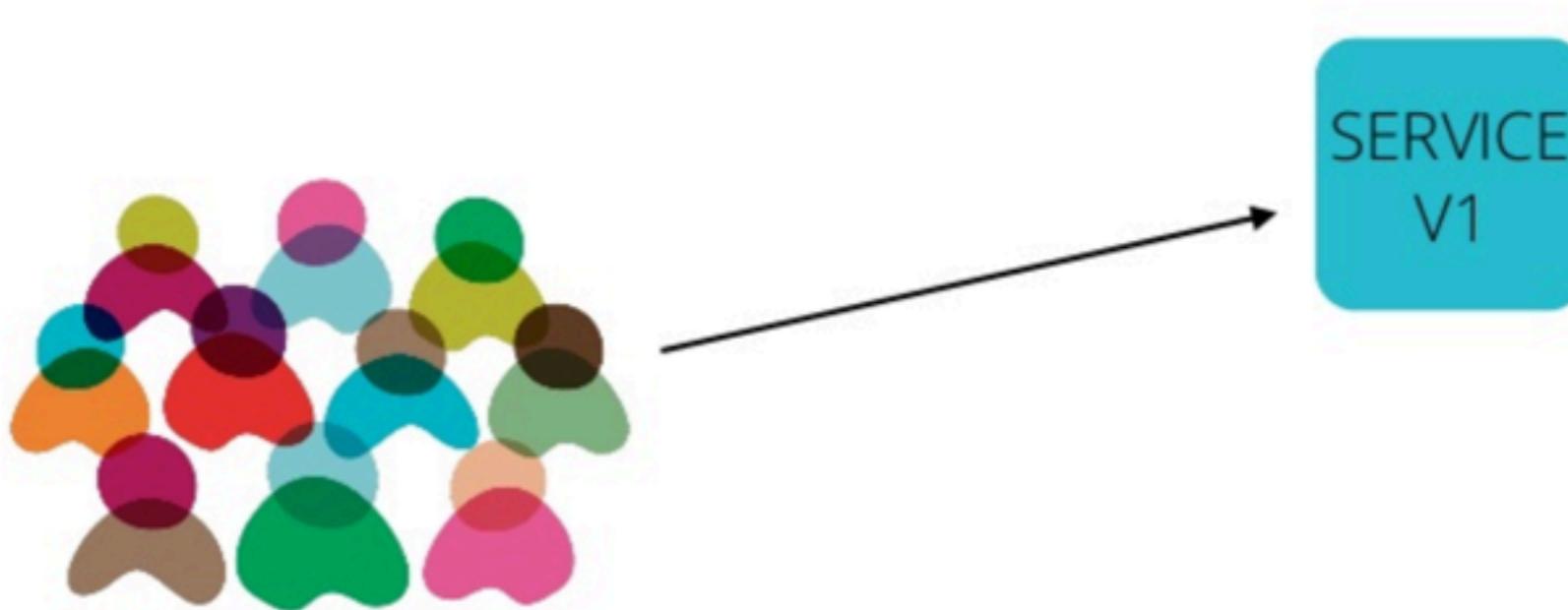
Deploy vs Release



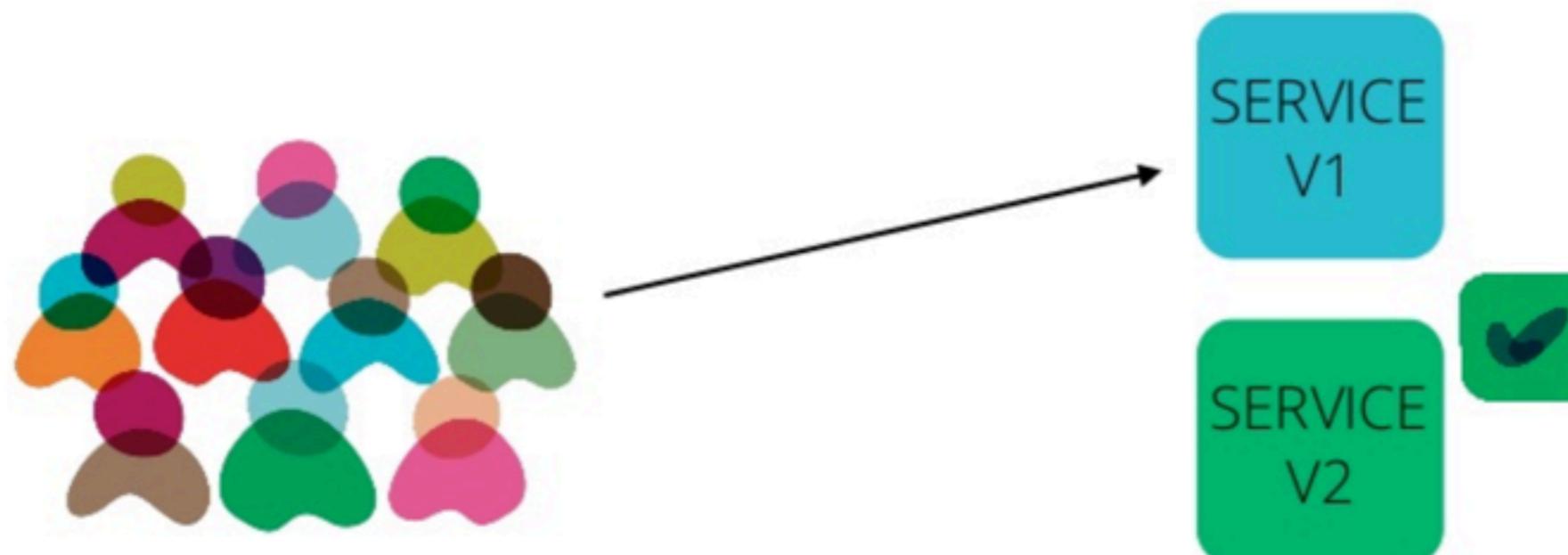
Blue Green Deployment



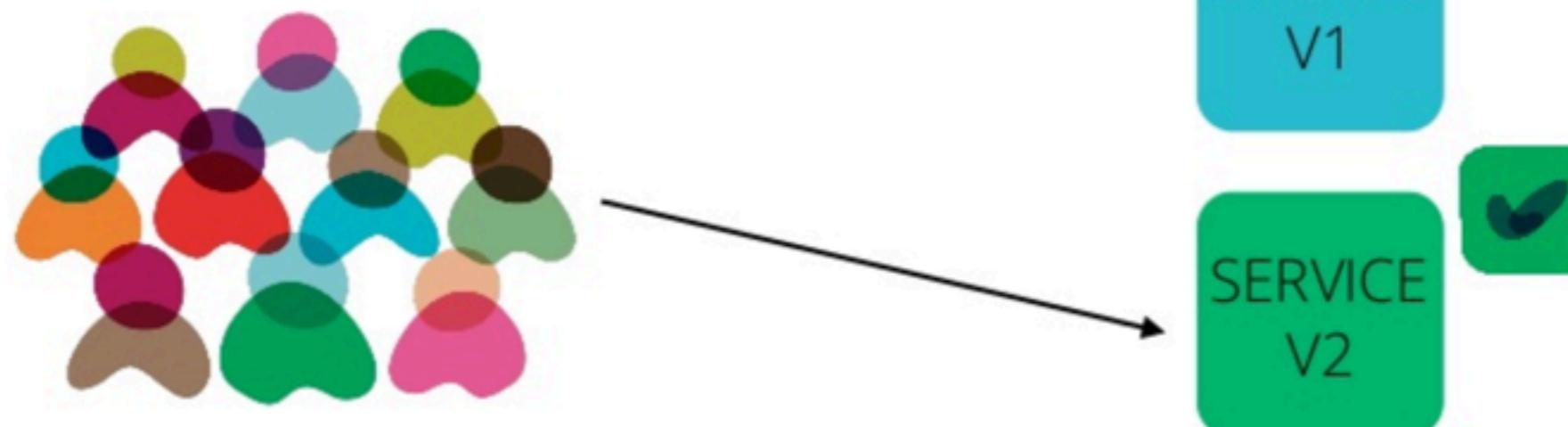
Blue Green Deployment



Blue Green Deployment



Blue Green Deployment



Canary Release



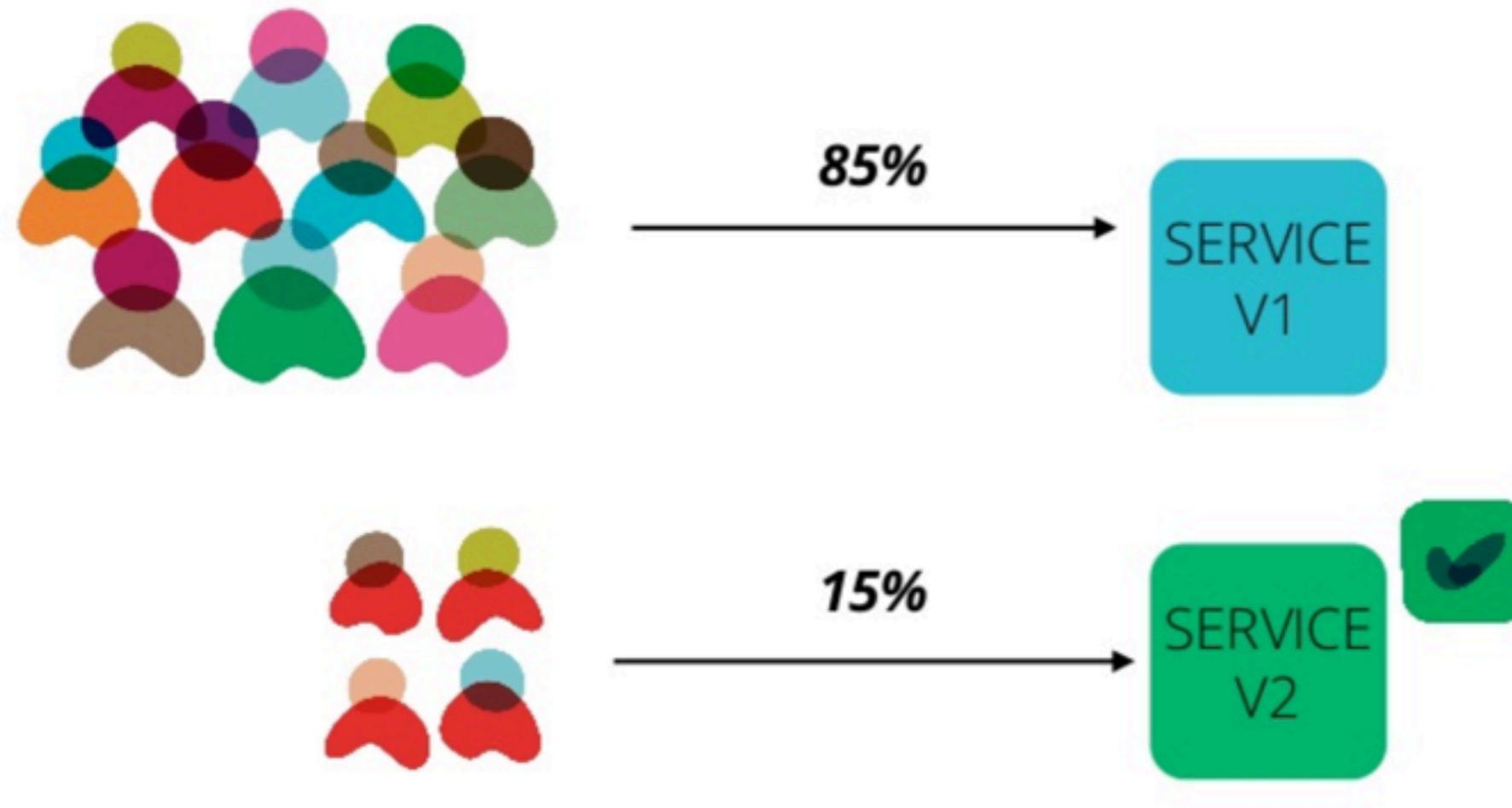
Canary Release



Canary Release



Canary Release



Mean Time to Recover (MTTR)



Mean Time to Recover (MTTR)

Tests are very important to reduce amount of defects in your systems. However, it's important to acknowledge that bugs will always happen in production.



Mean Time to Recover (MTTR)

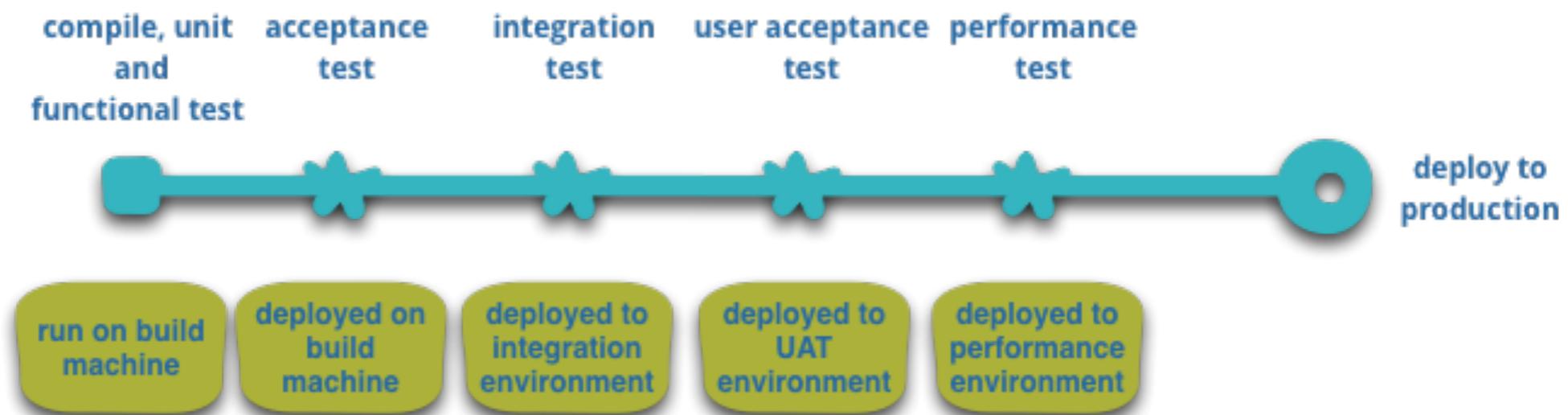
How **fast** to recover from them will help determining our success !



Current situation !!

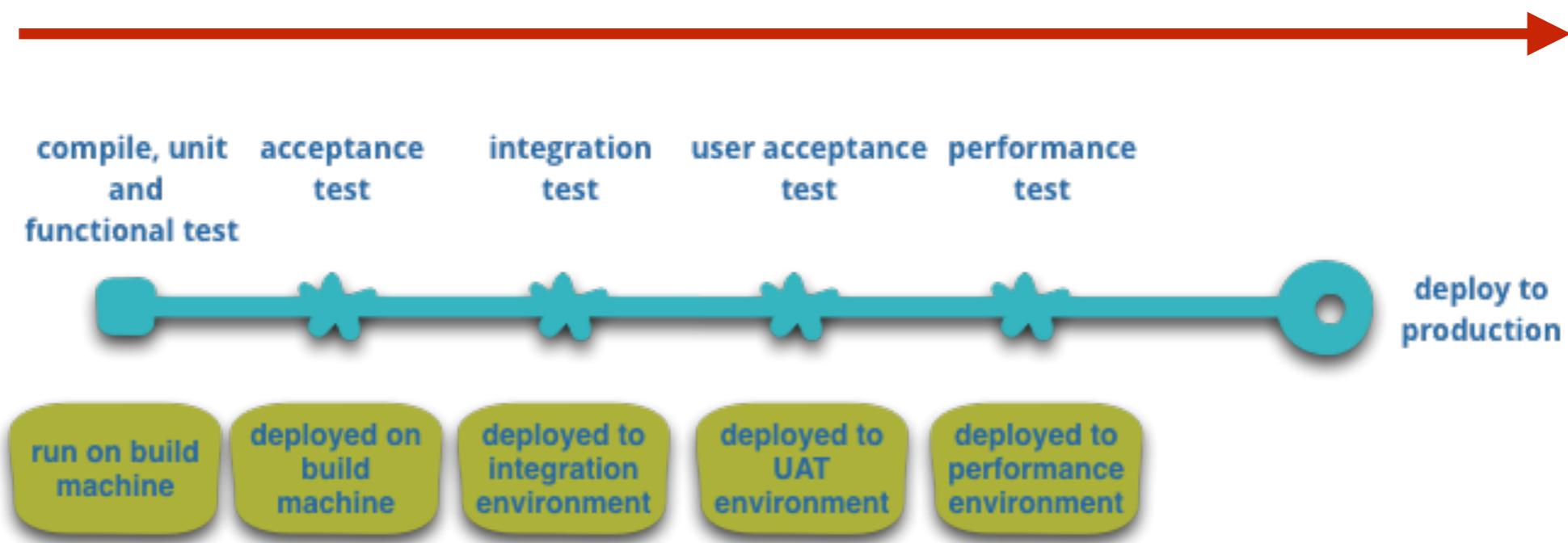


Infrastructure Automation

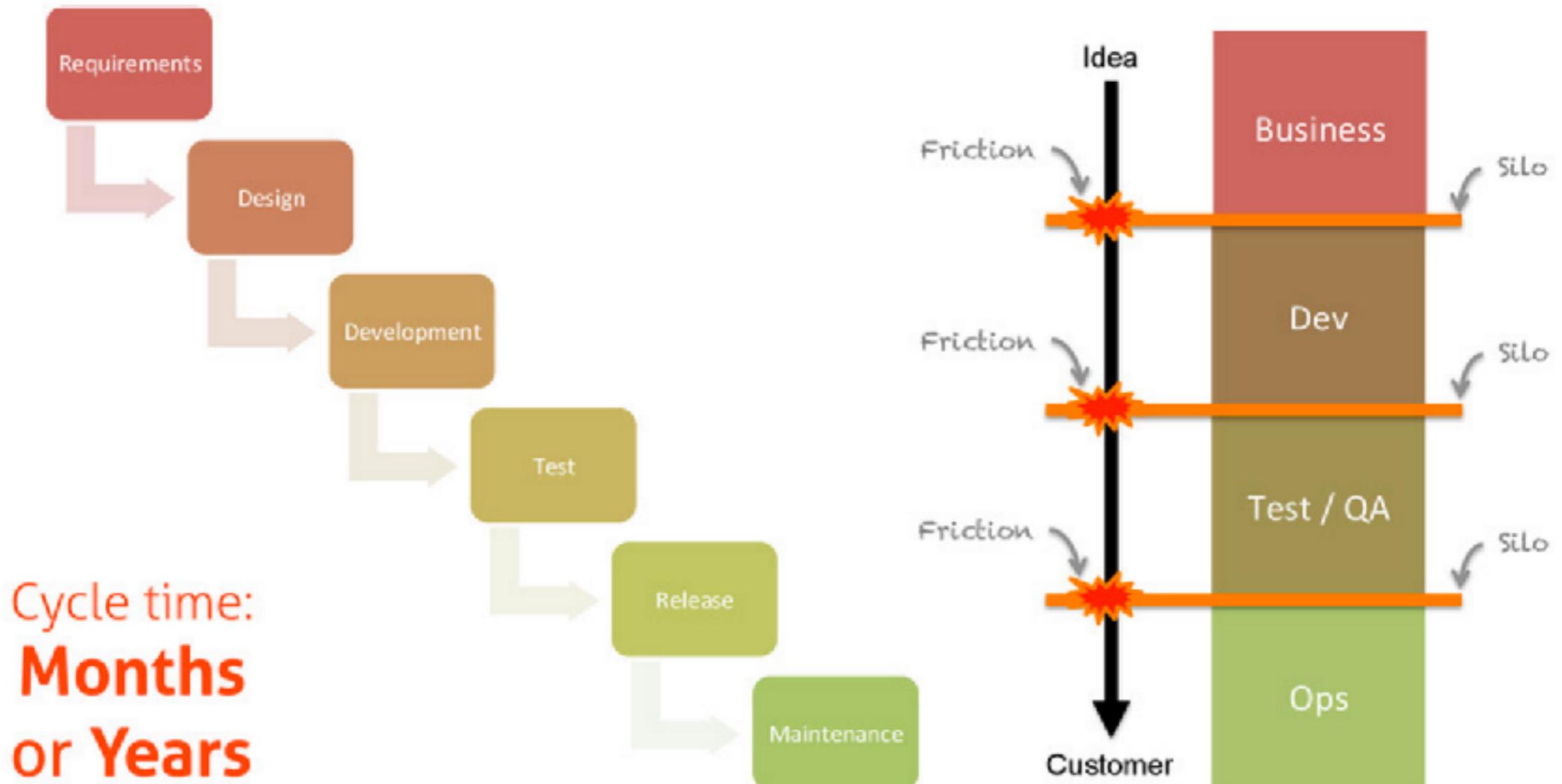


Infrastructure Automation

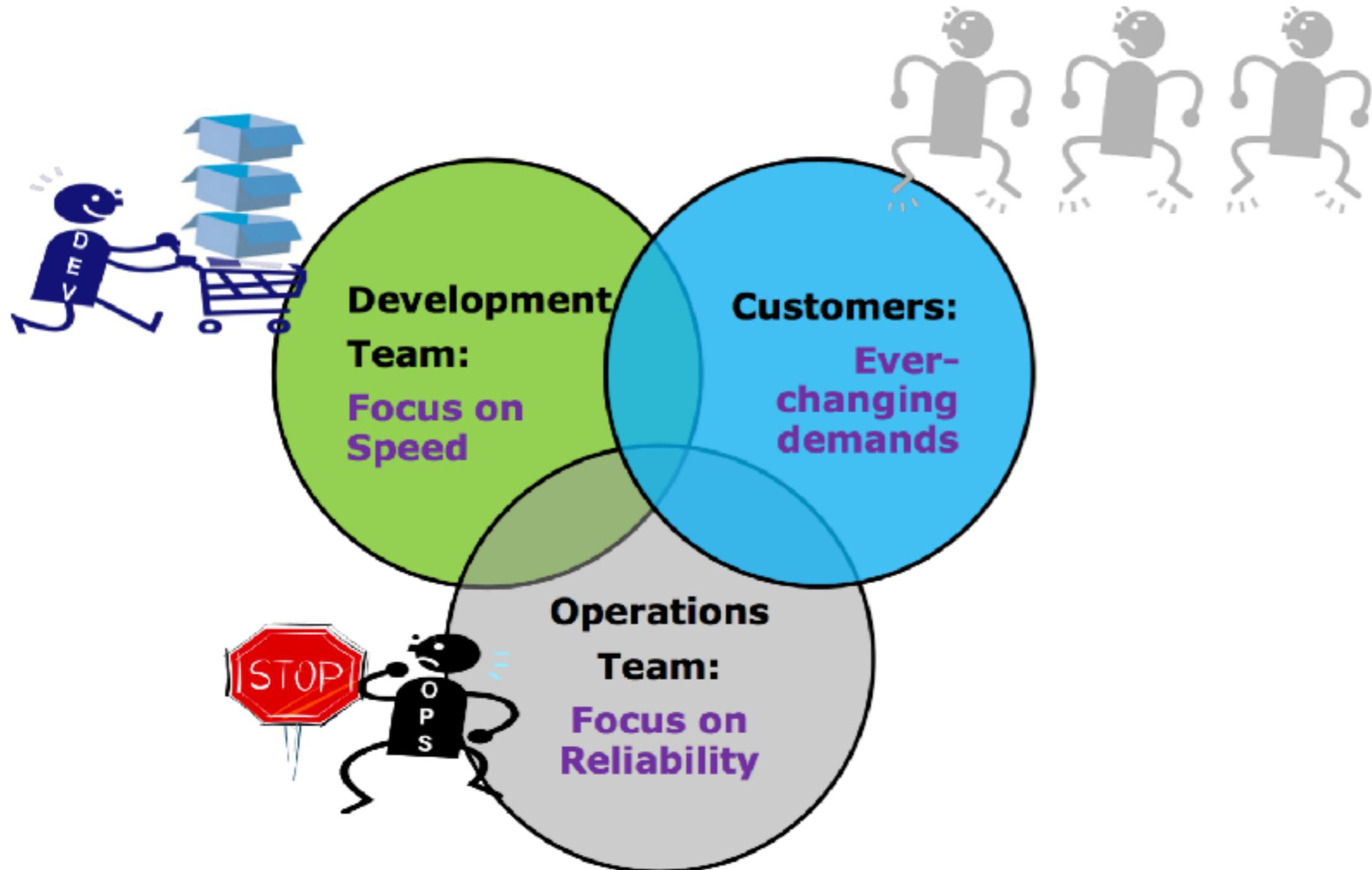
Lead time ?



Traditional development



Conflict of Interest



Conflict of Interest

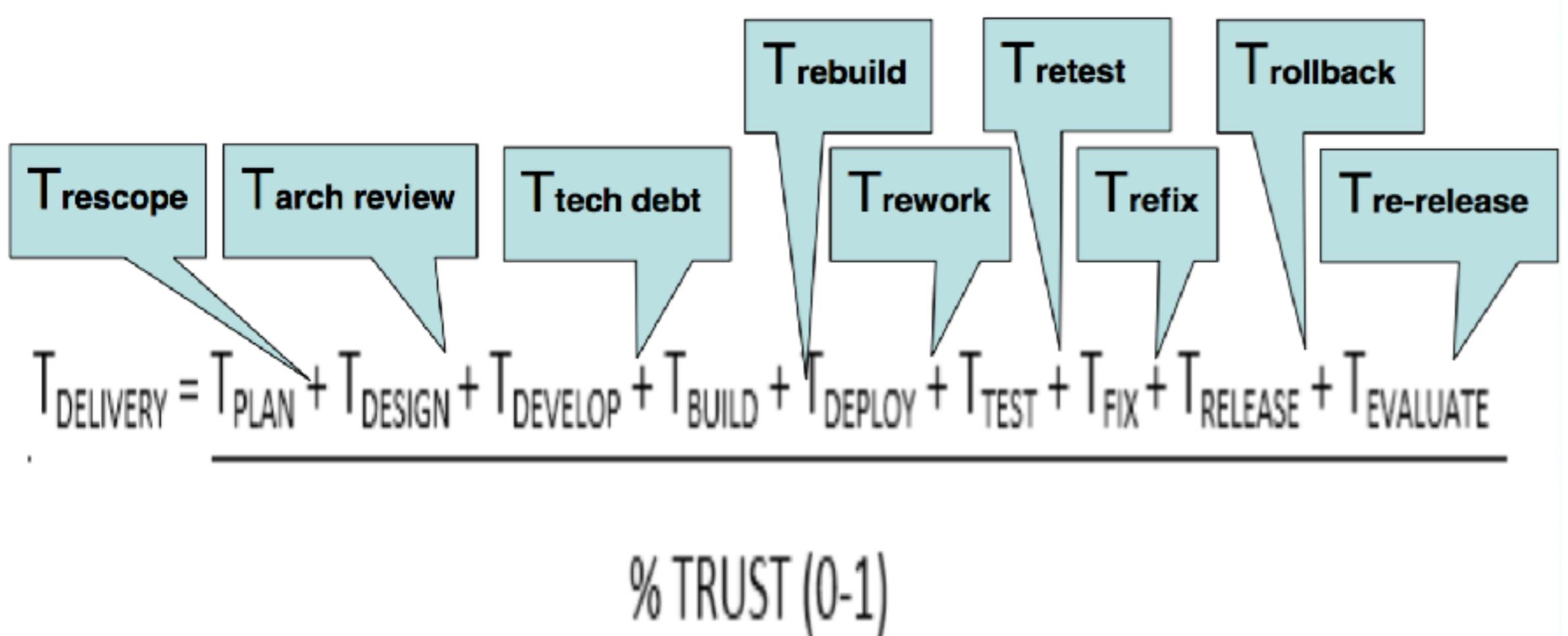


Conflict of Interest

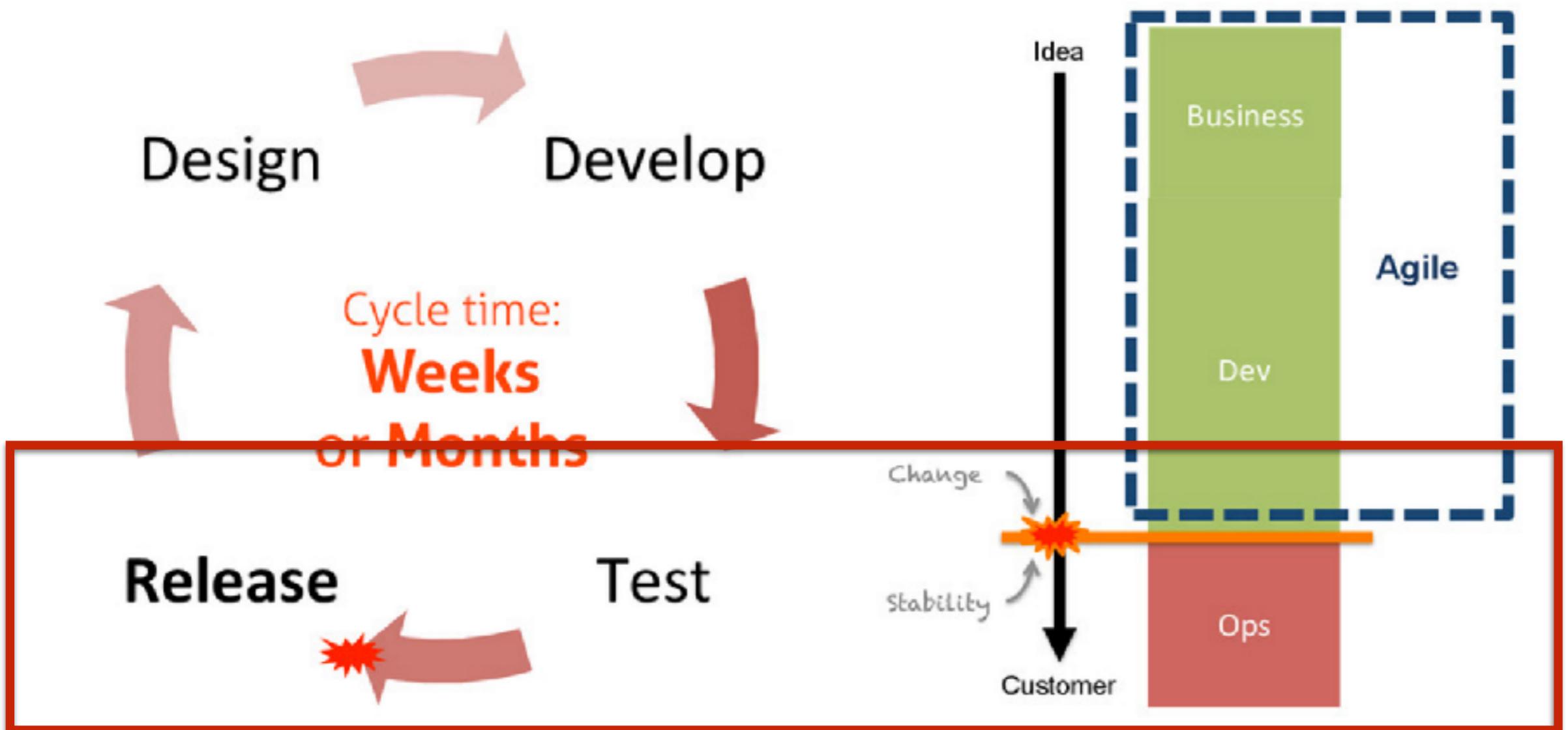




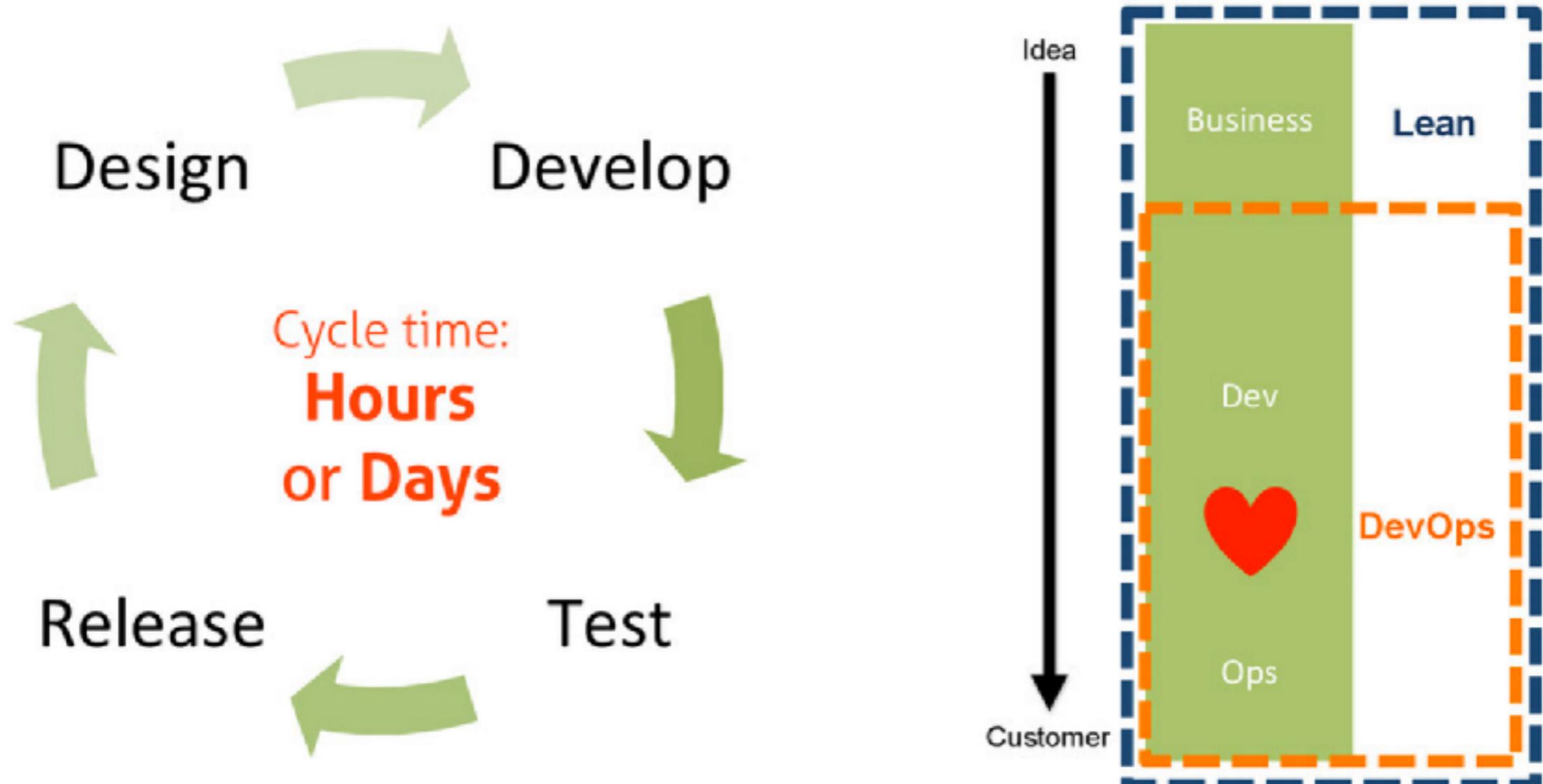
Low trust create extra steps

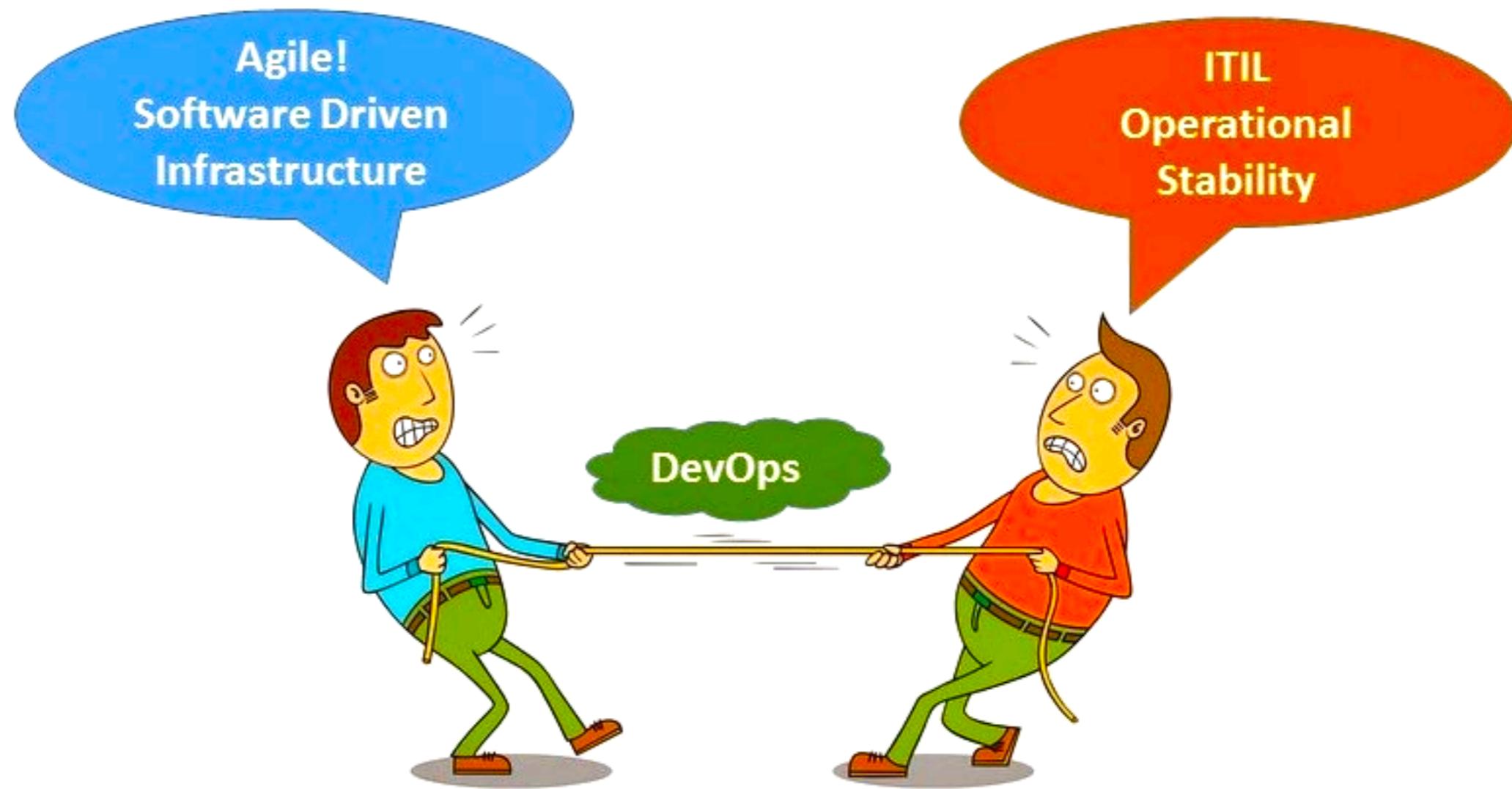


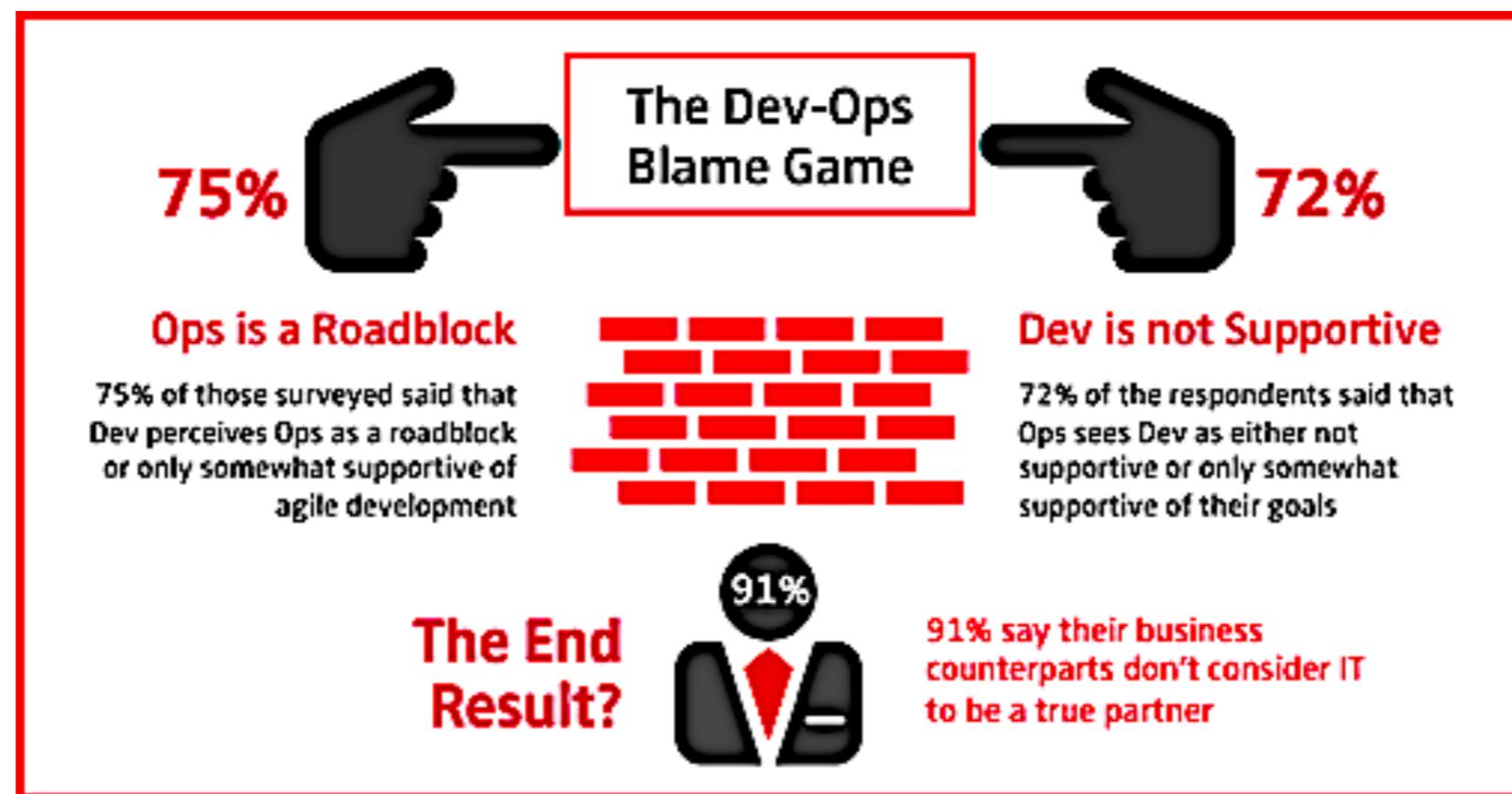
Iterative/Agile development

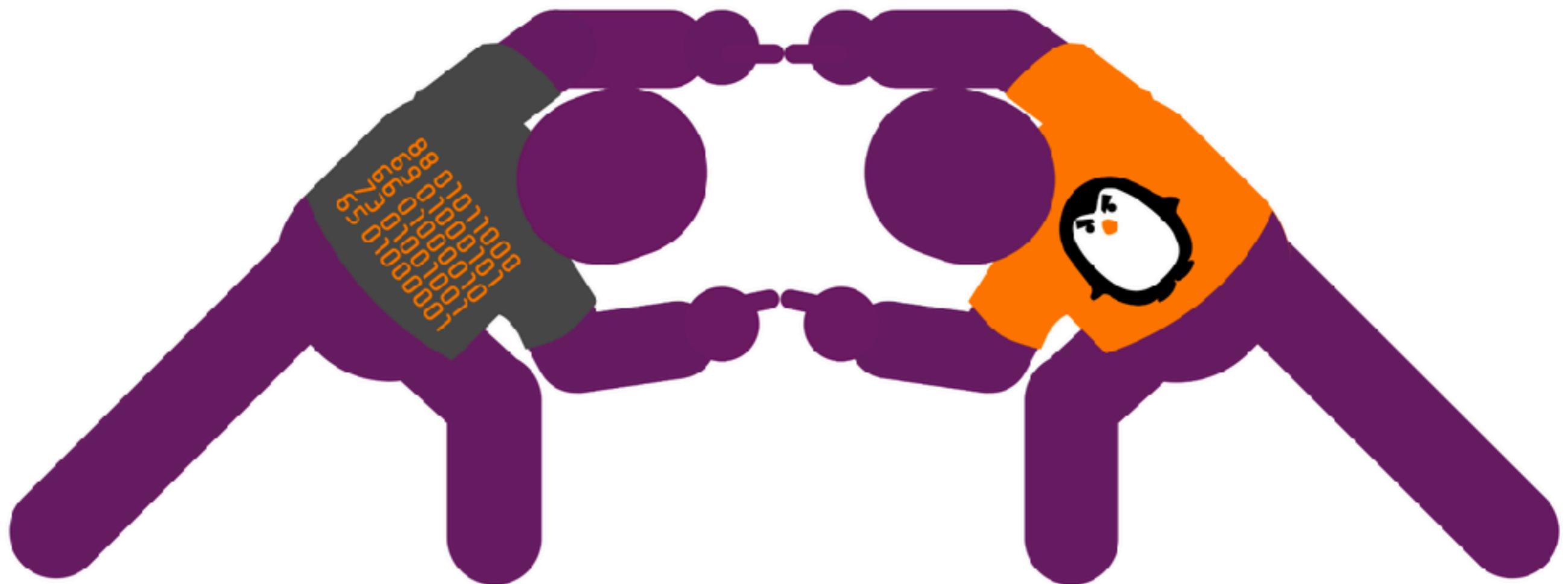


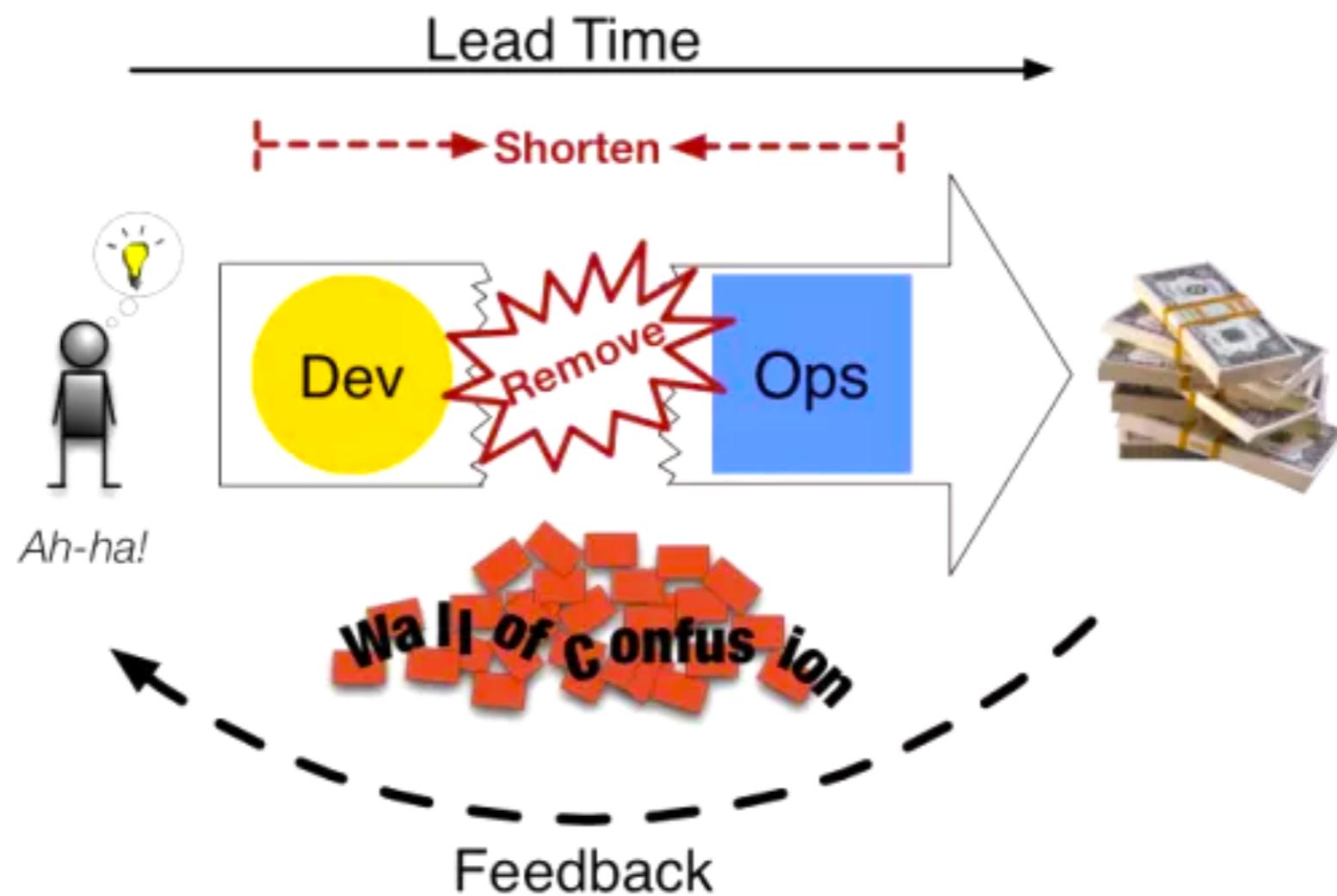
Rise of DevOps

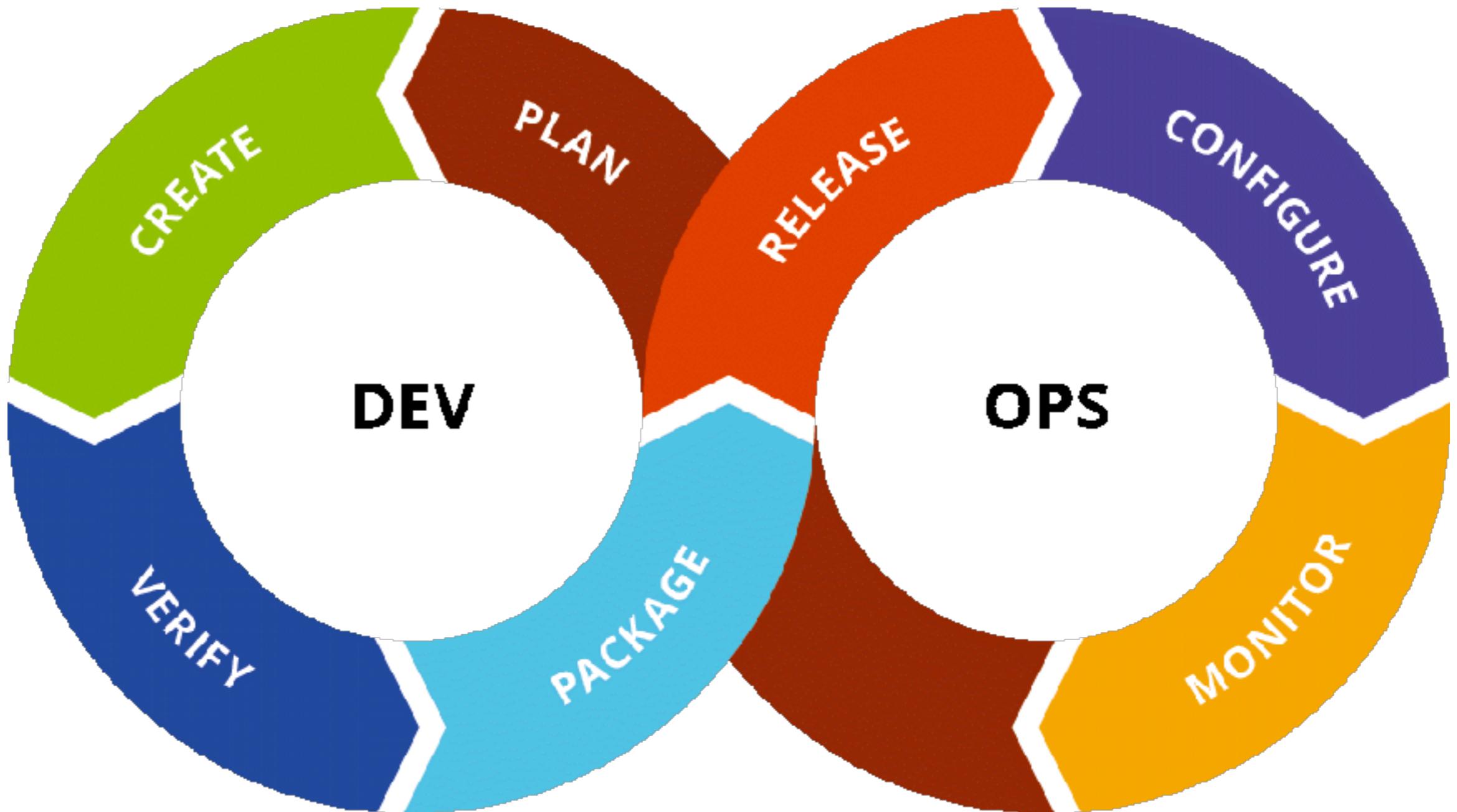












DEV

OPS

 **Application Performance**

Decrease latency by using APM Tools.

 **End User Analytics**

Monitor end user latency and check device performance

 **Quality Code**

Ensure deployments don't degrade performance

 **Code-Level Errors**

Lower MTTR by finding error root causes



 **Application Availability**

Make sure Uptime and SLAs are in order

 **Application Performance**

Solve problems by correlating infrastructure and application metrics

 **End User Complaints**

Fix problems before end users complain

 **Performance Analytics**

Use automatically generated baselines to focus troubleshooting



DevOps ?

"DevOps is
development
and operations
collaboration"

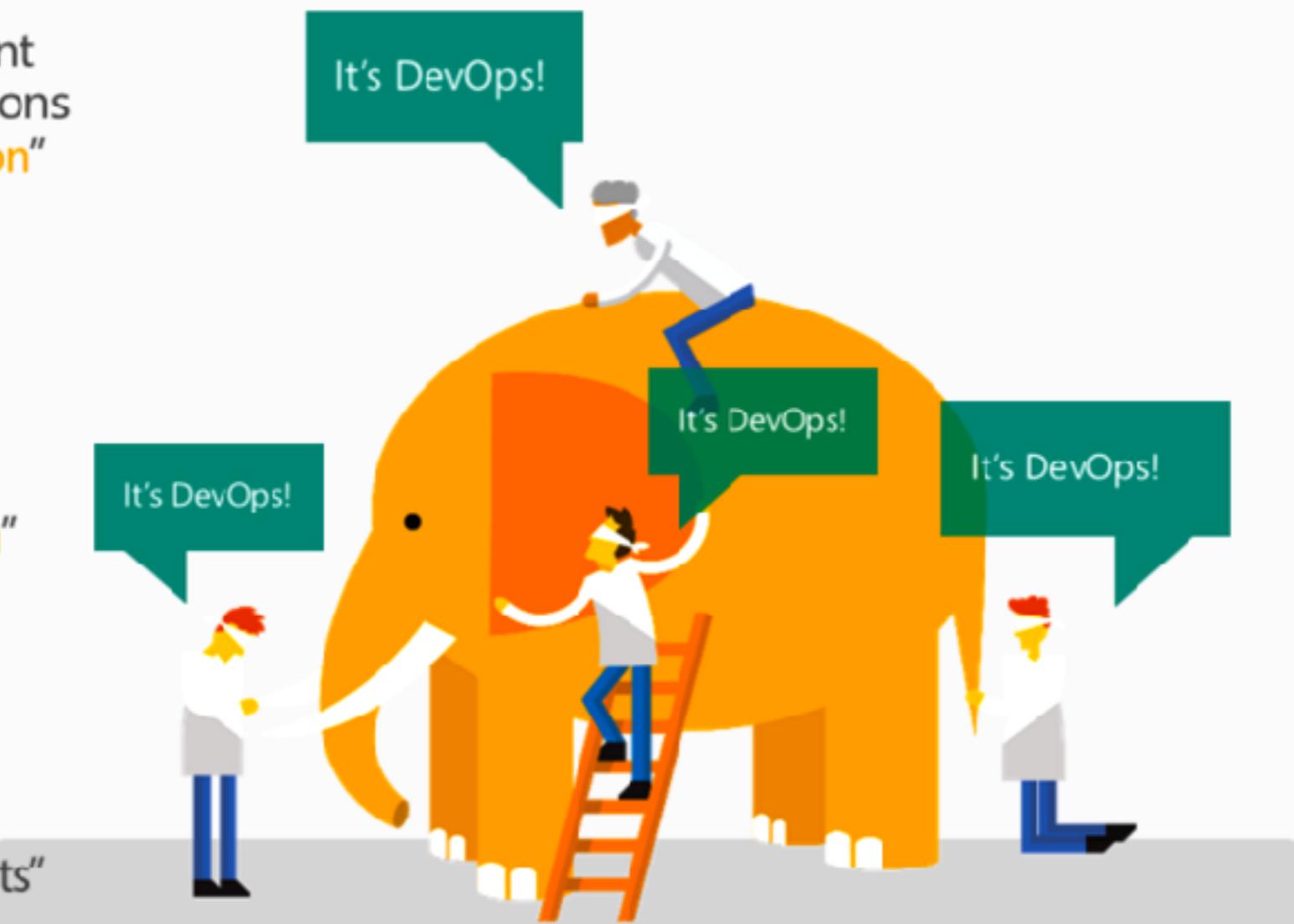
"DevOps
is using
automation"

"DevOps
is **small**
deployments"

"DevOps is
treating your
infrastructure
as code"

"DevOps
is feature
switches"

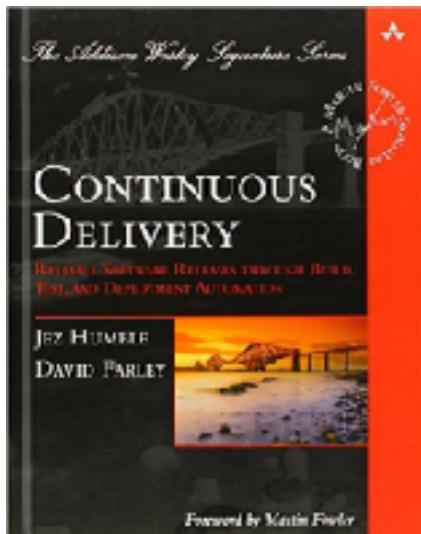
"Kanban
for Ops?"



DevOps ?

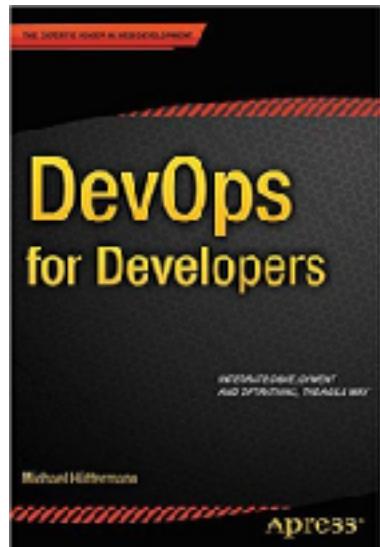
“A movement of people who care about developing and operating reliable, secure, high performance systems at scale.”

- Jez Humble -



DevOps ?

“A mix of patterns intended to **improve collaboration** between development and operations. DevOps addresses **shared goals and incentives** as well as **shared processes and tools.**”

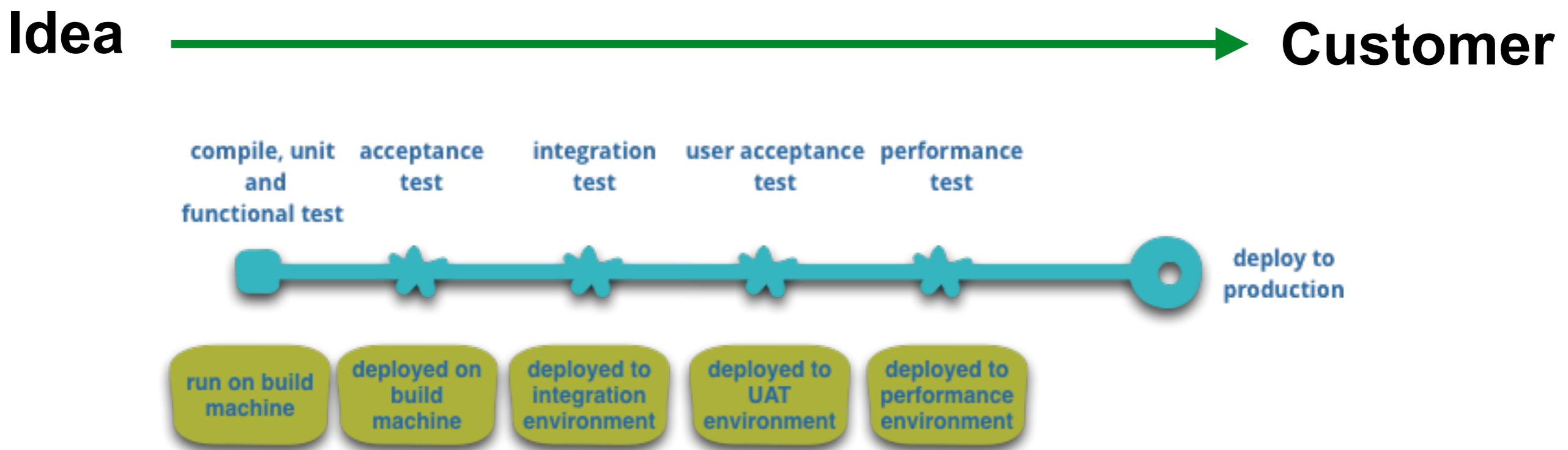


- Michael Huttermann -

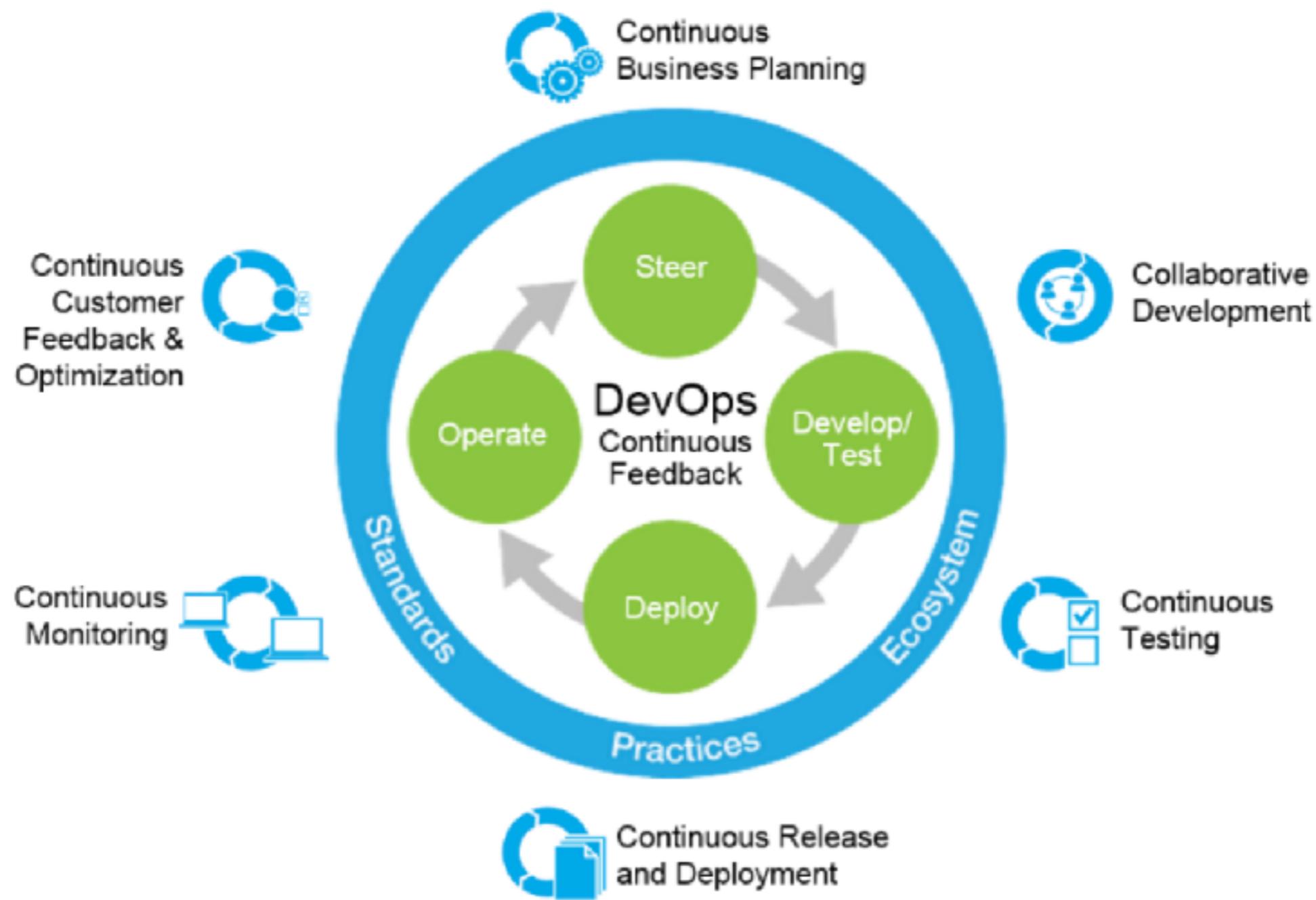


Goal of DevOps

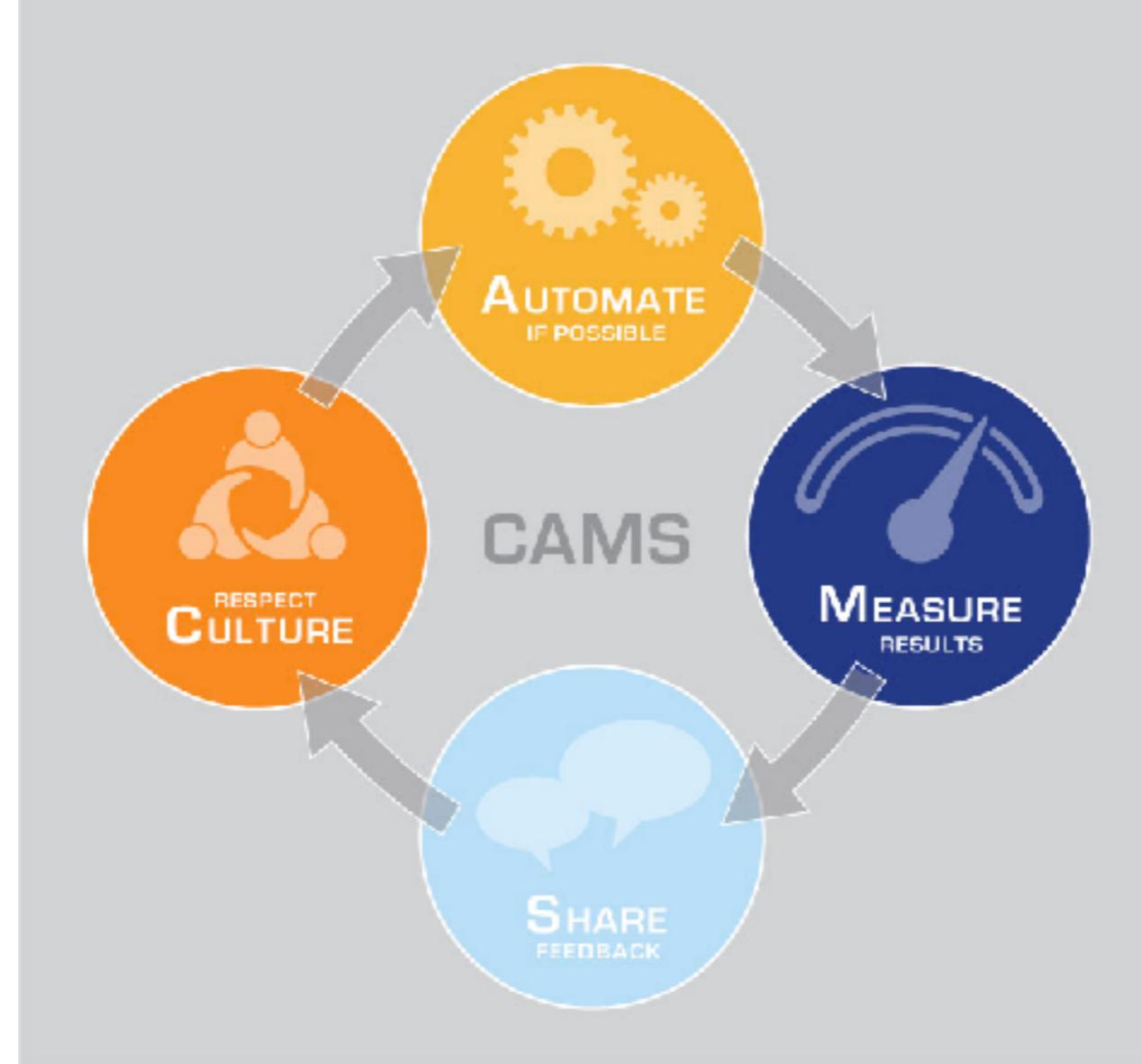
“Improve the delivery of value for Customer and Business”



DevOps Life Cycle



DevOps Principles



DevOps Principles

Culture => People, Process, Tools

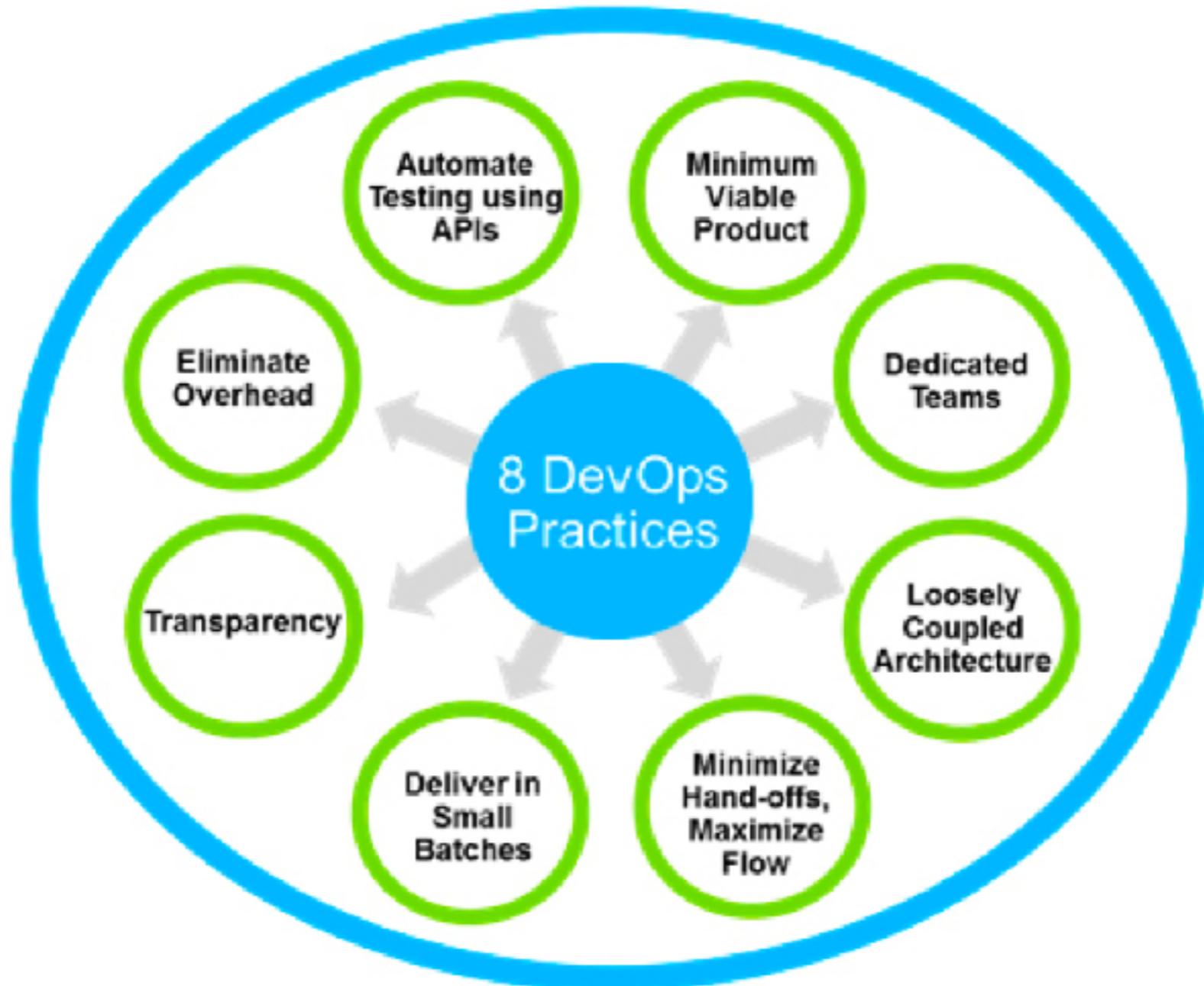
Automation => Infrastructure as Code

Measurement => Measure everything

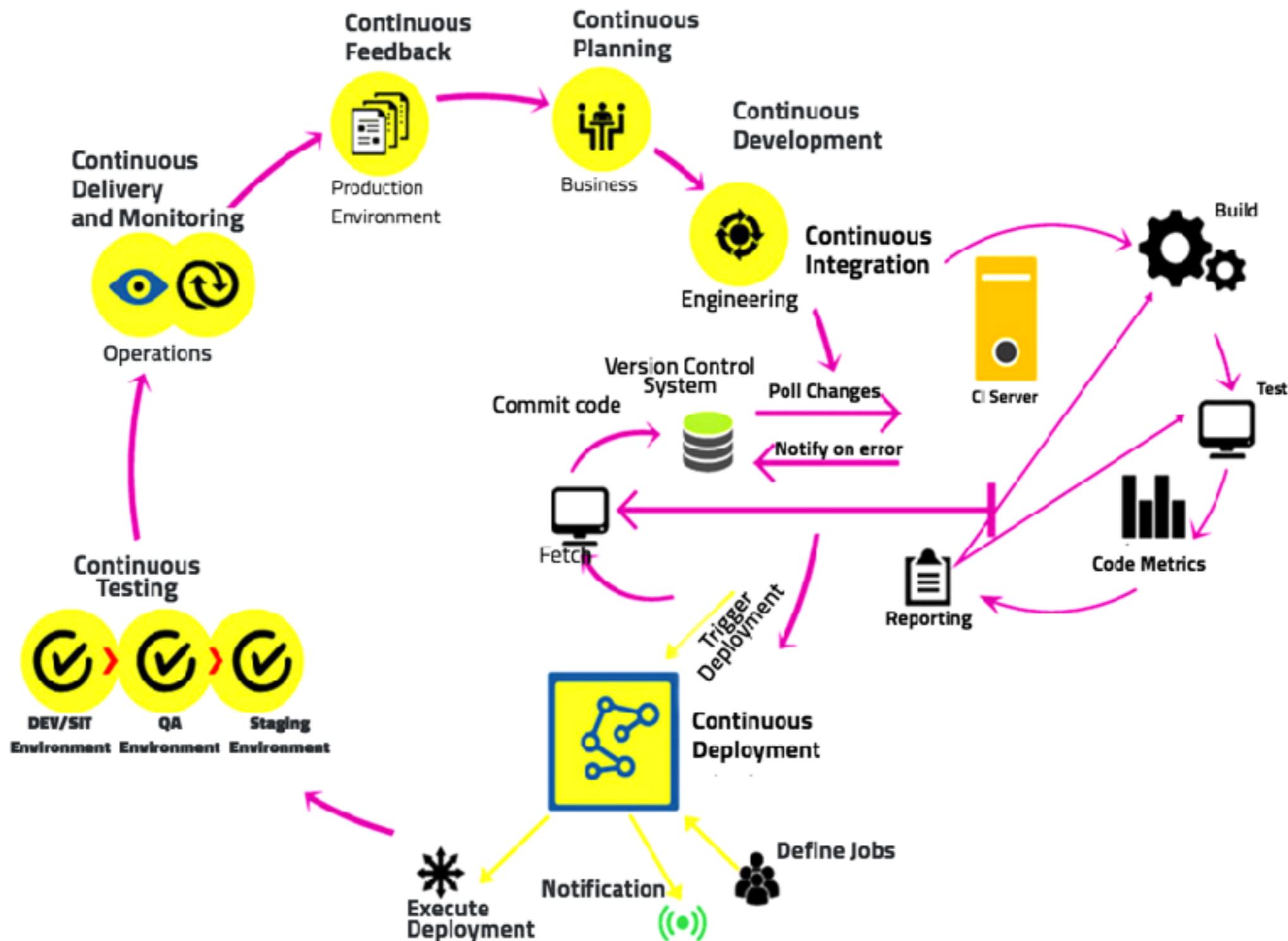
Sharing => Collaboration/Feedback



DevOps Practices



DevOps Practices



DevOps

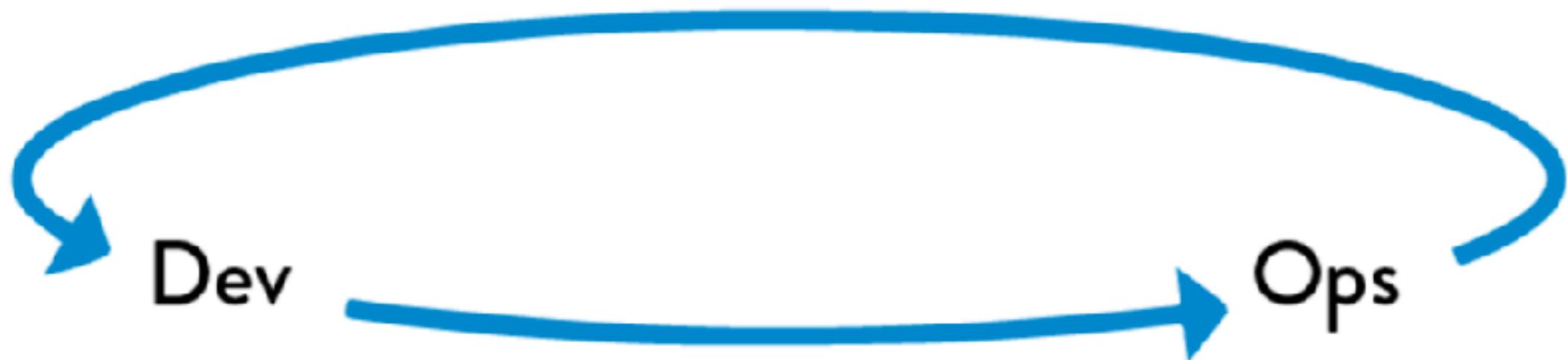
3 ways principle



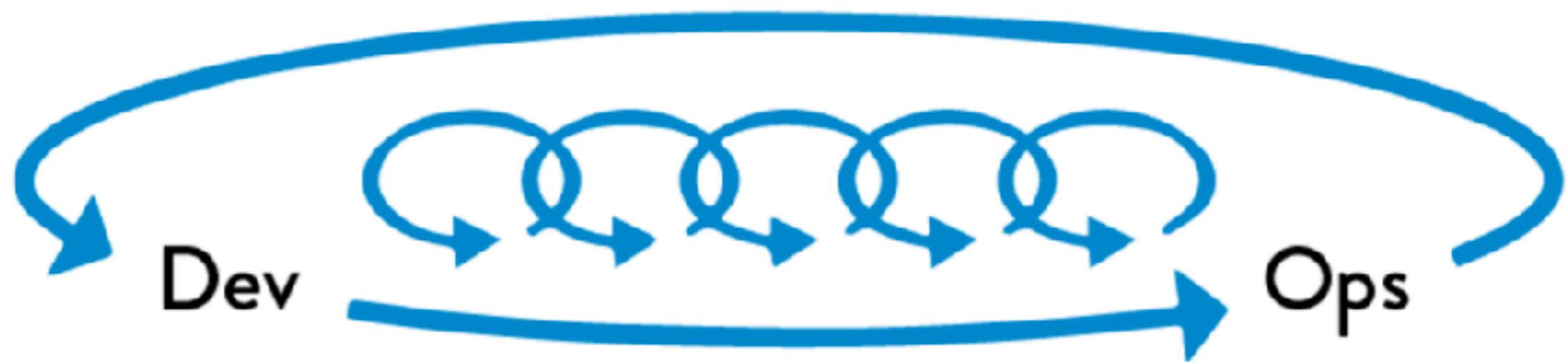
Flow principle



Feedback principle

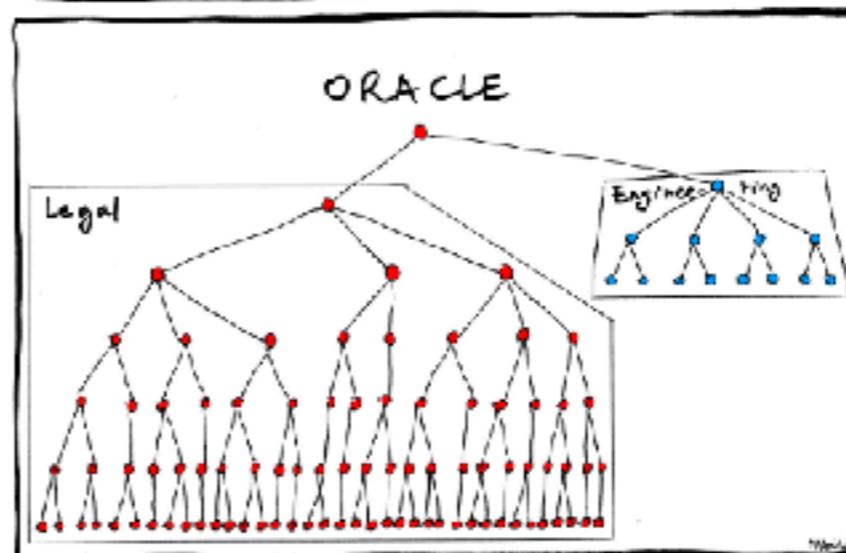
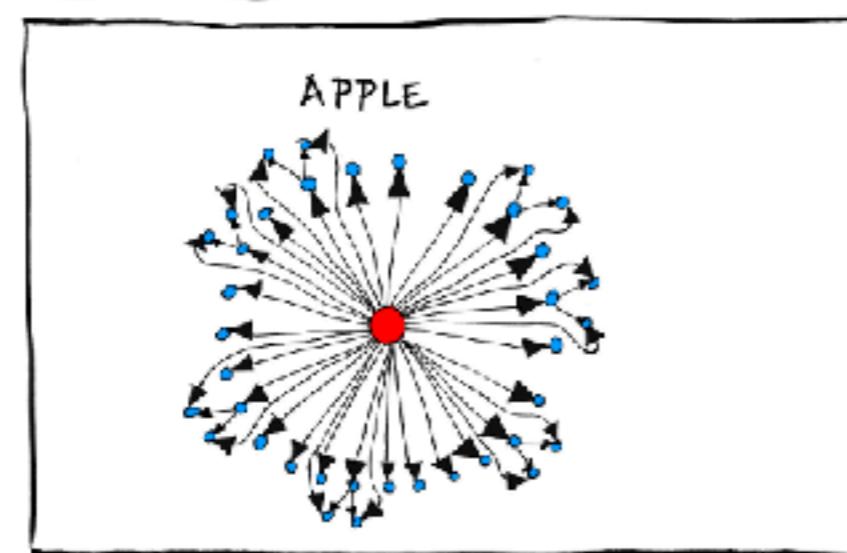
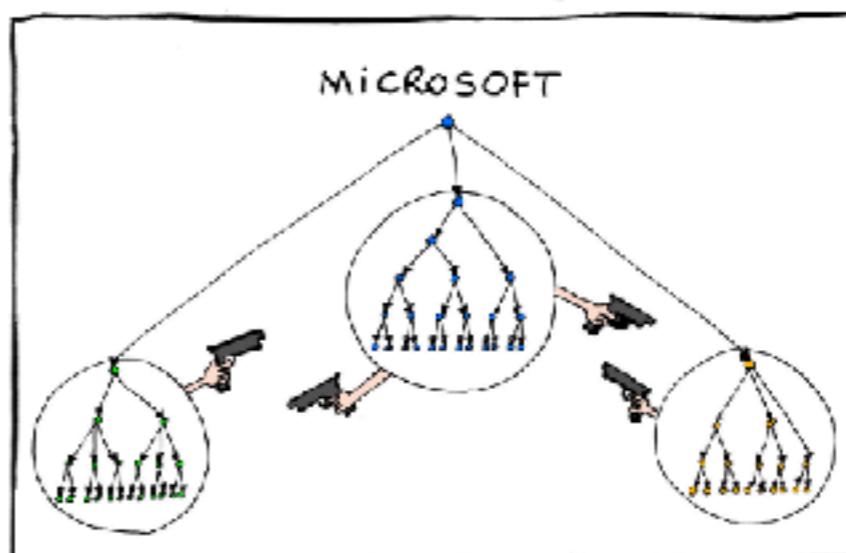
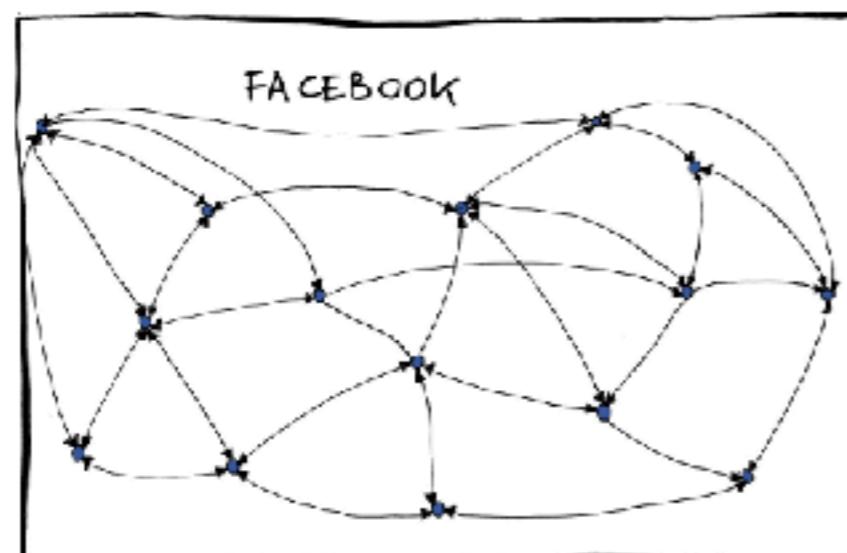
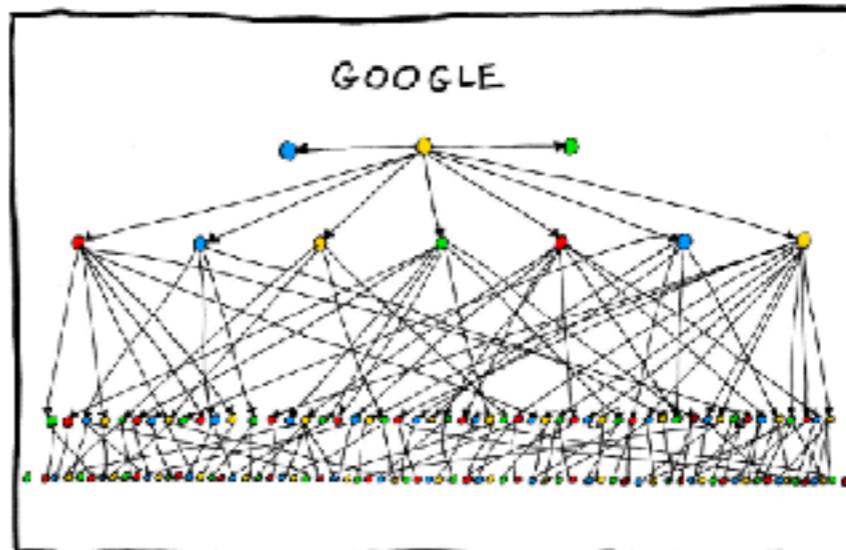
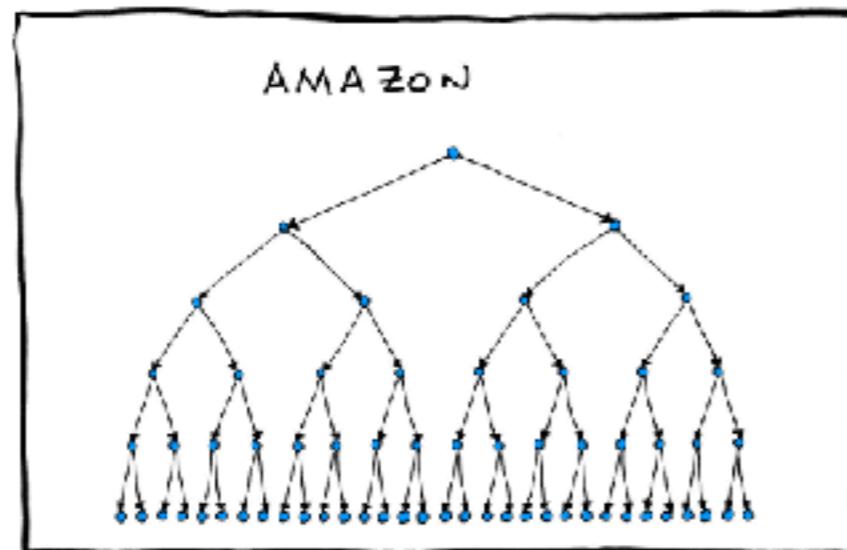


Continuous learning principle



All about Organization structure and culture





People -> Process -> Tool



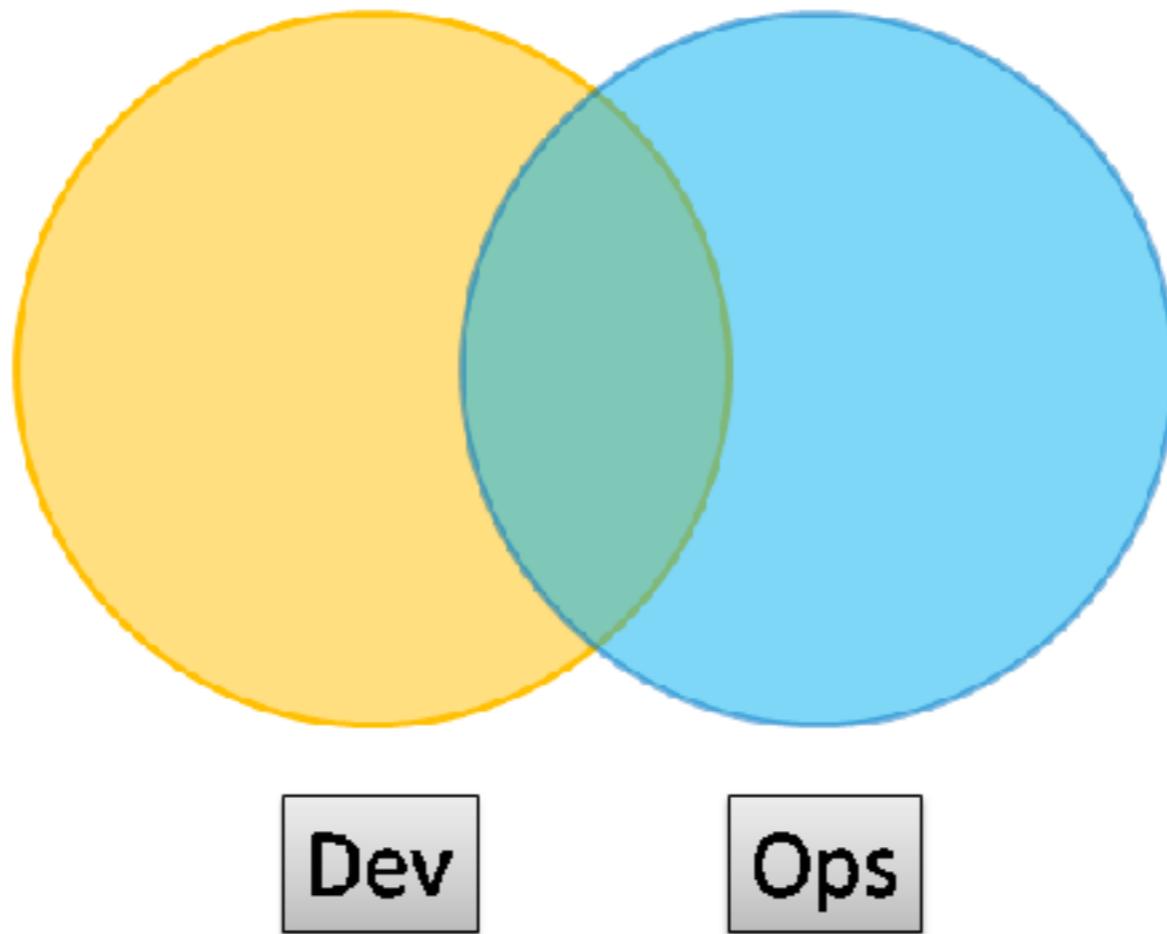
Autonomous



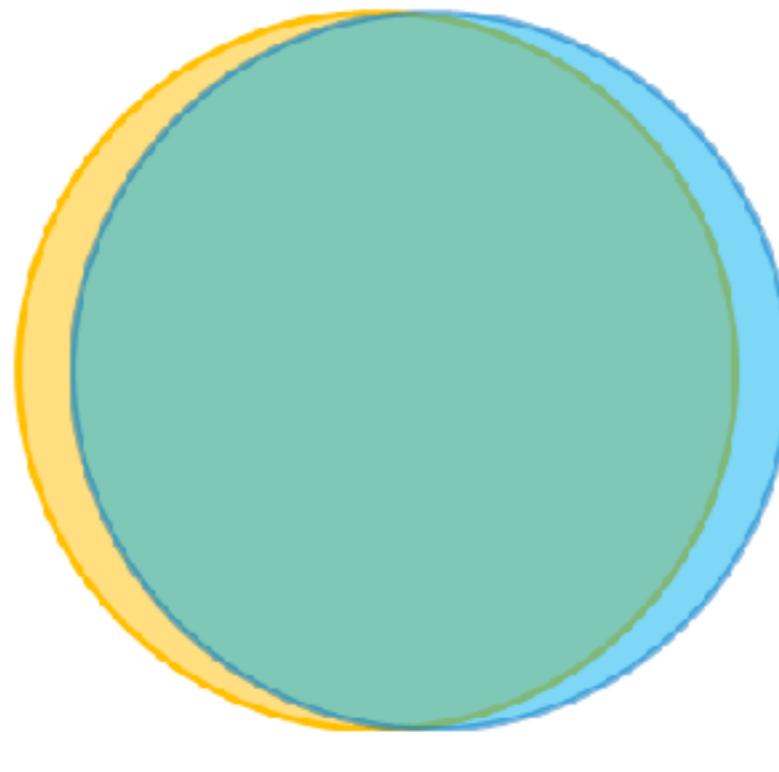
DevOps Topologies



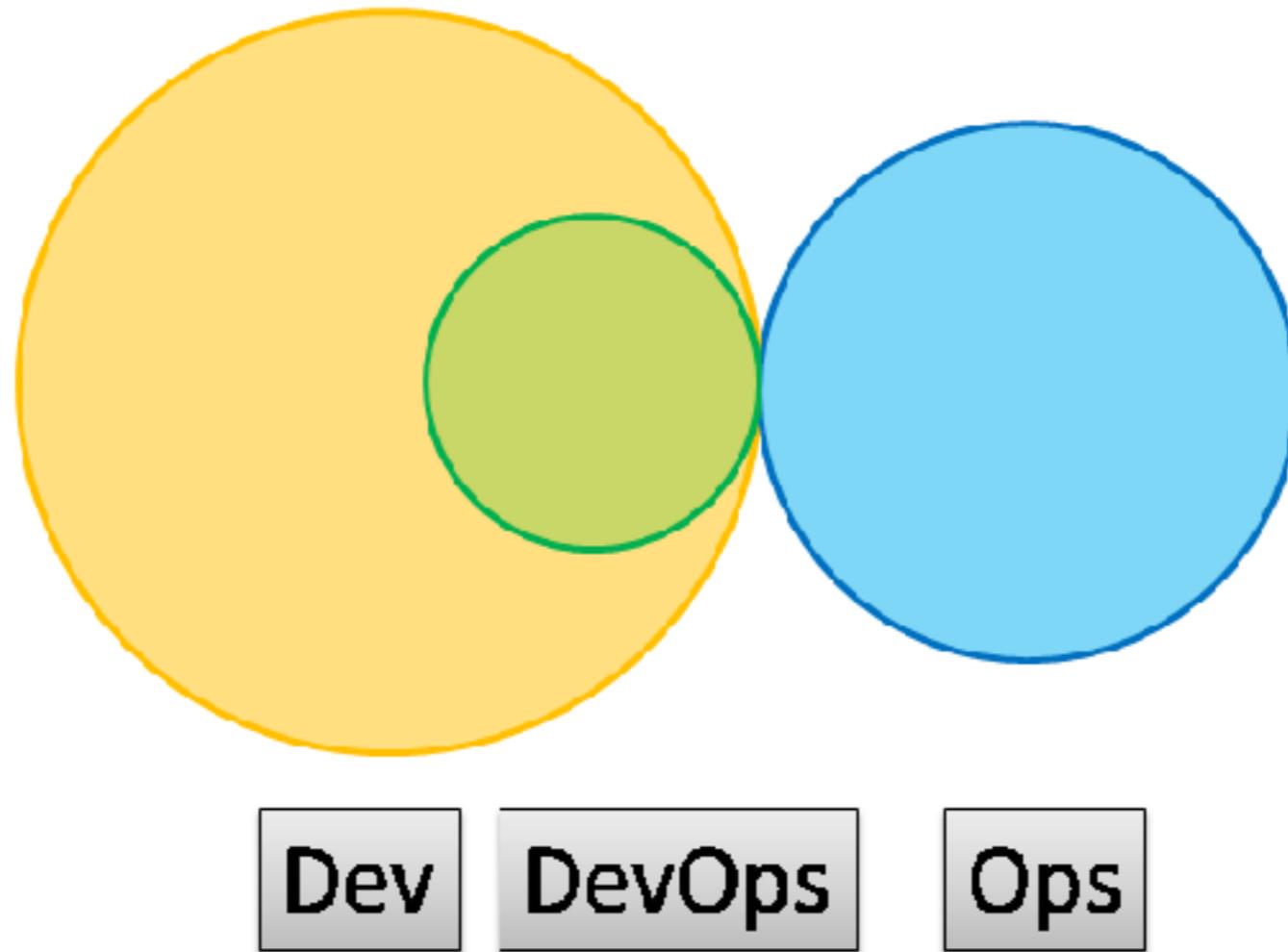
Type 1 – Smooth Collaboration



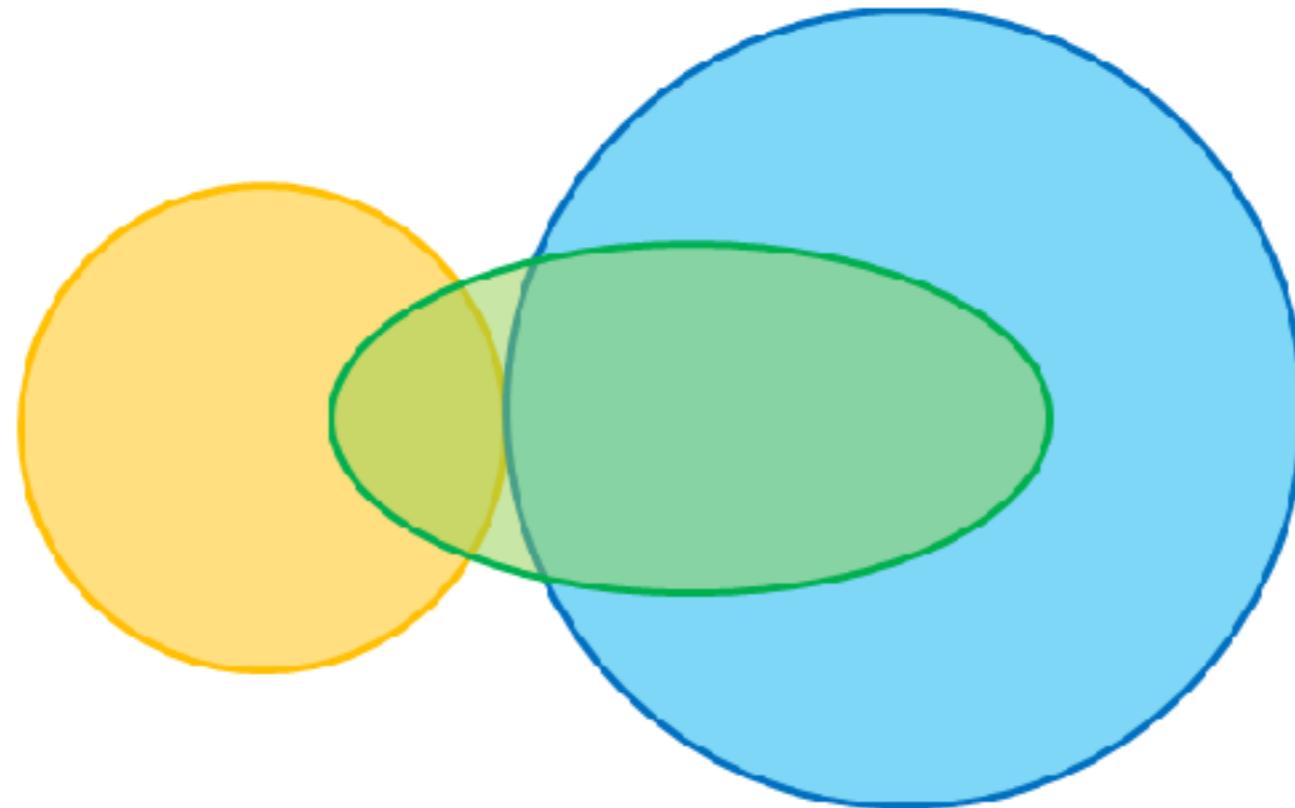
Type 2 – Fully Embedded



Type 3 – Infrastructure-as-a-Service



Type 4 – DevOps-as-a-Service



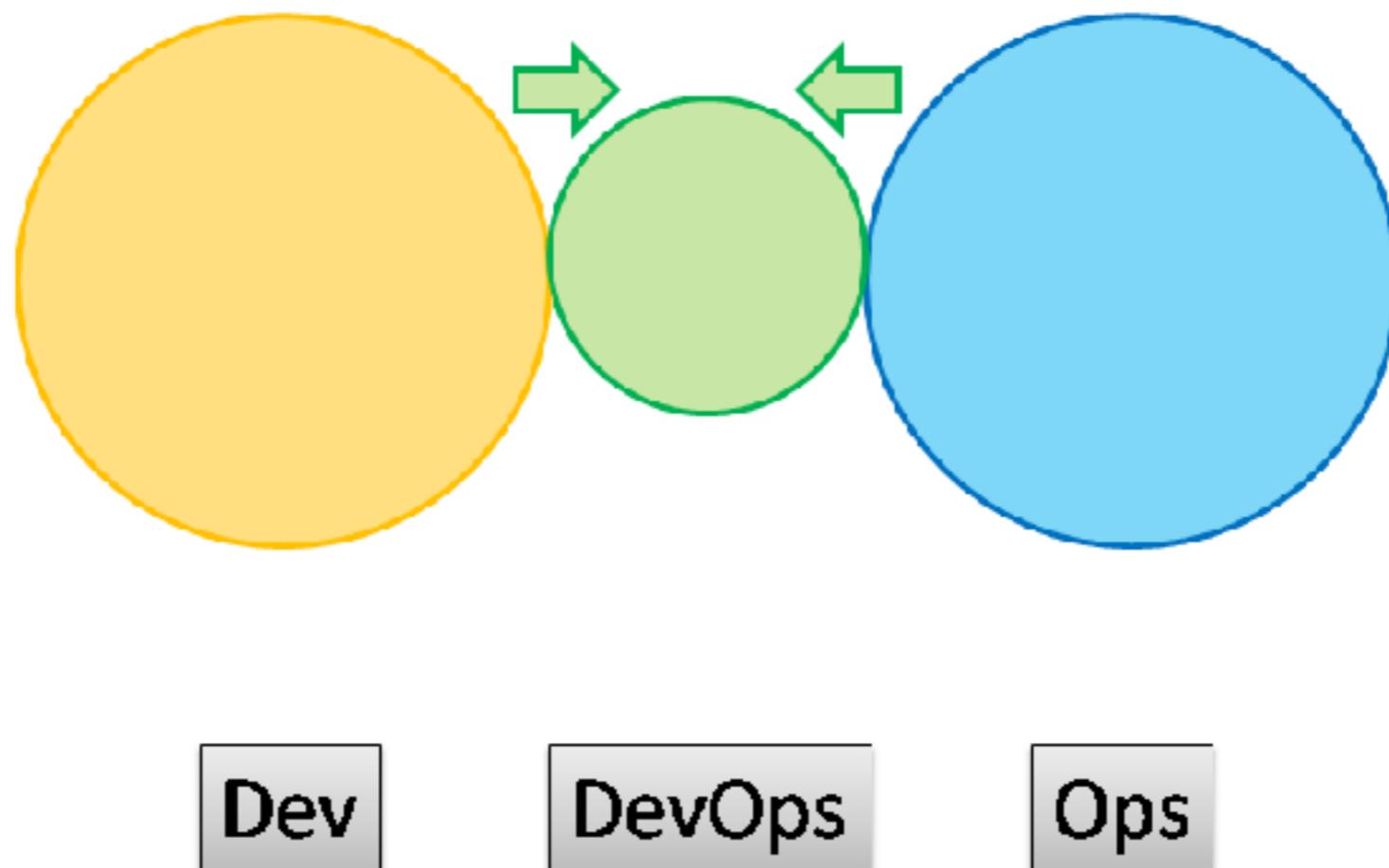
Dev

DevOps

Ops



Type 5 – Temporary DevOps Team



DevOps Tools

PERIODIC TABLE OF DEVOPS TOOLS (V2)

EMBED DOWNLOAD ADD

1	1m	Gh	Github	Os	OpenSource	ScM	Database Mgmt	Build	Aws	Amazone Web Services
3	Os	Gt	Git	Fr	Free	CI	Repo Mgmt	Testing	Az	Azure
4	En	Dm	DBmaestro	Fm	Freemium	Deployment	Config / Provisioning	Containerization	Gc	Google Cloud Platform
5				Pd	Paid	Cloud / IaaS / PaaS	Release Mgmt	Collaboration		
11	Fm	Bb	Bitbucket	En	Enterprise	BI / Monitoring	Logging	Security		
12	Os	Lb	Liquibase							
13	Os	Rg	Redgate	21	Os	Gr	Ant	Fn	Gl	GitLab
		Mv	Maven	22	Os	At	ANT	HtNesse	Gt	Git
				23	Os	Fn		Selenium	Gp	Gulp
				24	Os	Se		Gatling	Br	Broccoli
				25	Fm	Ga		Docker Hub	Cu	Cucumber
				26	Os	Dh		Jenkins	Cj	Cucumberjs
				27	Fr	Jn		Bamboo	Qu	Qunit
				28	Os	Tr		Travis CI	Npm	npm
				29	Pd				Cs	Codeship
				30	Os				Vs	Visual Studio
				31	Pd				Cr	CircleCI
				32	Os				Cp	Capistrano
				33	Os				Ju	Julia
				34	Os				Rd	Rundeck
				35	Os				Cf	CFEngine
				36	En				Ds	Swarm
				37	Os				Op	OpenStack
				38	En					
				39	Os					
				40	Os					
				41	Os					
				42	Fr					
				43	Cs					
				44	Fm					
				45	Os					
				46	Fm					
				47	Pd					
				48	Fm					
				49	Fr					
				50	Fr					
				51	Os					
				52	Os					
				53	Fr					
				54	Os					
				55	Fm					
				56	En					
				57	Fr					
				58	Os					
				59	Os					
				60	Fm					
				61	Fr					
				62	Fm					
				63	Os					
				64	Fm					
				65	Fm					
				66	Os					
				67	En					
				68	Fm					
				69	Fr					
				70	En					
				71	Cs					
				72	Fm					
				73	Os					
				74	En					
				75	Os					
				76	Os					
				77	Fm					
				78	Os					
				79	En					
				80	Os					
				81	Os					
				82	Os					
				83	Fm					
				84	Pd					
				85	En					
				86	En					
				87	Fm					
				88	En					
				89	Cs					
				90	En					
				91	Fm					
				92	En					
				93	Fm					
				94	En					
				95	En					
				96	En					
				97	Fr					
				98	Pd					
				99	Fm					
				100	Pd					
				101	Fm					
				102	Fm					
				103	Fm					
				104	Ph					
				105	En					

XebiaLabs
Deliver Faster

Follow @xebialabs

91	Fm	92	En	93	Fm	94	En	95	En	96	En	97	Fr	98	Pd	99	Fm	100	Pd	101	Fm	102	Fm	103	Fm	104	Ph	105	En
Xlr	XL Release	Ur	UrbanCode Release	Bm	RMC Release Process	Hp	HP Codar	Au	Automatic	Pi	Plutora Release	Sr	Servera Release	Tfs	Team Foundation	Tr	Telco	Jr	Jira	Rf	HipChat	Sl	Slack	Fd	Flowdock	Pv	Primal Tracker	Sn	ServiceNow
Ki	Kibana	Nr	New Relic	Ni	Nagios	Zb	Zabbix	Dd	Datadog	Ei	Elasticsearch	St	StackState	Sp	Splunk	Le	Logentries	Sl	Sumsologic	Ls	Logstash	Gr	Graylog	Sn	Smart	Tr	Tripwire	Ff	Fortify

<https://xebialabs.com/periodic-table-of-devops-tools/>



Microservices

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No DevOps Team

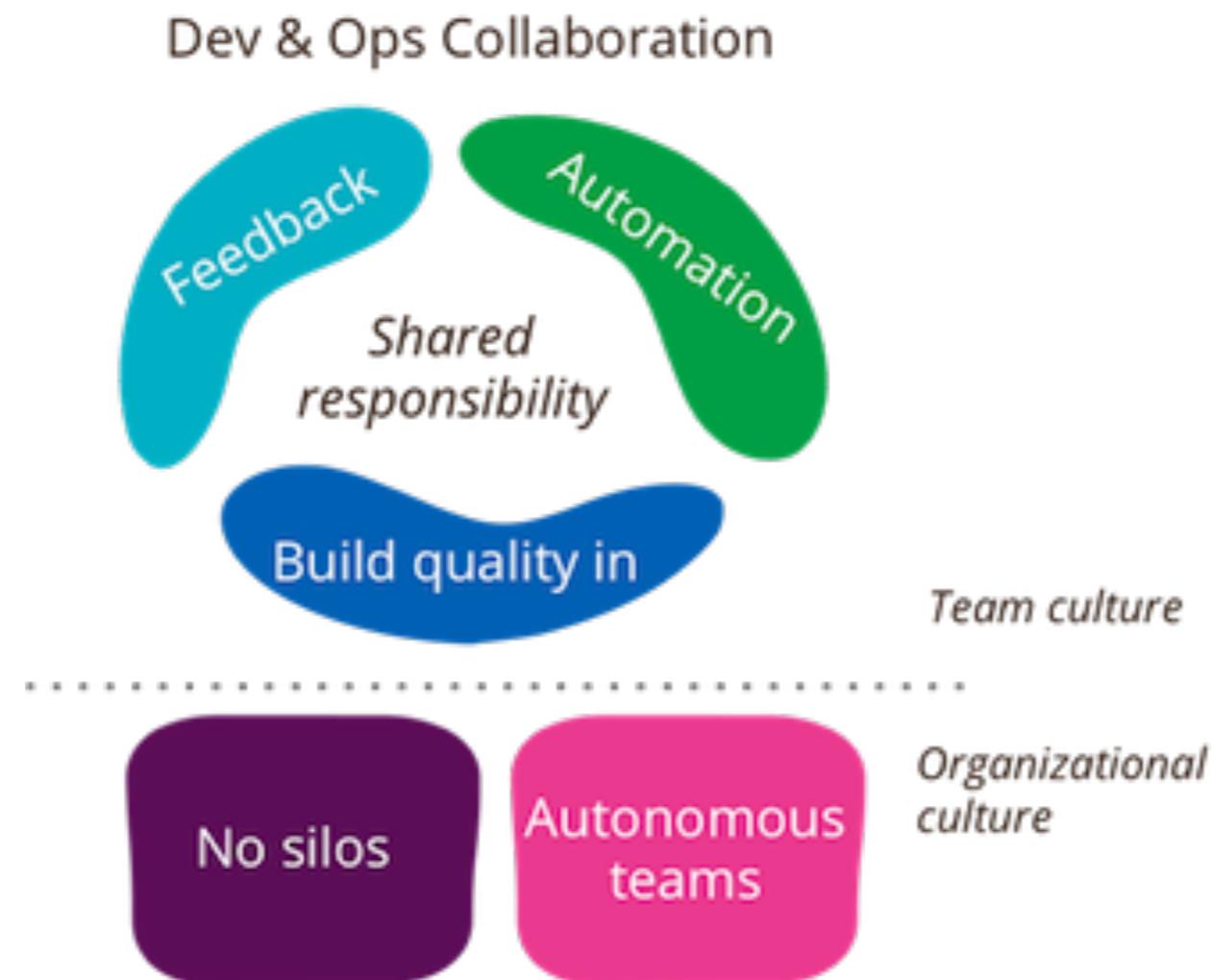
Problem department !!



DevOps != Tools
Tools enable DevOps



Team and Organization culture



<https://martinfowler.com/bliki/DevOpsCulture.html>

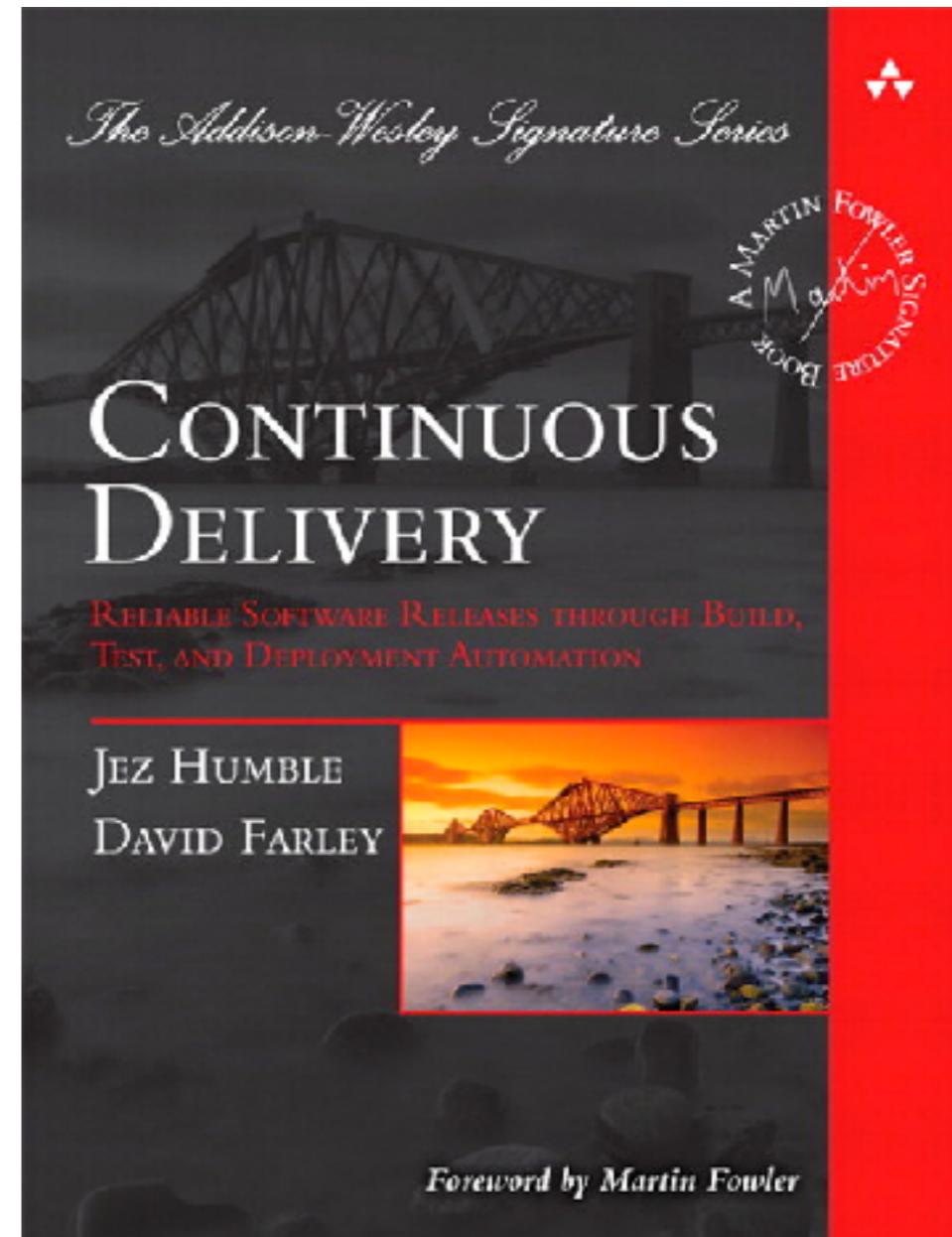
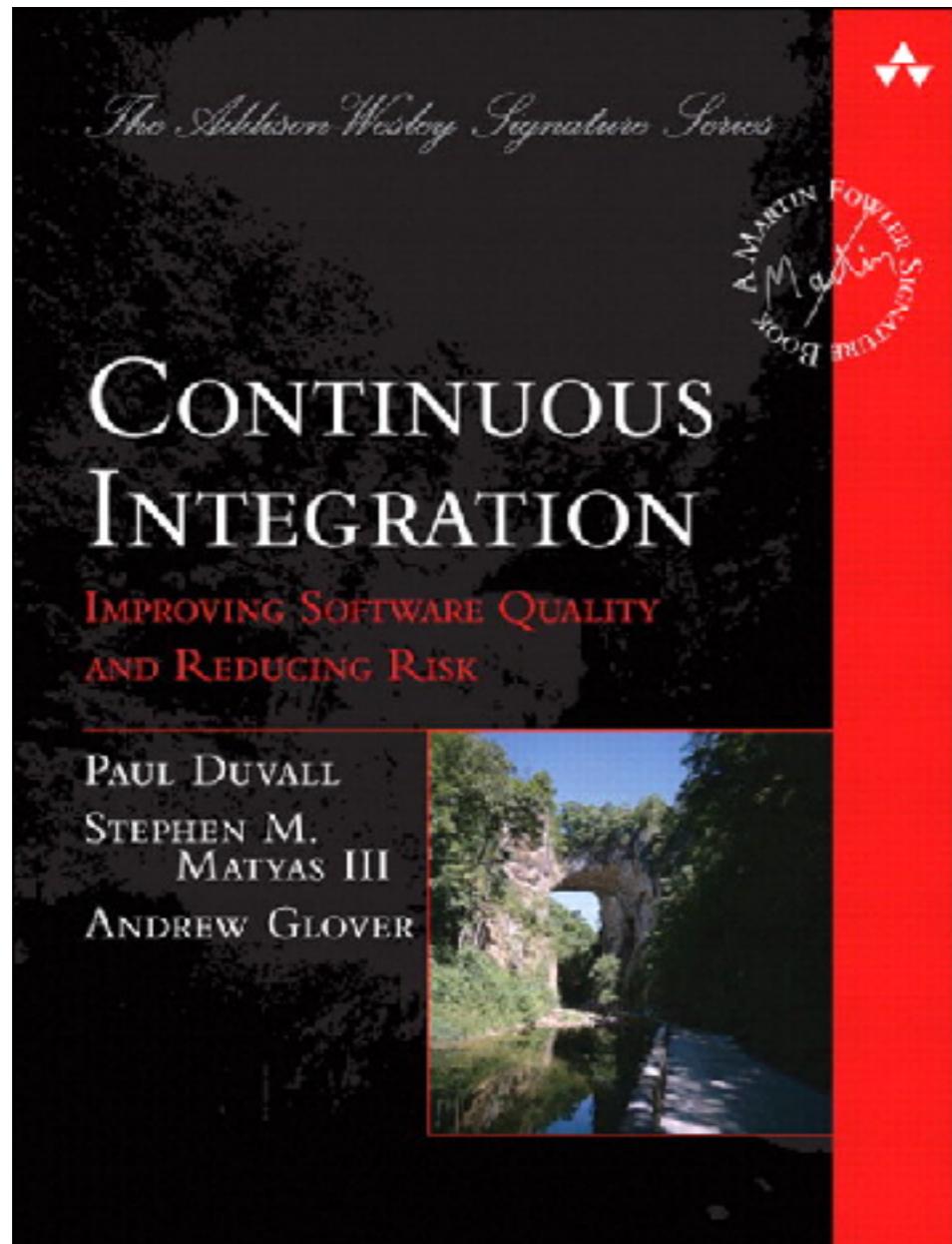




Start with Continuous Integration Continuous Delivery



Improve quality and reduce risk



Microservices

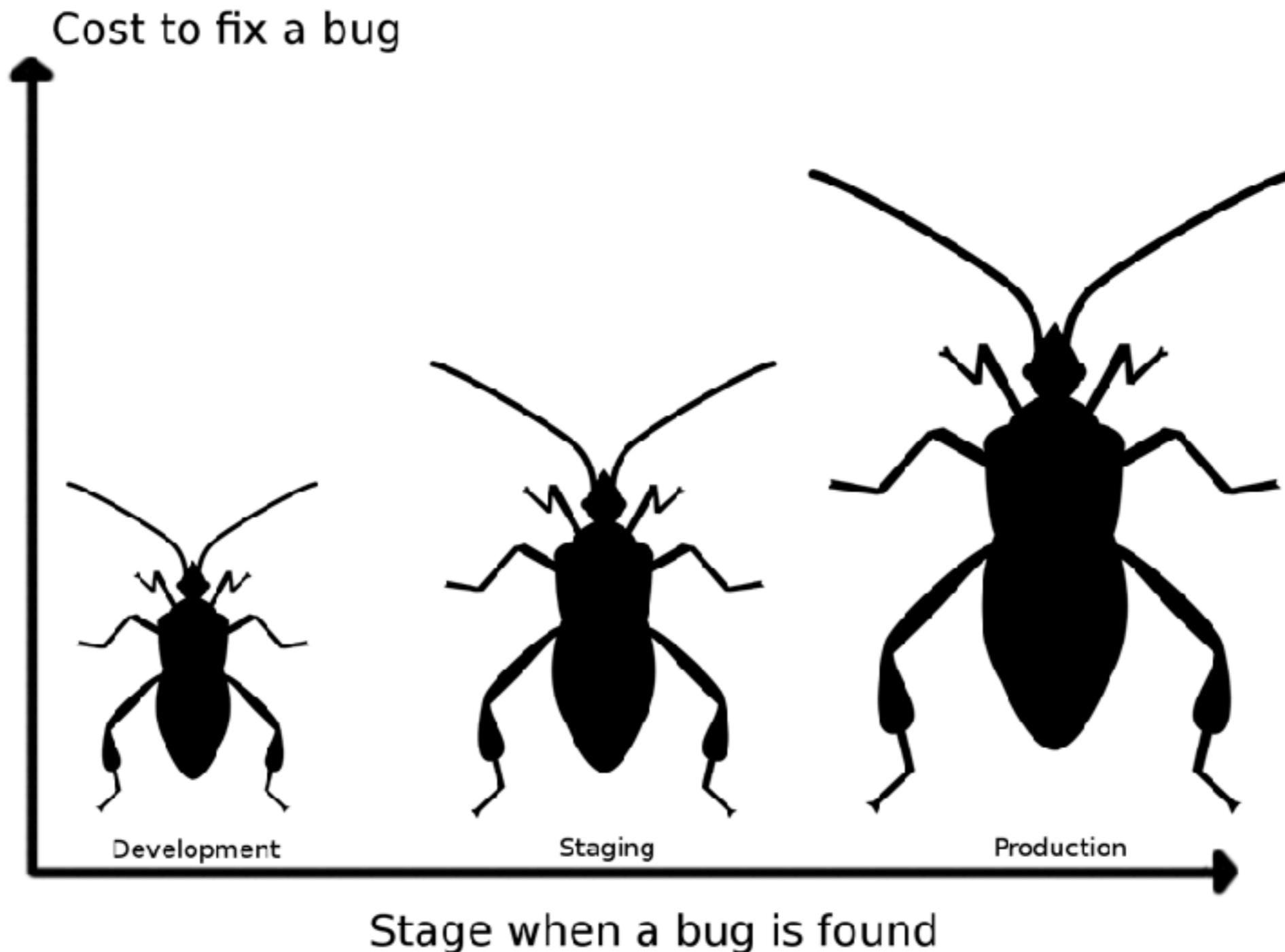
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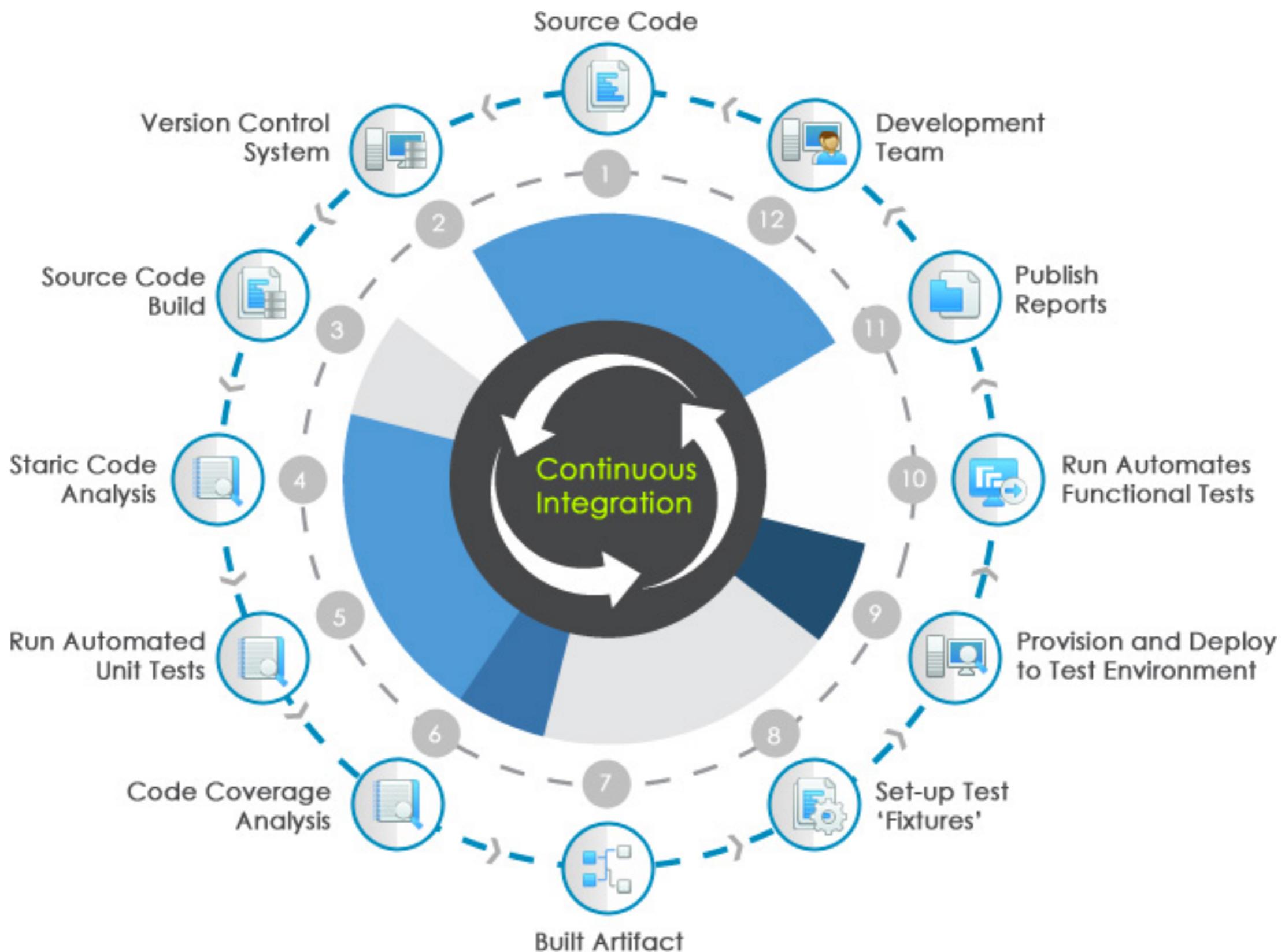
The cost of integration

1. Merging the code
2. Duplicate changes
3. Test again again !!
4. Fixing bugs
5. Impact on stability



The cost of integration







Jenkins

Bamboo



TeamCity

> goTM



Hudson





Jenkins

Bamboo

CI is about what people do
not about what tools they use



Hudson



Continuous Integration

Discipline to integrate frequently



Continuous Integration

Strive to make **small change**

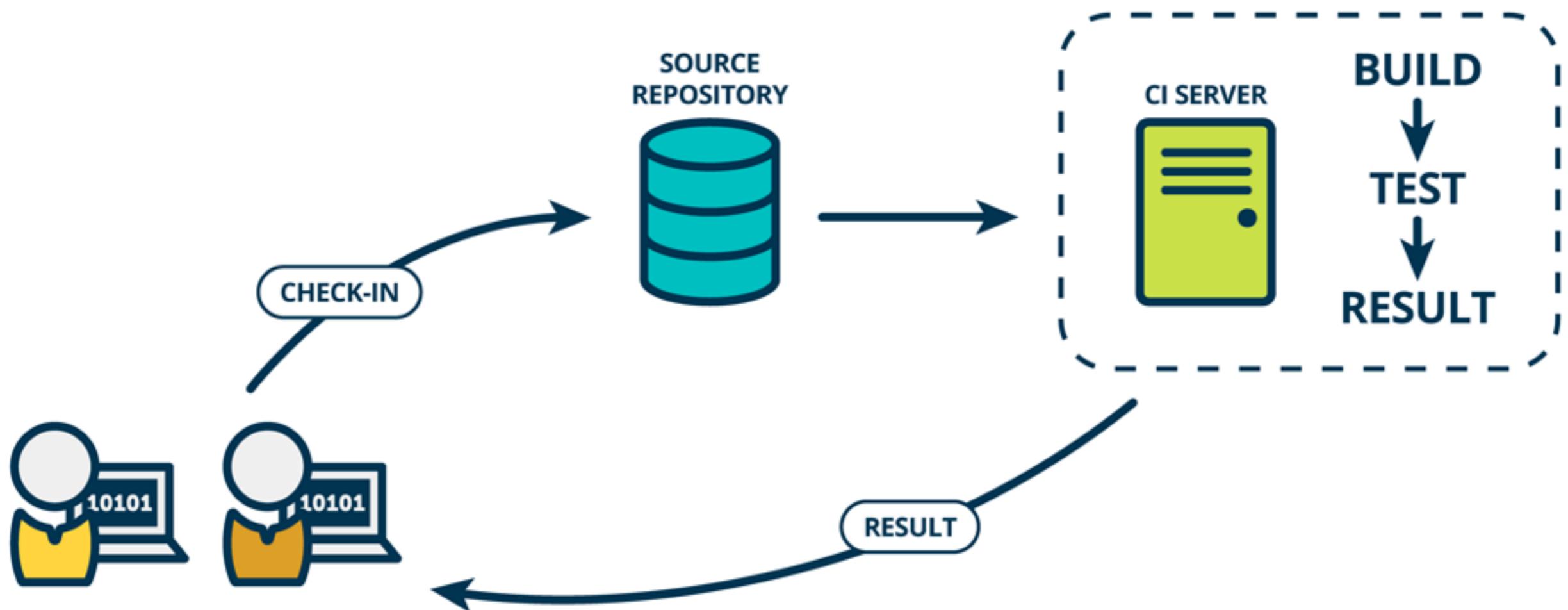


Continuous Integration

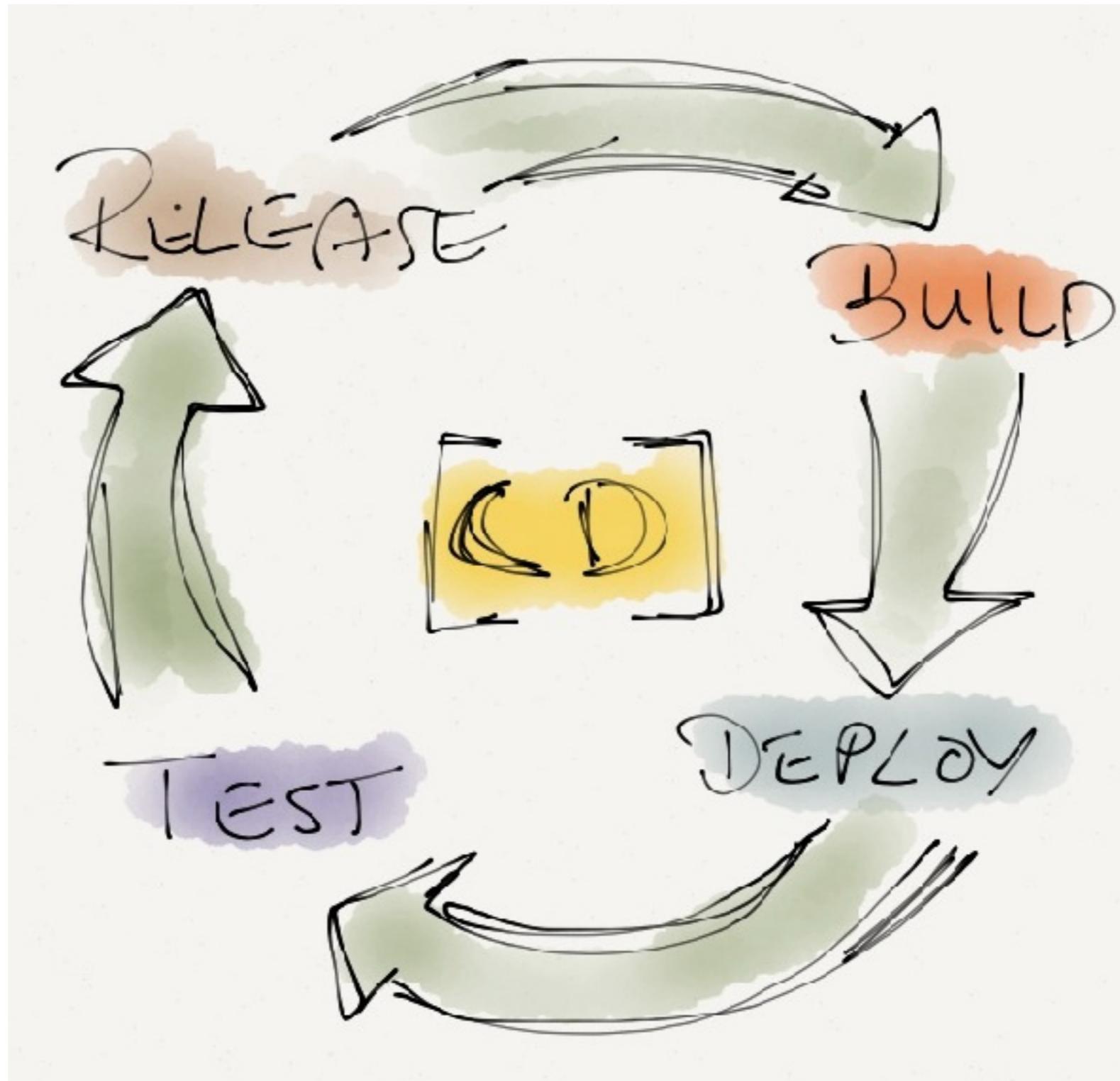
Strive for **fast feedback**



Continuous Integration



CD ?



CD ?

CONTINUOUS DELIVERY



CONTINUOUS DEPLOYMENT



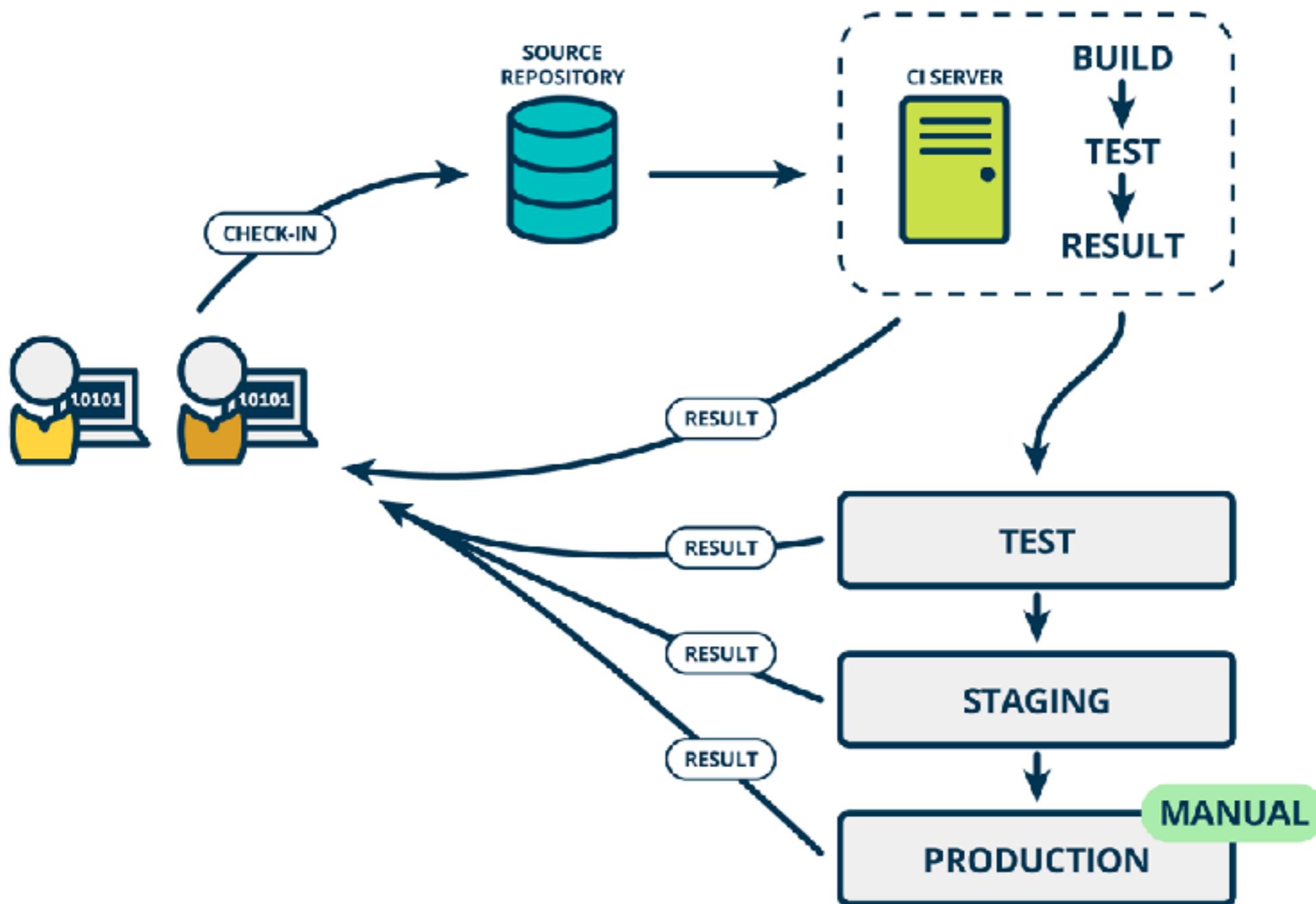
<http://blog.crisp.se/2013/02/05/yassalsundman/continuous-delivery-vs-continuous-deployment>



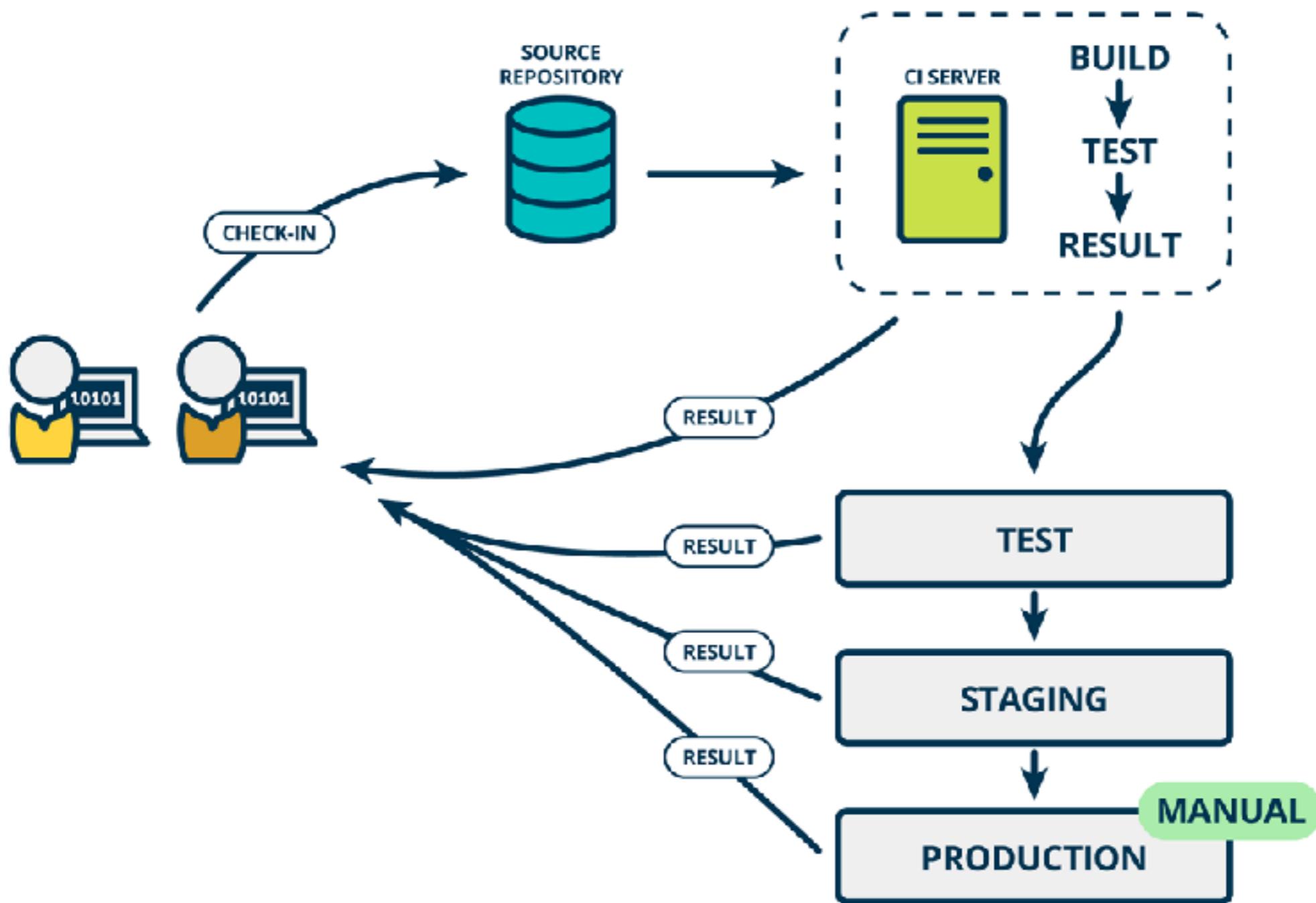
Microservices

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Continuous Delivery



Rise of DevOps



Continuous Integration

is a Software development practices



Practice 1

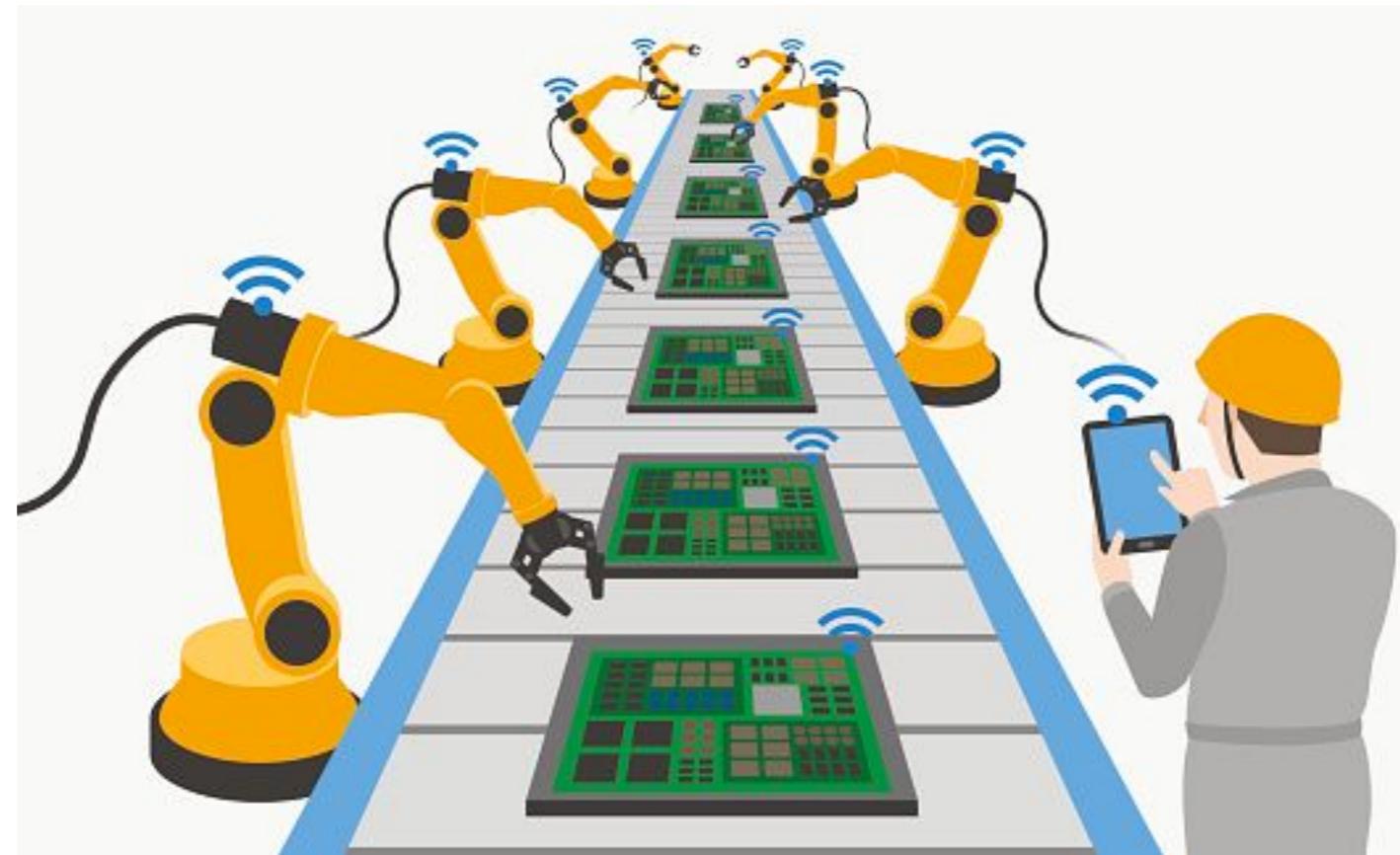
Maintain a single source repository

In general, you should store in source control
everything you need to build anything



Practice 2

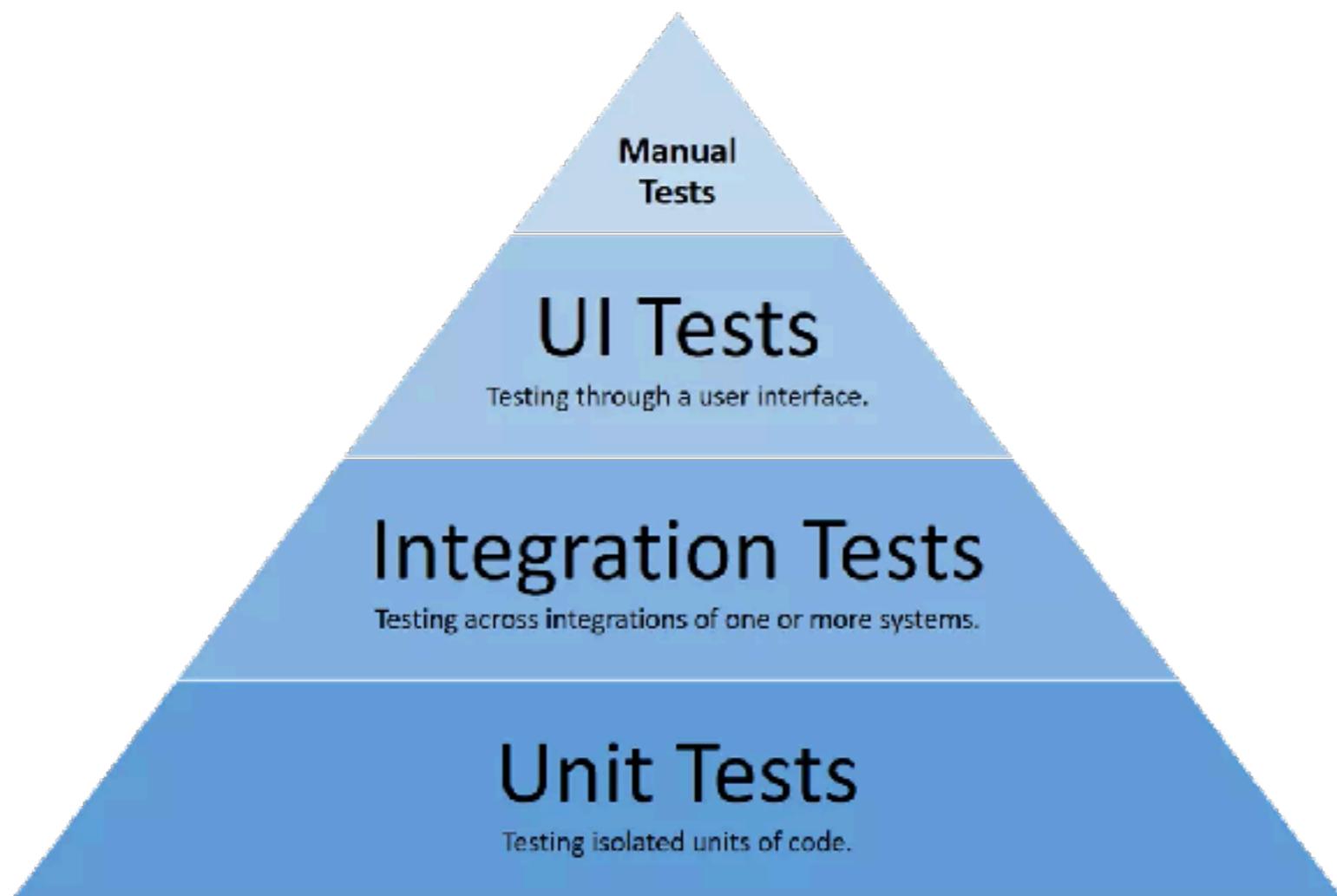
Automated the build
Automated environment for builds



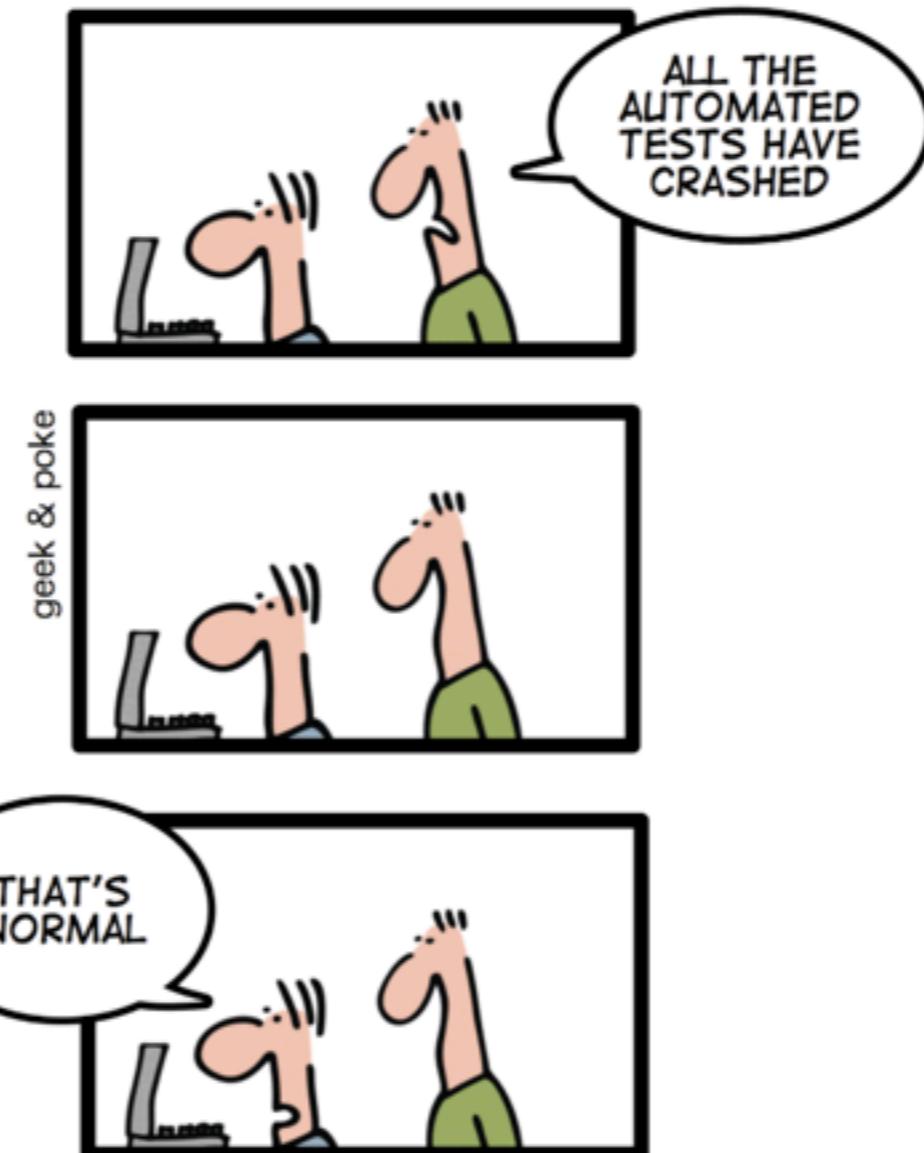
Practice 3

Make your build **self-testing**

Build process => compile, linking and **testing**



*TODAY: CONTINUOUS INTEGRATION
GIVES YOU THE COMFORTING
FEELING TO KNOW THAT
EVERYTHING IS NORMAL*

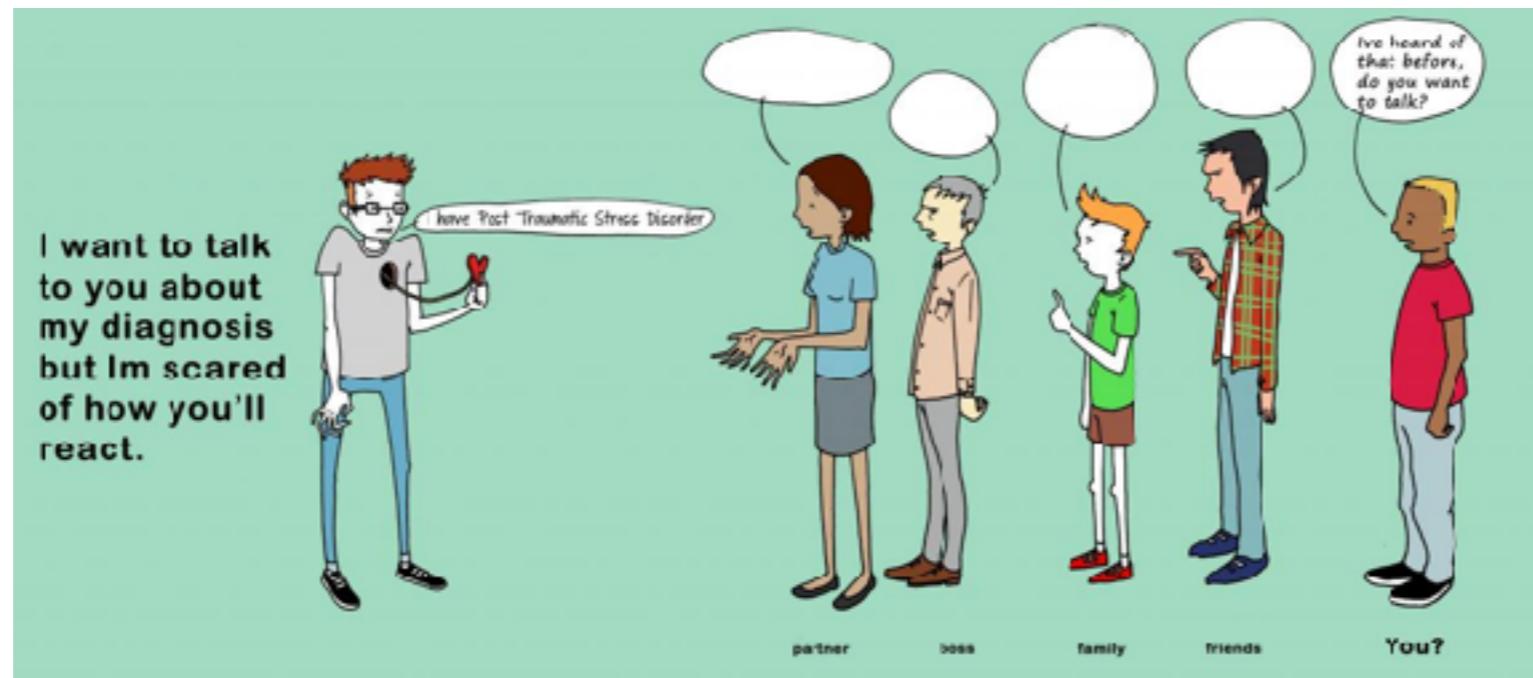


Practice 4

Everyone commits to the mainline everyday

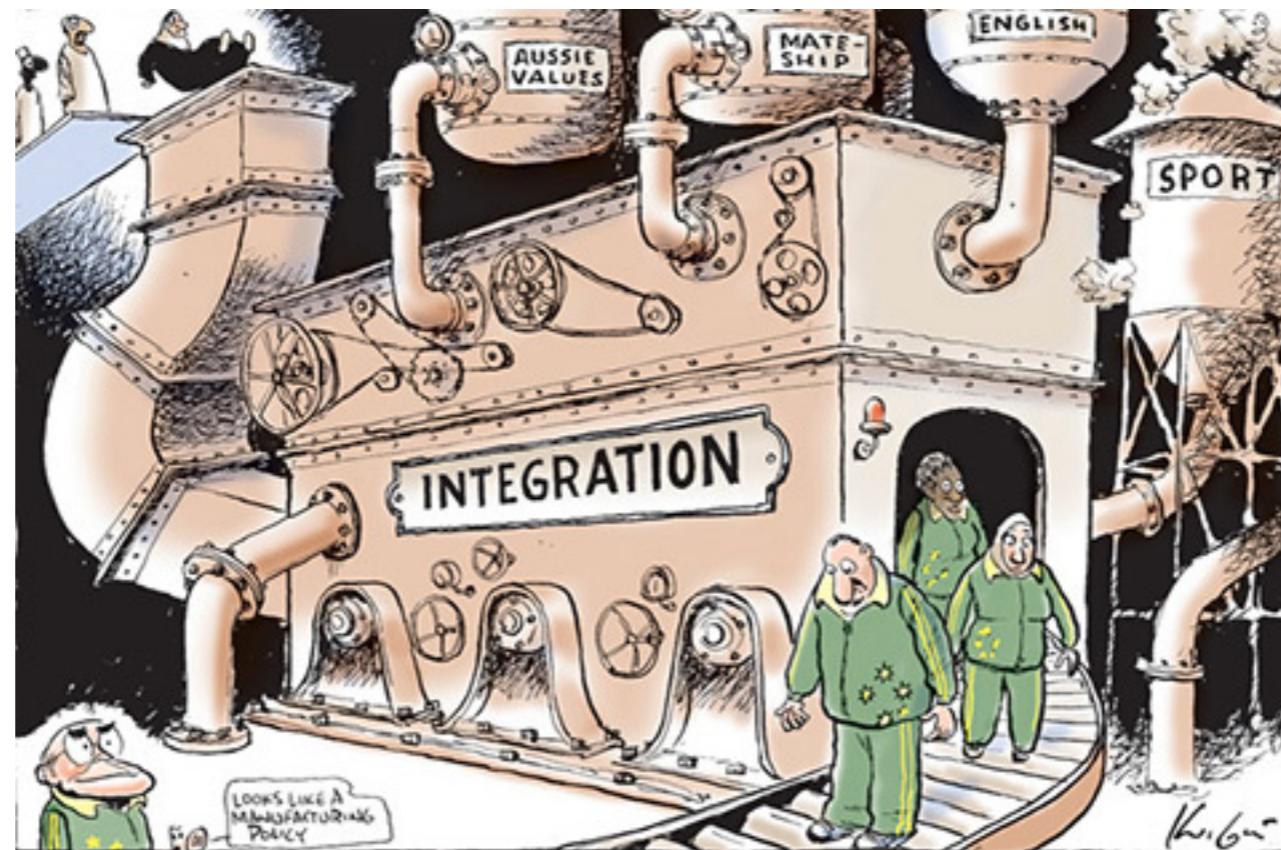
Integration is about communication

Integration allows developers to tell other developers



Practice 5

Every commits should build the mainline on an
Integration machine



Nightly build is not enough for Continuous Integration



Practice 6

Fix broken builds immediately

“Nobody has a higher priority task than fixing the build”



Practice 7

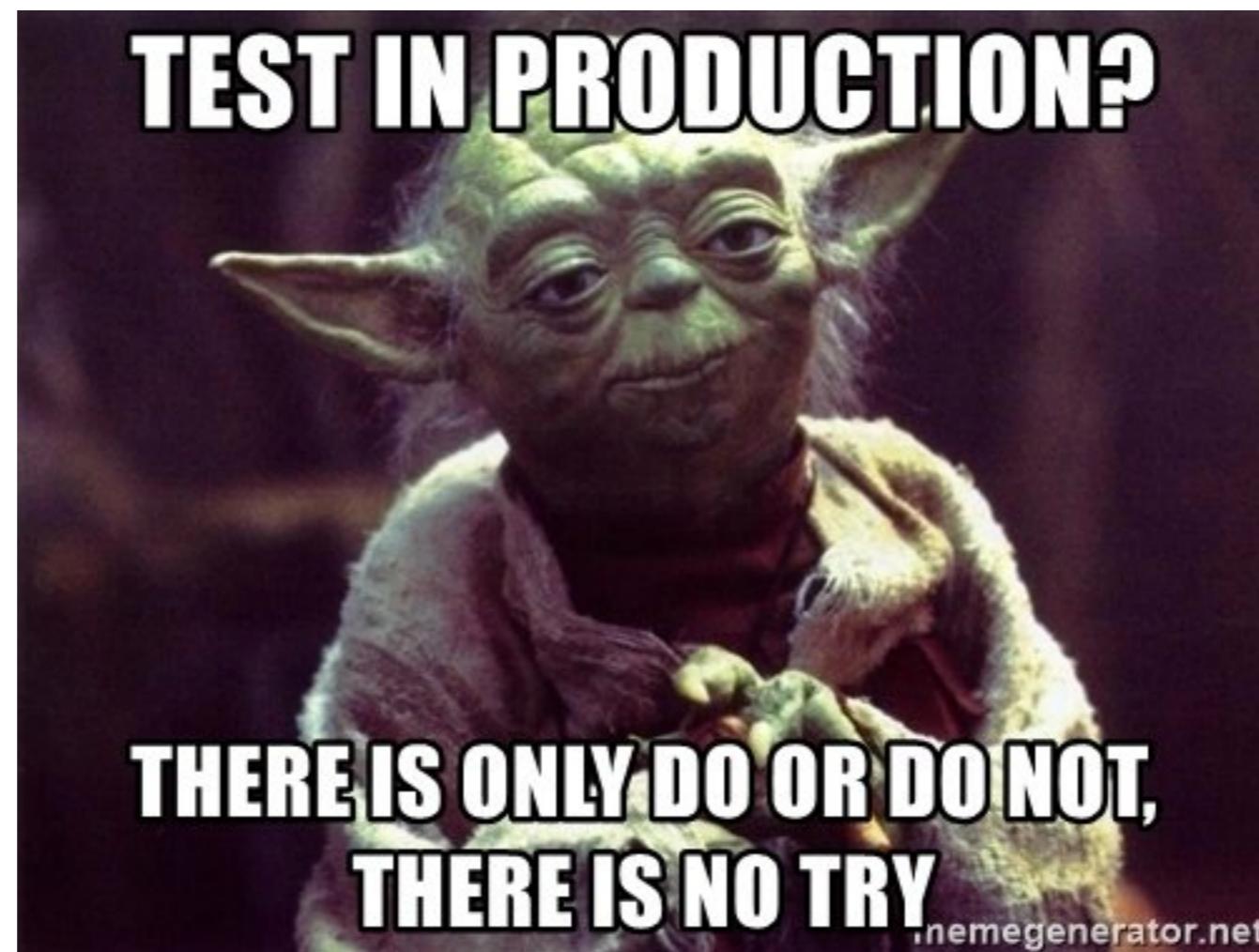
Keep the build **fast**

Continuous Integration is to provide rapid feedback



Practice 8

Test in clone of the **Production** environment



Practice 9

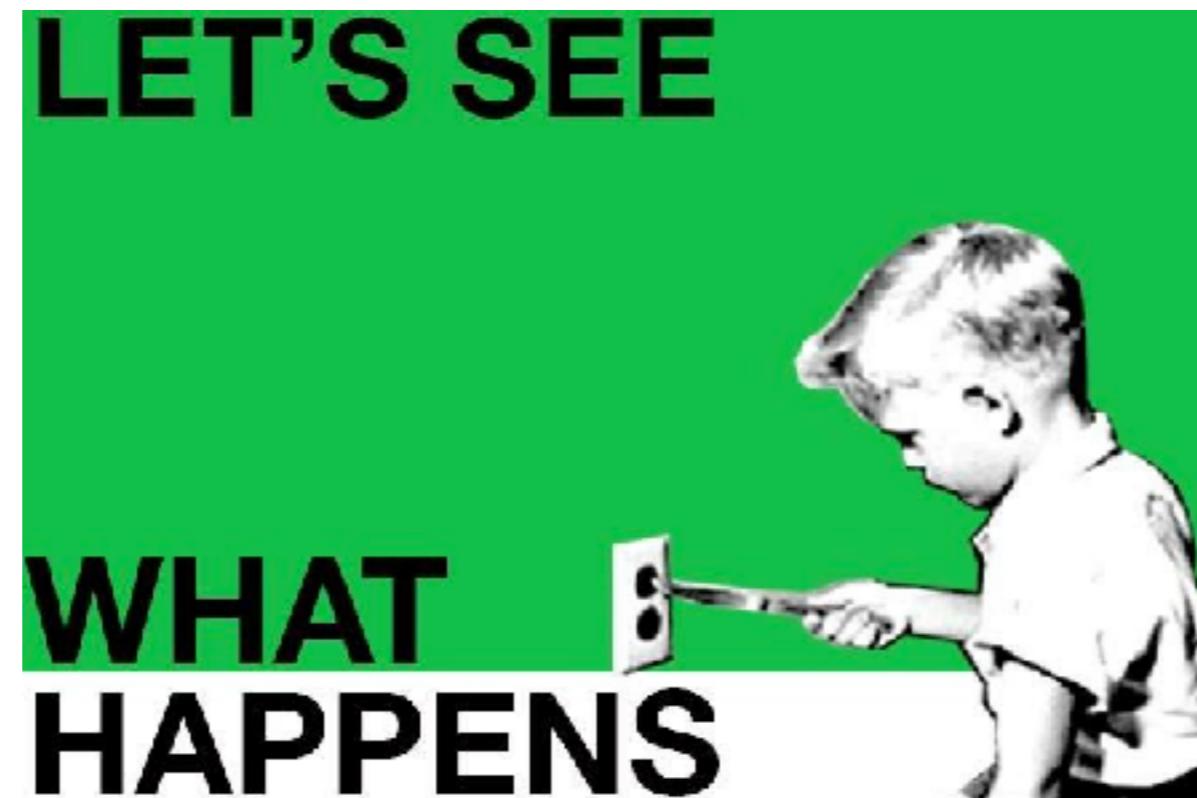
Make it easy for anyone to get
the latest executable

Make sure well known place where people can find



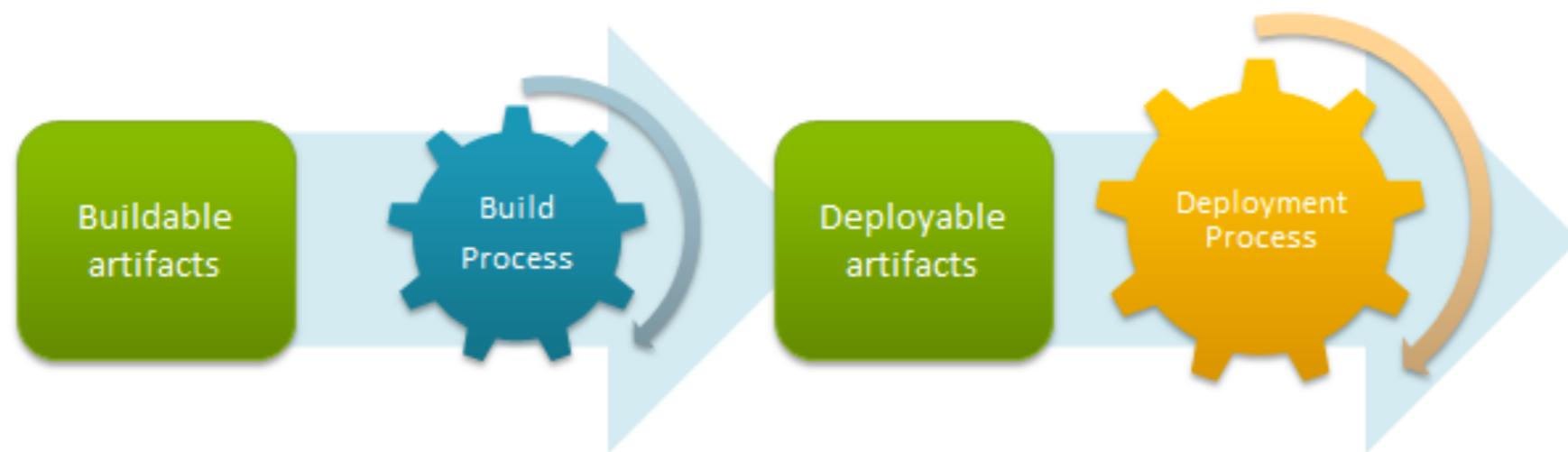
Practice 10

Everyone can see what's happening
Easier to see the state of the system and changes
Show the good information



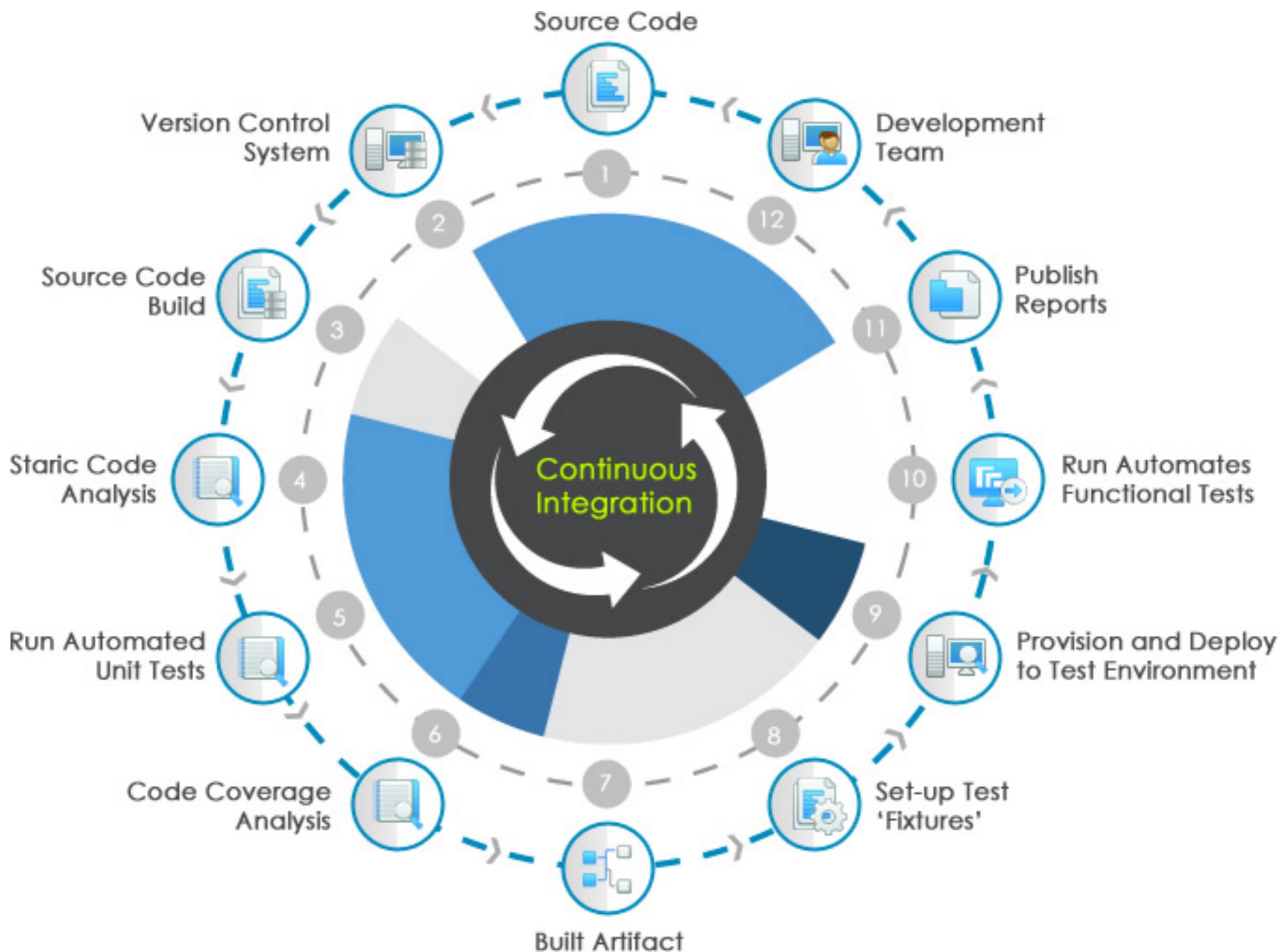
Practice 11

Automated deployment



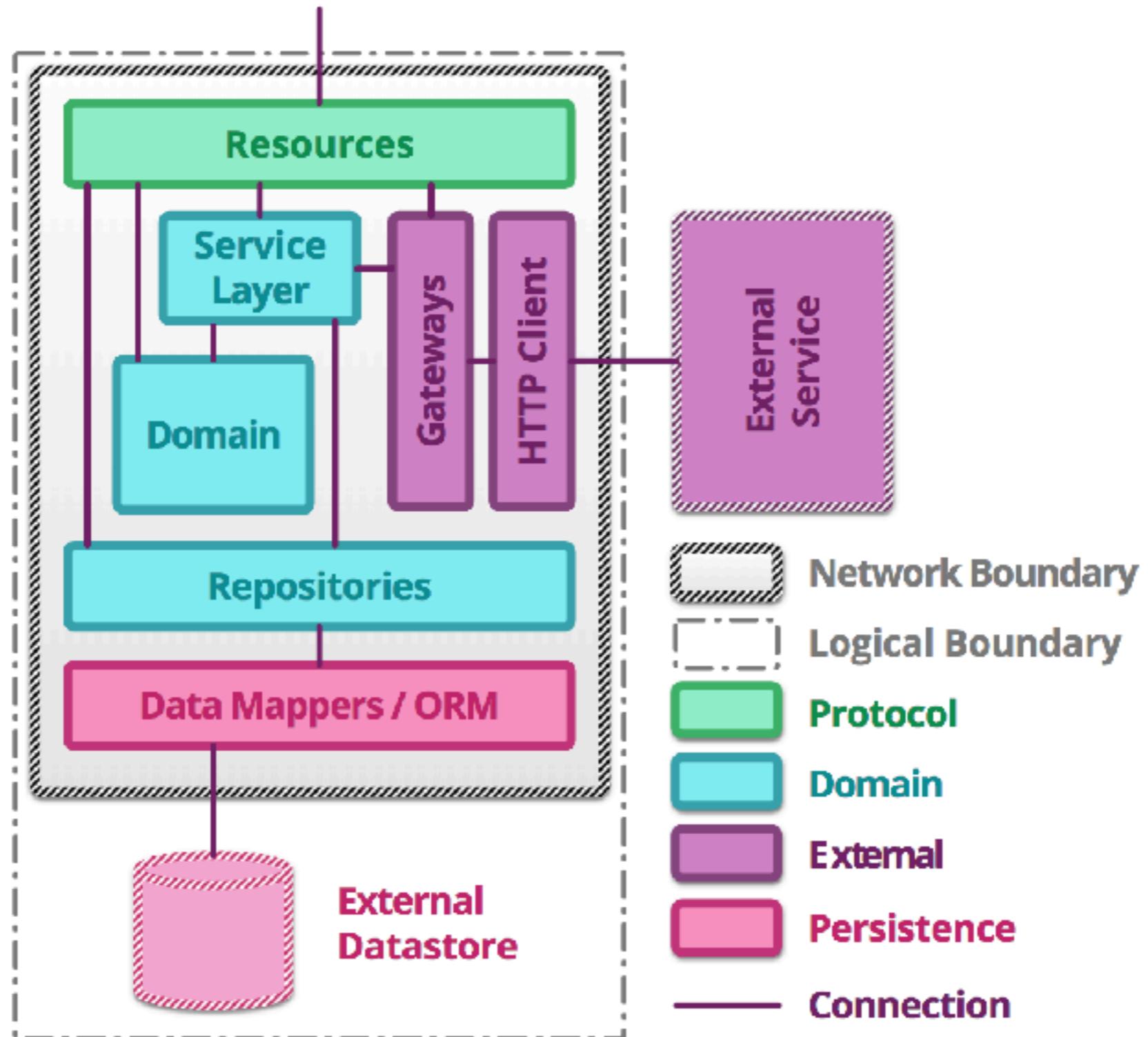
**“Behind every successful agile
project, there is a
Continuous Integration Server”**





Let's workshop





Development



Testing



Deployment



Summary

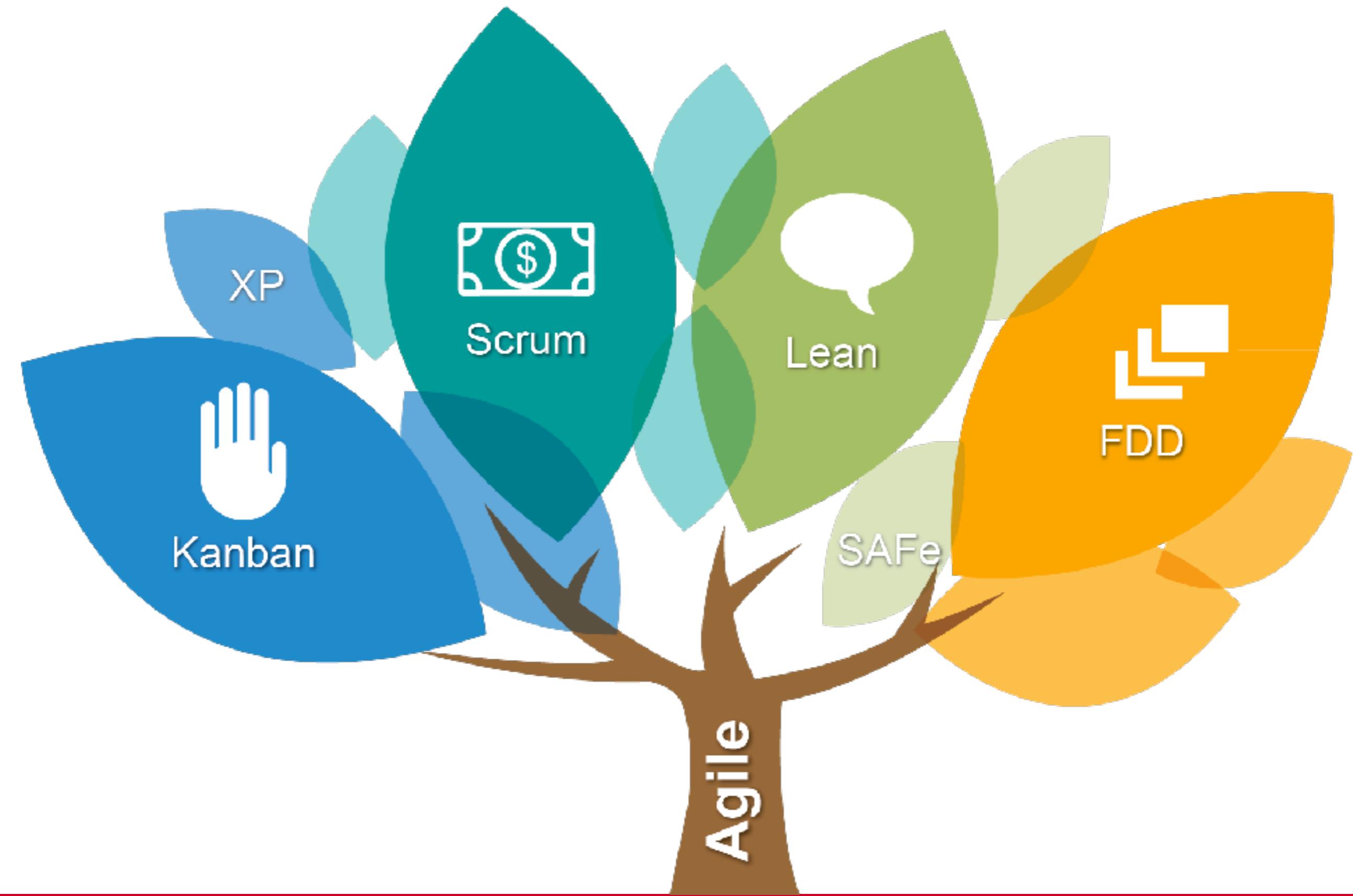


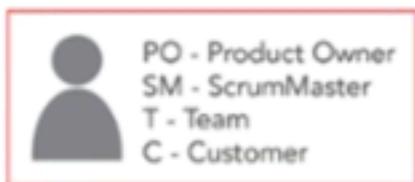


WATERFALL

AGILE







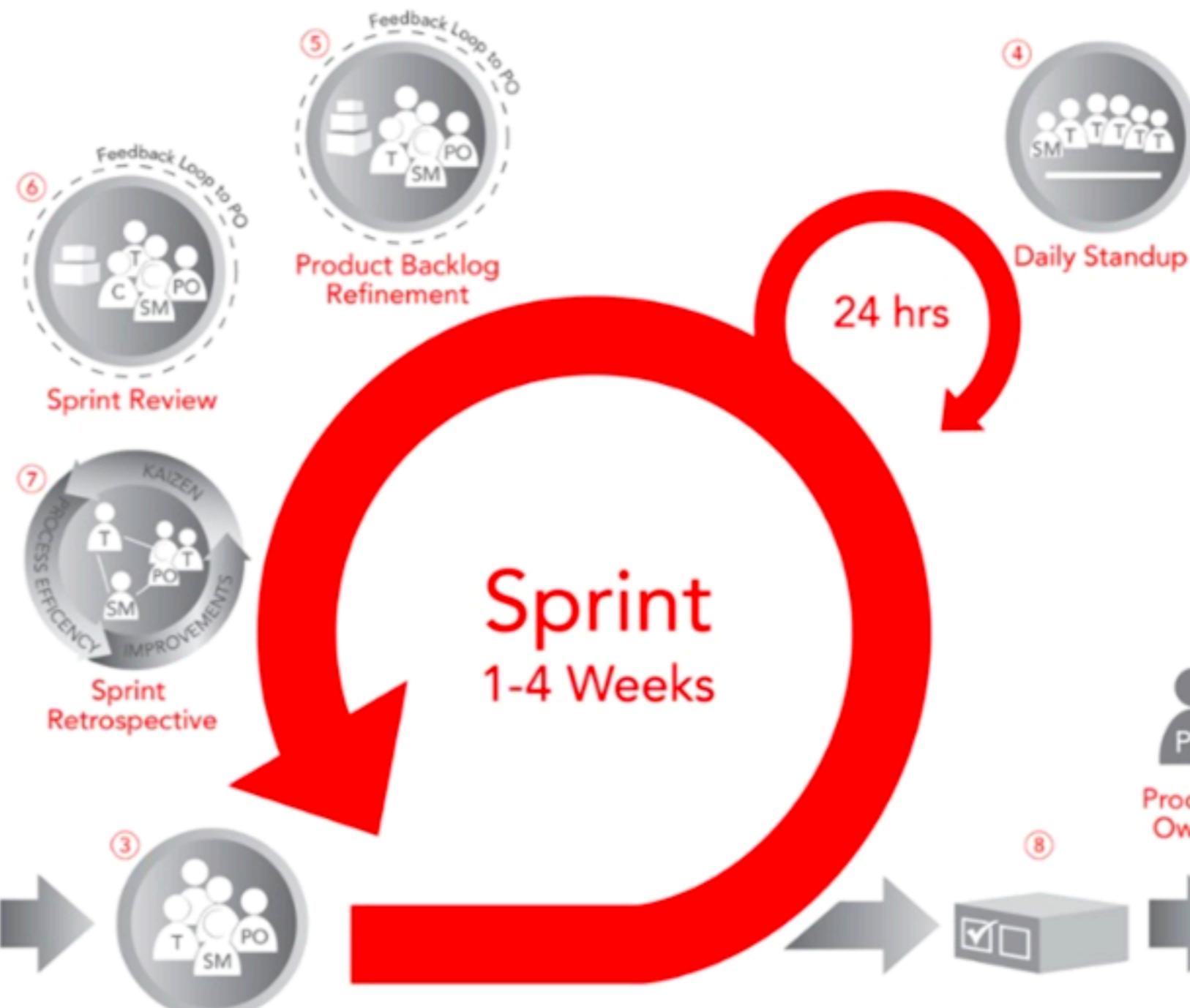
Product Owner



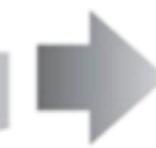
Product Backlog (Features)

② Sprint Backlog (Stories)

Sprint Planning



Product Owner



Customer-Ready Product Increment



Incremental Product Release



Agile manifestos

THE AGILE MANIFESTO

We are uncovering better ways of developing software by doing it and helping others do it.

**CUSTOMER
COLLABORATION**
over contract negotiation

**RESPONDING TO
CHANGE**
over following a plan

**INDIVIDUALS AND
INTERACTIONS**
over processes and tools

**WORKING
SOFTWARE**
over full documentation



Agile principles

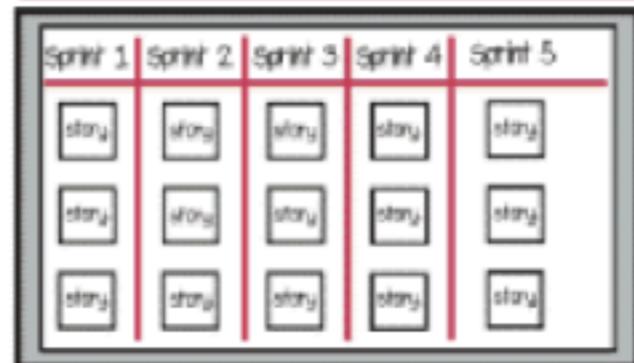
1 Satisfy the **customer**



Welcome **change**



Deliver **frequently**



4 Work **together**



5 Trust and **support**



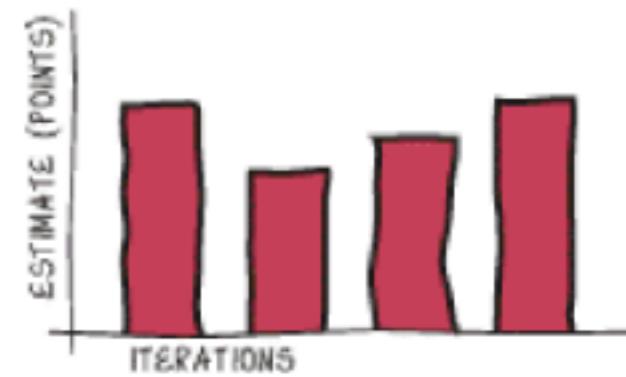
Face-to-face **conversation**



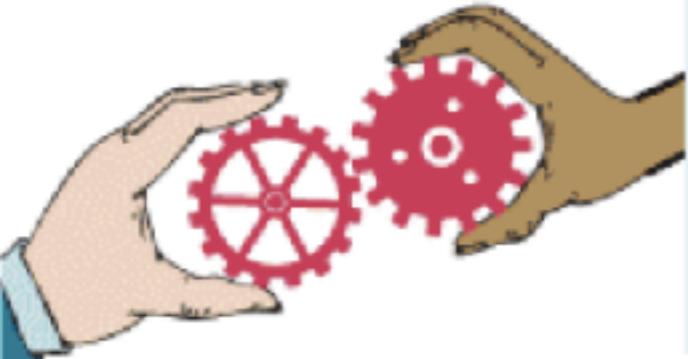
Working **software**



8 Sustainable **development**



9 **Technical** Excellence



10 Maintain **simplicity**



11 Self-organizing **teams**



12 Reflect and **adjust**



Origin by <https://www.knowledgetrain.co.uk>, modified by Jacky Shen



