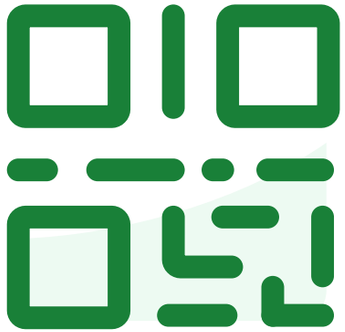
DevOps Foundations
Intro – Why DevOps

Feedback Round, Slido



Join at slido.com
#3473187

slido

Please download and install the Slido app on all computers you use

Did you have any experience operating an application?

ⓘ Start presenting to display the poll results on this slide.

slido

Please download and install the Slido app on all computers you use

How much of a developer are you?

ⓘ Start presenting to display the poll results on this slide.

slido

Please download and install the Slido app on all computers you use

Have you hands-on experience (= can solve problems with it) with

ⓘ Start presenting to display the poll results on this slide.

slido

Please download and install the Slido app on all computers you use

What Programming Languages do you use?

ⓘ Start presenting to display the poll results on this slide.

slido

Please download and install the Slido app on all computers you use

What (Web)Frameworks are you using (e.g. for providing a web service)?

ⓘ Start presenting to display the poll results on this slide.

Motivation 1: Break the Silos

Motivation 1: Break the Silos

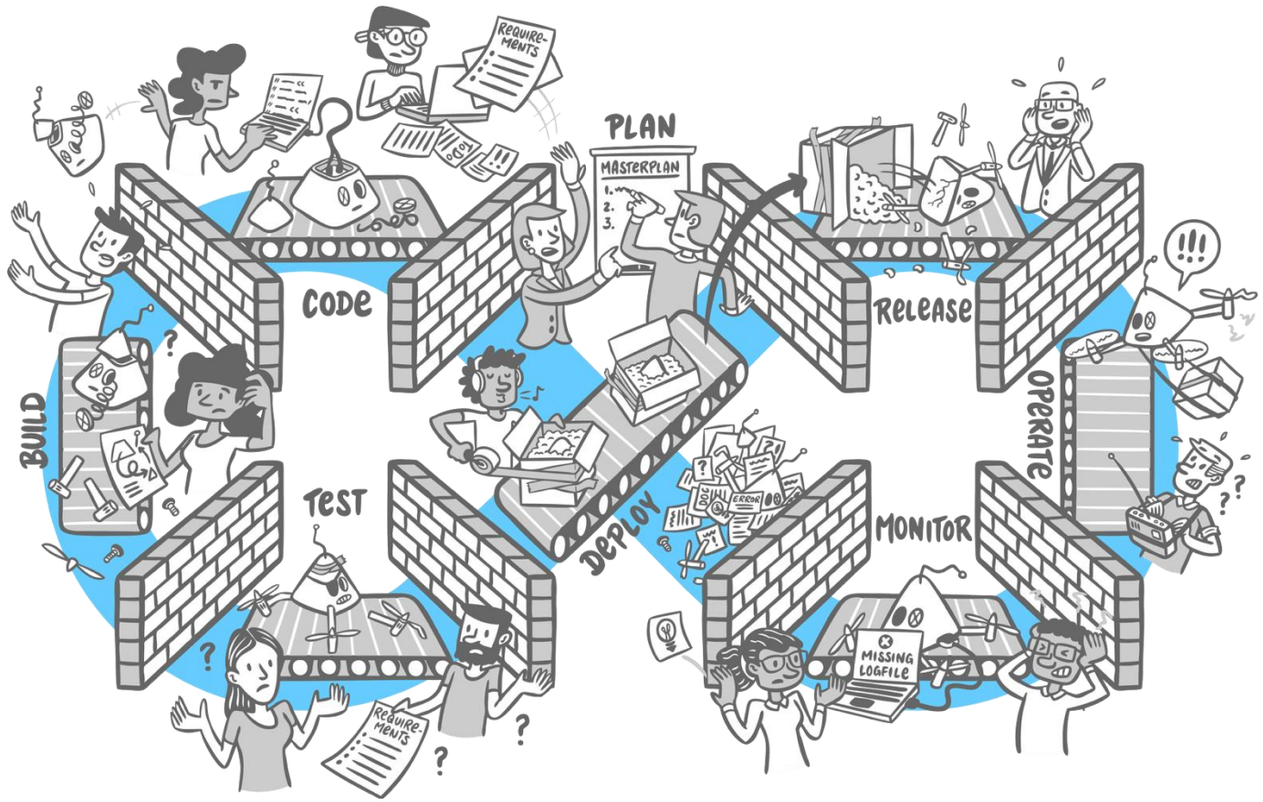
Motivation 1: Break the Silos

Developer vs. Operations

Developer	IT Operations
I want change	I want Stability
I want to add / modify features	I want to create / enhance services
Doesn't deploy consistent software	Motivation to resist change
Development Process is Agile	Operations Process is static

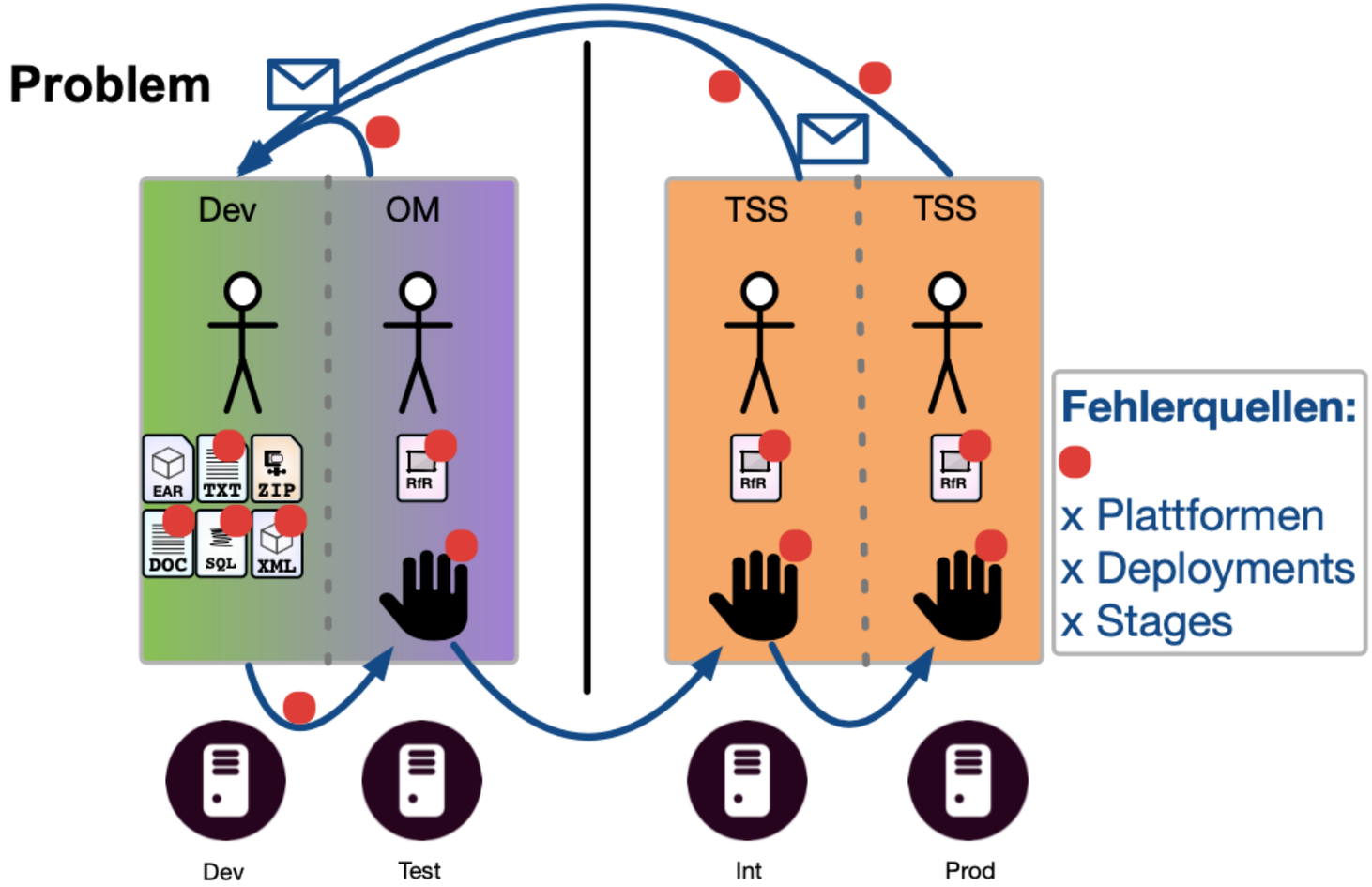
Learn DevOps - Edward Viaene - Copyright 2015

Motivation 1: Break the Silos



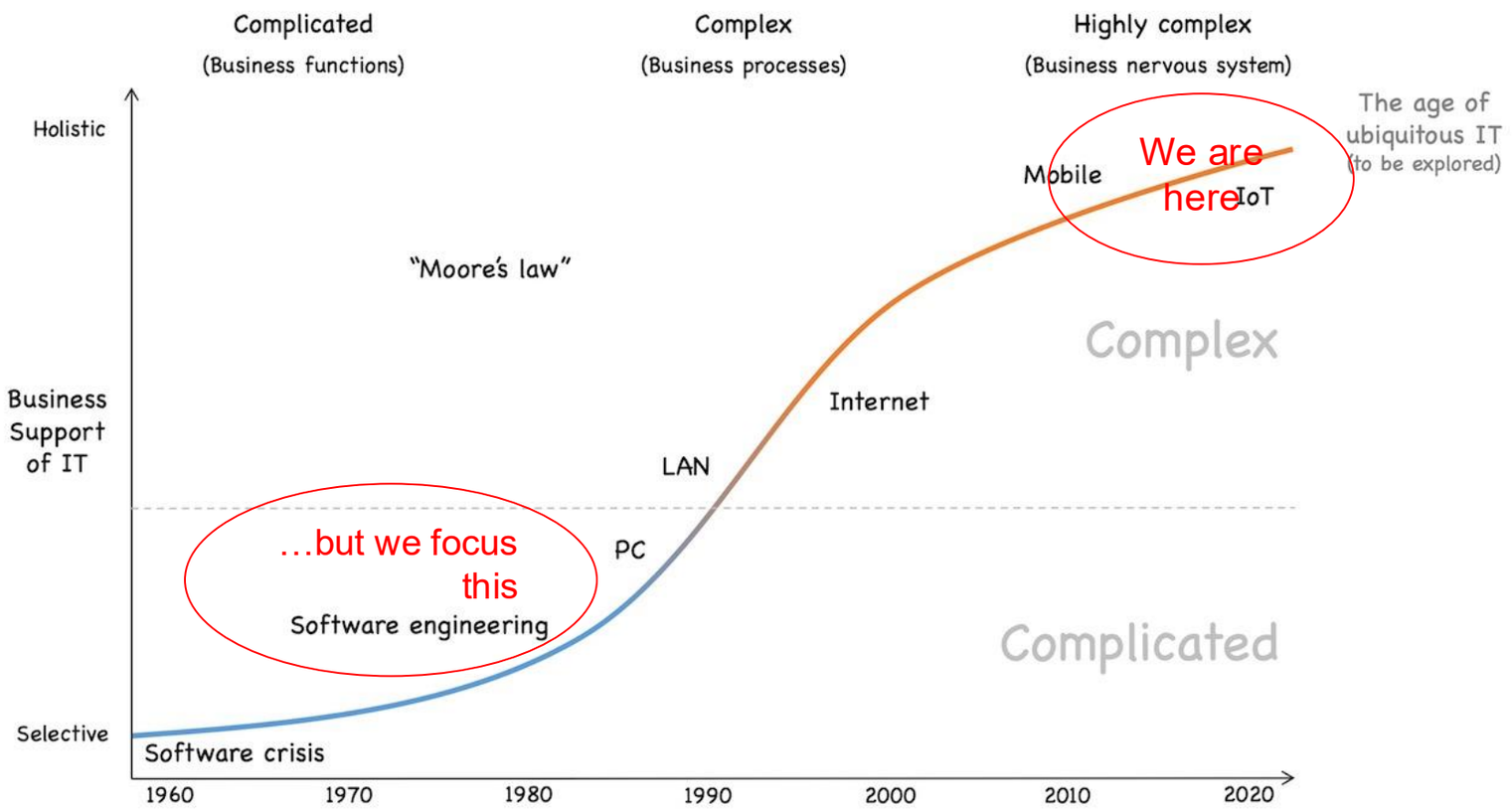
Credits for this fabulous comics to Zühlke

Motivation 1: Break the Silos



Hardly measurable
→ cultural impact

Motivation 2: Handle Complexity



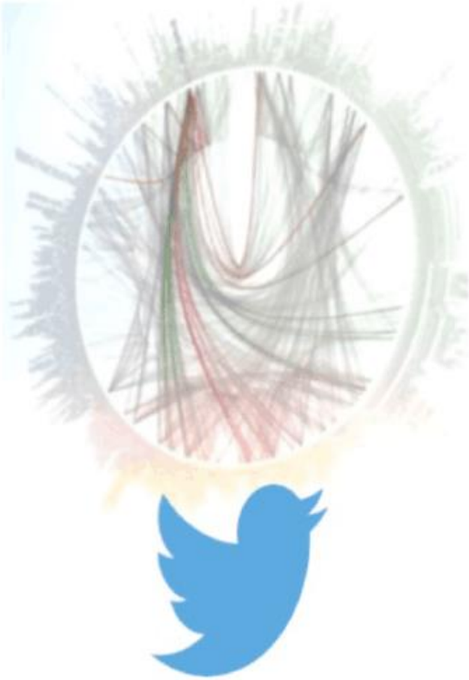
Modules for Softwaredevelopment	Modules for Softwareoperations
>20	<10
Programming Languages, Technologies, etc.	Processes, System Engineering, -management

Motivation 2: Handle Complexity

450 microservices

500+ microservices

500+ microservices



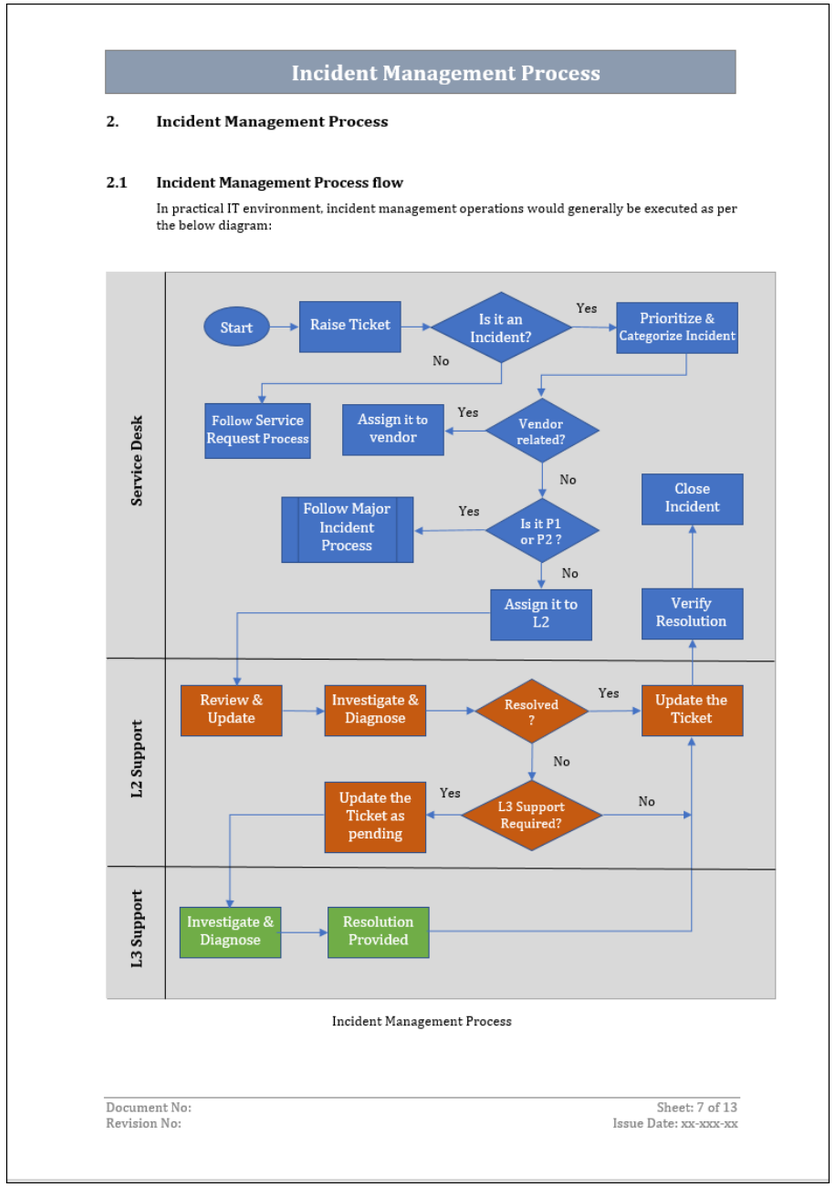
500+ microservices

Motivation 3
Technology over processes

"We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan

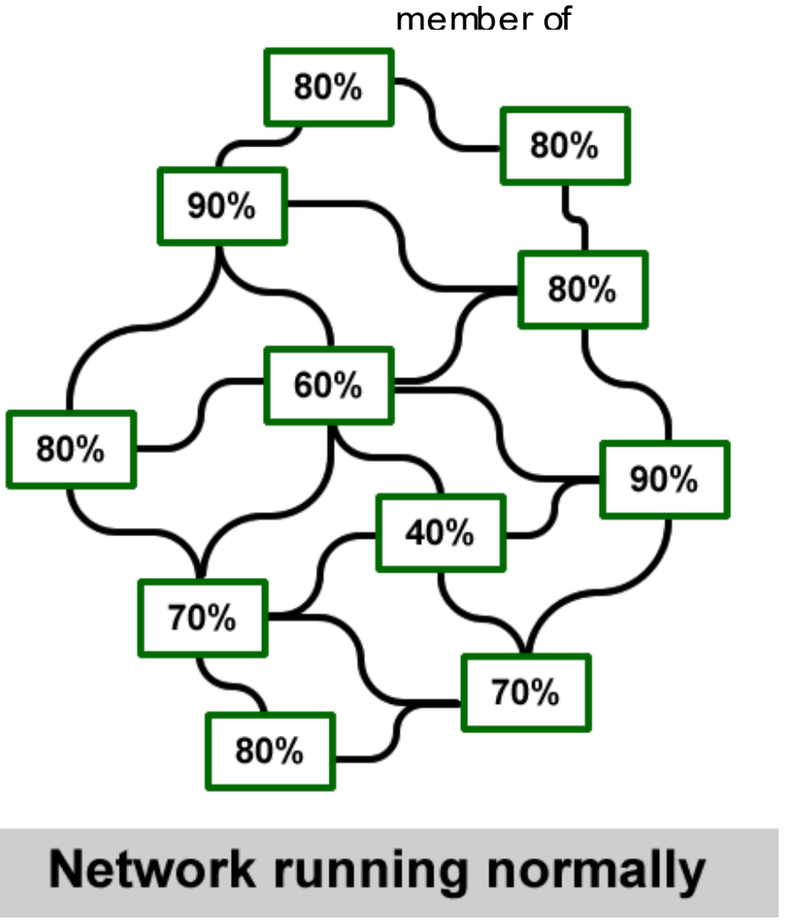
That is, while there is value in the items on the right, we value the items on the left more."



Motivation 3: Technology over processes

- (Not only) microservices are distributed systems
  - Errors are seldomly isolated
  - One failed services affects other «healthy» services

Mean Time to Repair (MTTR) is crucial to prohibit escalating errors.



Mean time to repair =

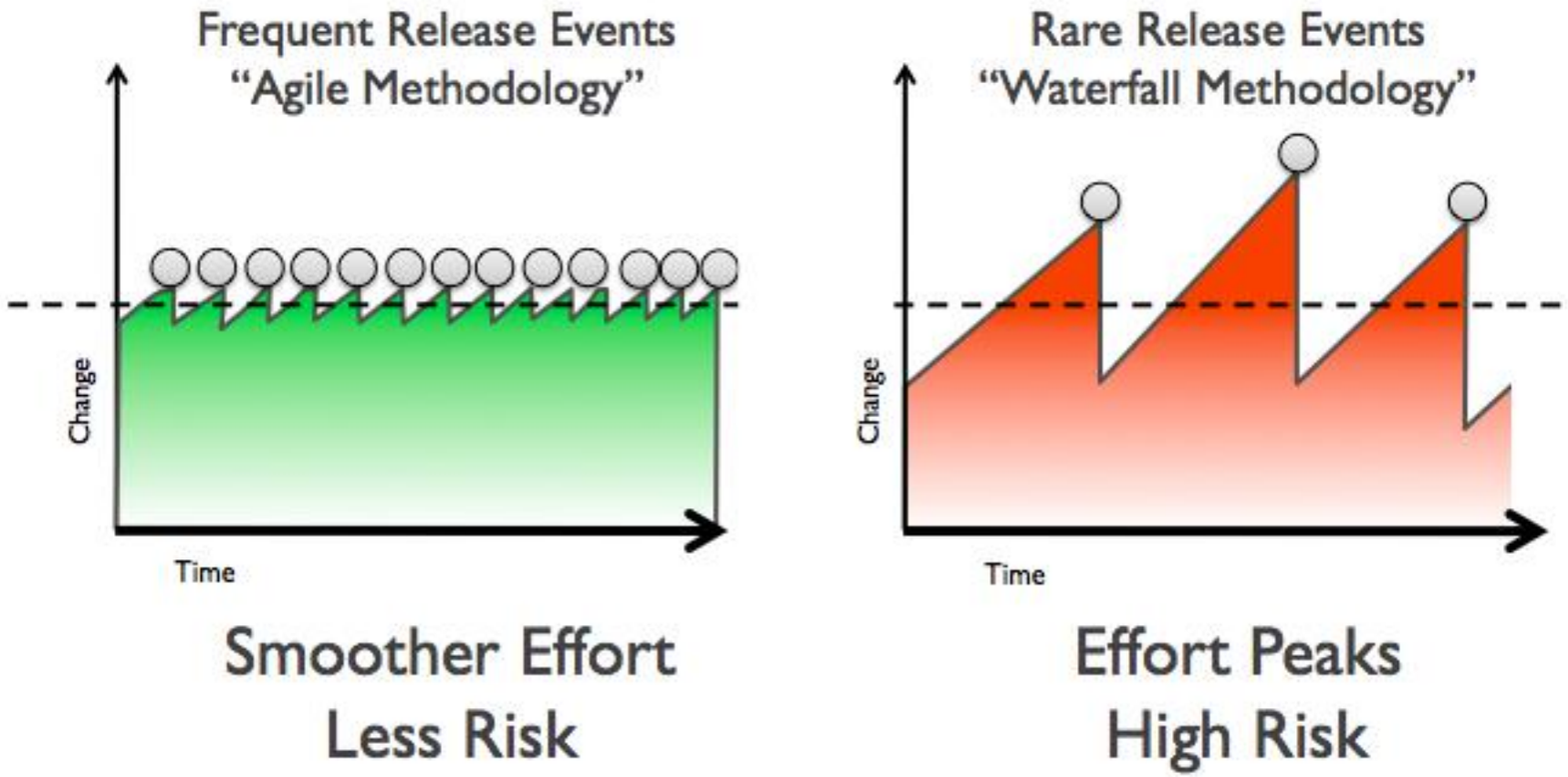
```
average(incident resolved timestamp - incident created timestamp)
```

Motivation 4: Accelerate the flow

	1970s–1980s	1990s	2000s–Present
Era	Mainframes	Client/Server	Commoditization and Cloud
Representative technology of era	COBOL, DB2 on MVS, etc.	C++, Oracle, Solaris, etc.	Java, MySQL, Red Hat, Ruby on Rails, PHP, etc.
Cycle time	1–5 years	3–12 months	2–12 weeks
Cost	$1M–$100M	$100k–$10M	$10k–$1M
At risk	The whole company	A product line or division	A product feature
Cost of failure	Bankruptcy, sell the company, massive layoffs	Revenue miss, CIO's job	Negligible

Company	Deploy Frequency	Deploy Lead Time	Reliability	Customer Responsiveness
Amazon	23,000 / day	minutes	high	high
Google	5,500 / day	minutes	high	high
Netflix	500 / day	minutes	high	high
Facebook	1 / day	hours	high	high
Twitter[2]	3 / week	hours	high	high
typical enterprise	once every 9 months	months or quarters	low/medium	low/medium

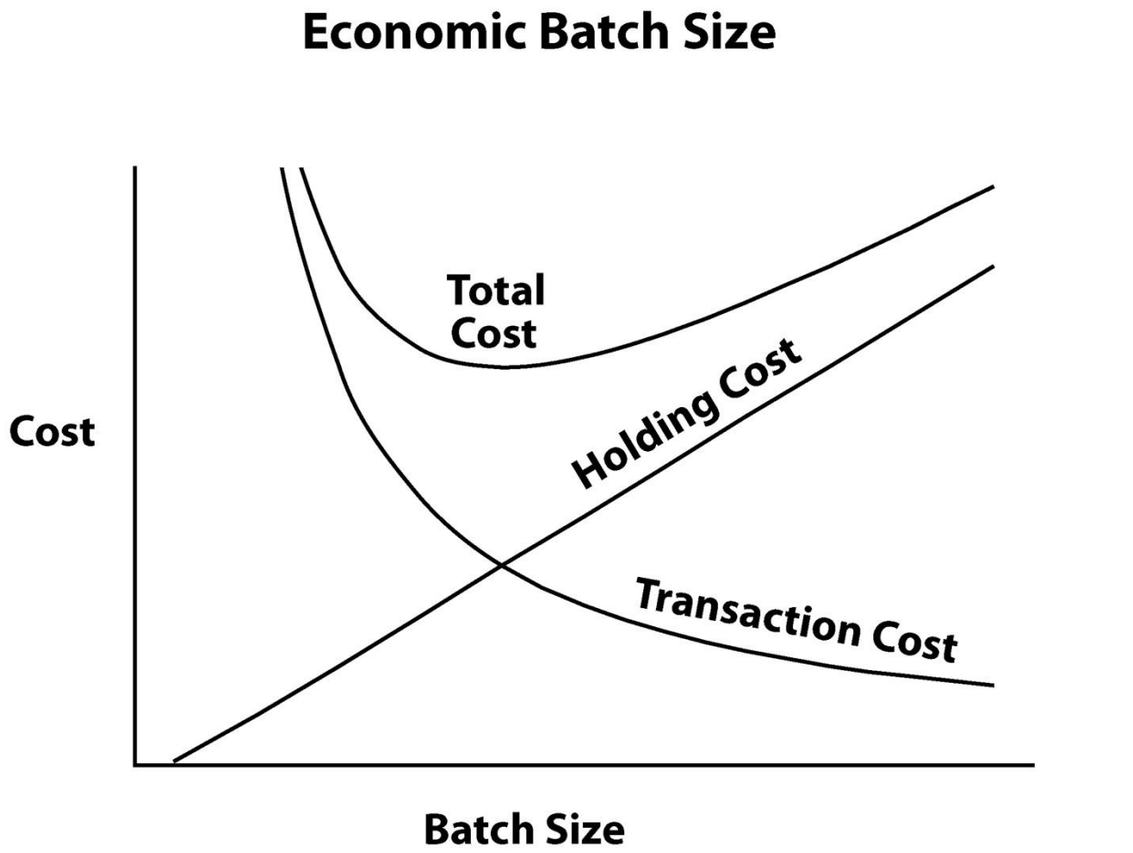
Motivation 4: Accelerate the flow



Motivation 4: Accelerate the flow

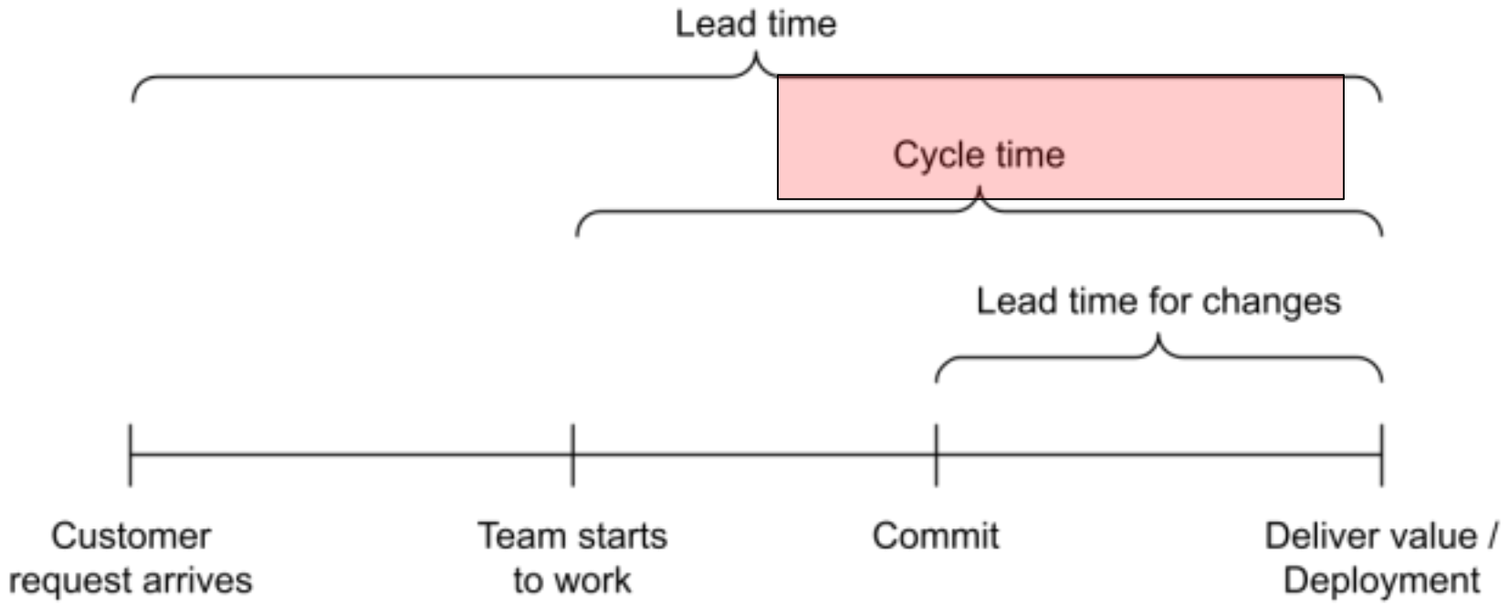
Deployment Frequency =

`number of deployments per day`



From "The Principles of Product Development Flow," by Donald G. Reinertsen. Celeritas Publishing: 2009. Copyright 2009, Donald G. Reinertsen

Motivation 4: Accelerate the flow



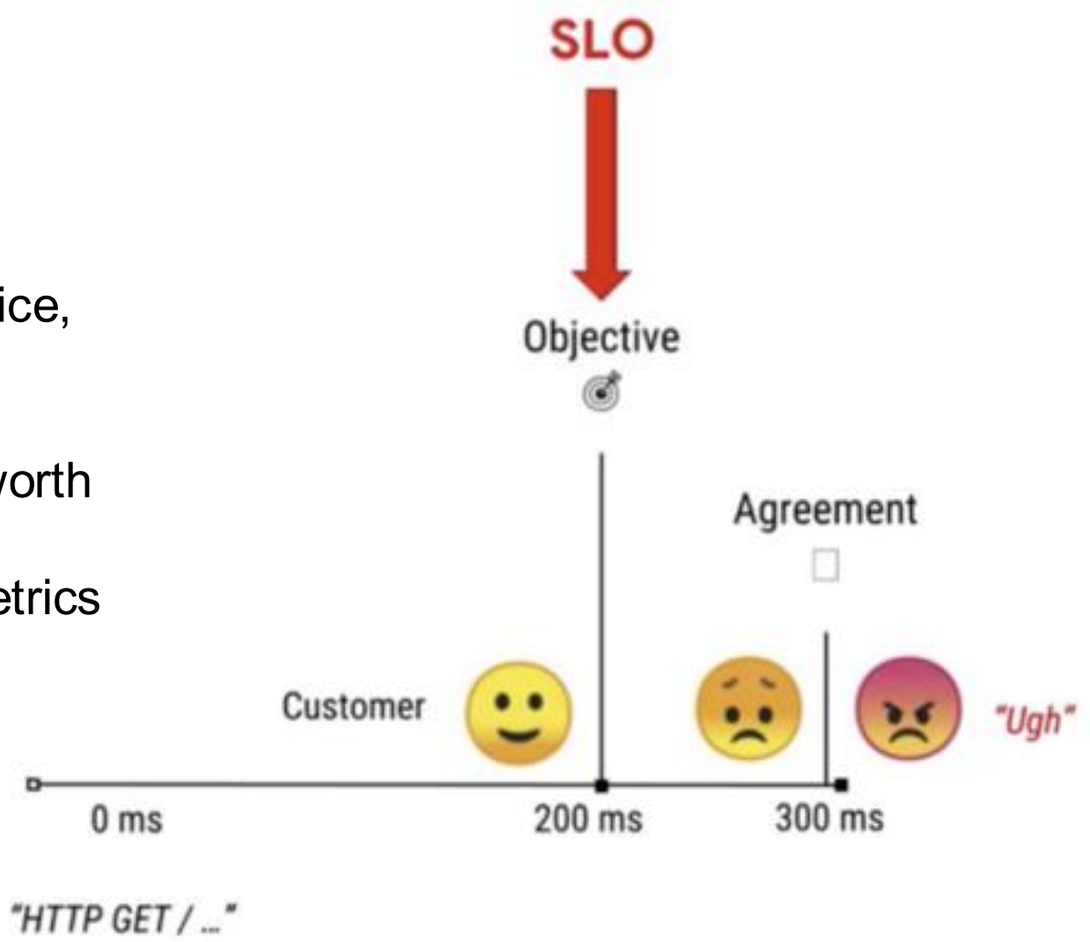
Change failure rate =

```
Percentage of failed deployement in need of hotfix/rollback/etc.
```

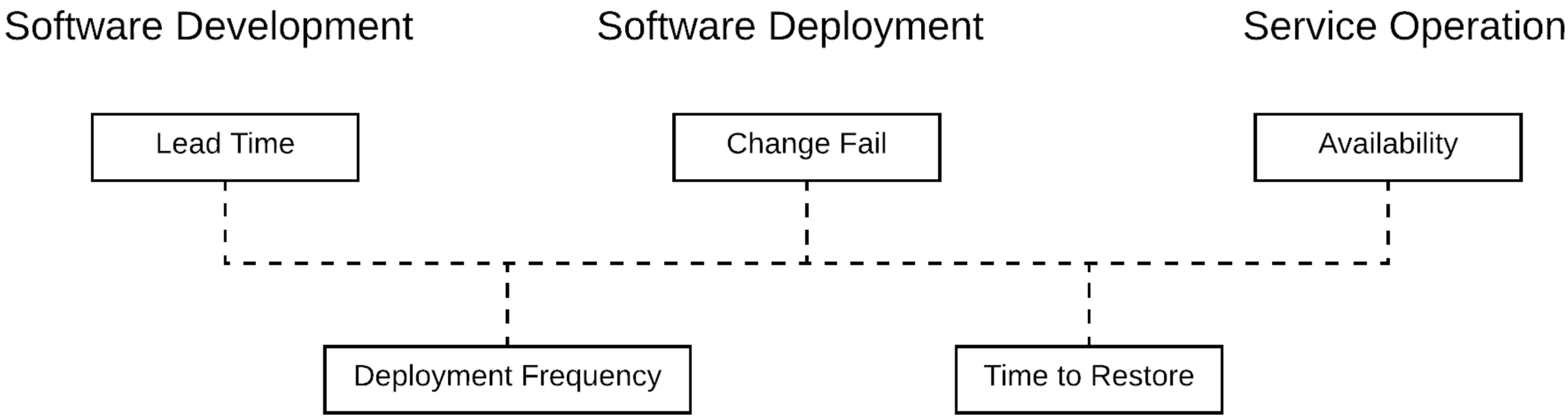
Motivation 5: Reliability is the most important feature

- If a system isn't reliable, users won't trust it.
- If users don't trust a system, when given a choice, they won't use it.
- Since all software systems are governed by network effects, if a system has no users, it's worth nothing.
- You are what you measure, so choose your metrics carefully.

→ https://sre.google/workbook/reaching-beyond/



Dora Metrics

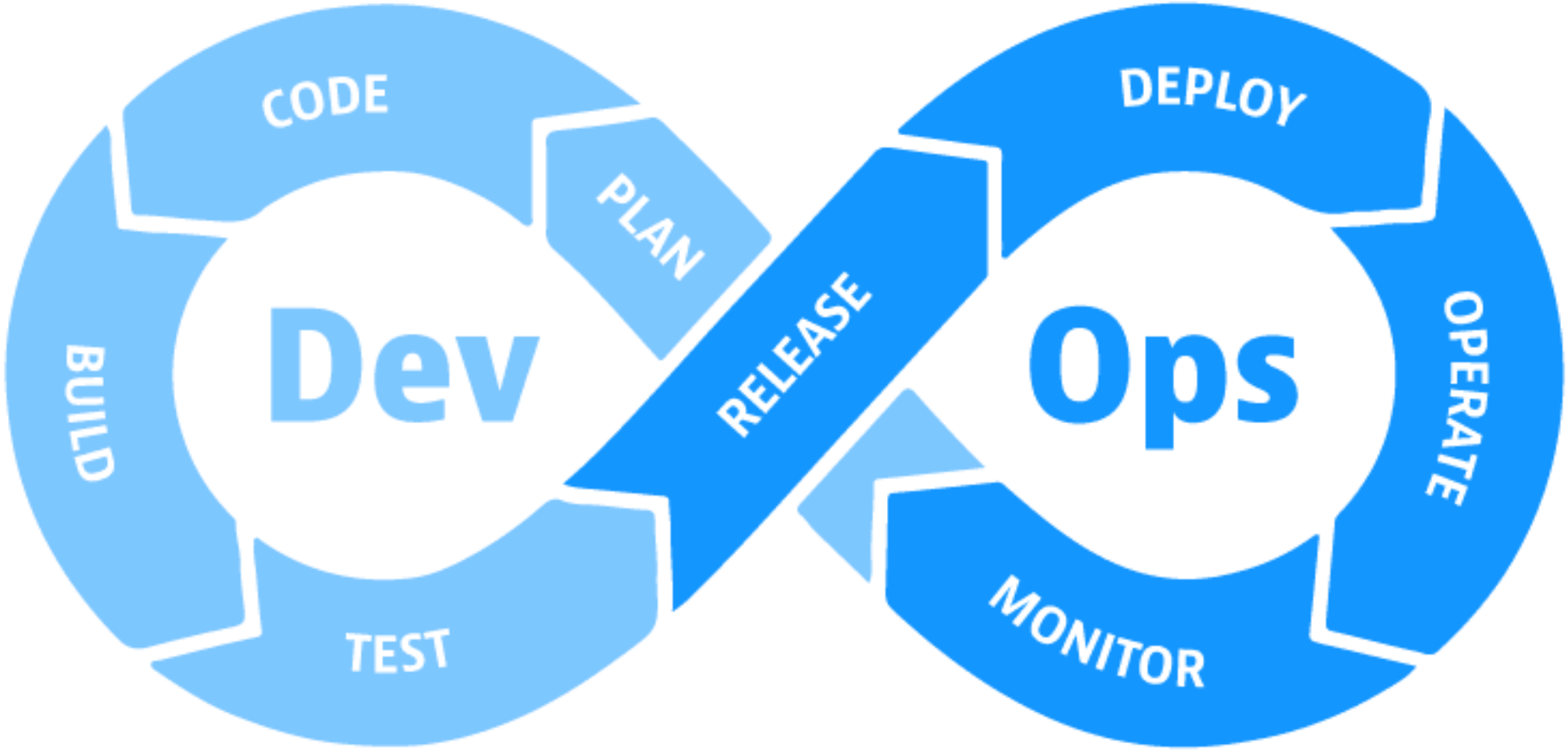


Dora Metrics

Software delivery performance metric	Low	Medium	High
Deployment frequency For the primary application or service you work on, how often does your organization deploy code to production or release it to end users?	Between once per month and once every 6 months	Between once per week and once per month	On-demand (multiple deploys per day)
Lead time for changes For the primary application or service you work on, what is your lead time for changes (i.e., how long does it take to go from code committed to code successfully running in production)?	Between one month and six months	Between one week and one month	Between one day and one week
Time to restore service For the primary application or service you work on, how long does it generally take to restore service when a service incident or a defect that impacts users occurs (e.g., unplanned outage or service impairment)?	Between one week and one month	Between one day and one week	Less than one day
Change failure rate For the primary application or service you work on, what percentage of changes to production or released to users result in degraded service (e.g., lead to service impairment or service outage) and subsequently require remediation (e.g., require a hotfix, rollback, fix forward, patch)?	46%-60%	16%-30%	0%-15%

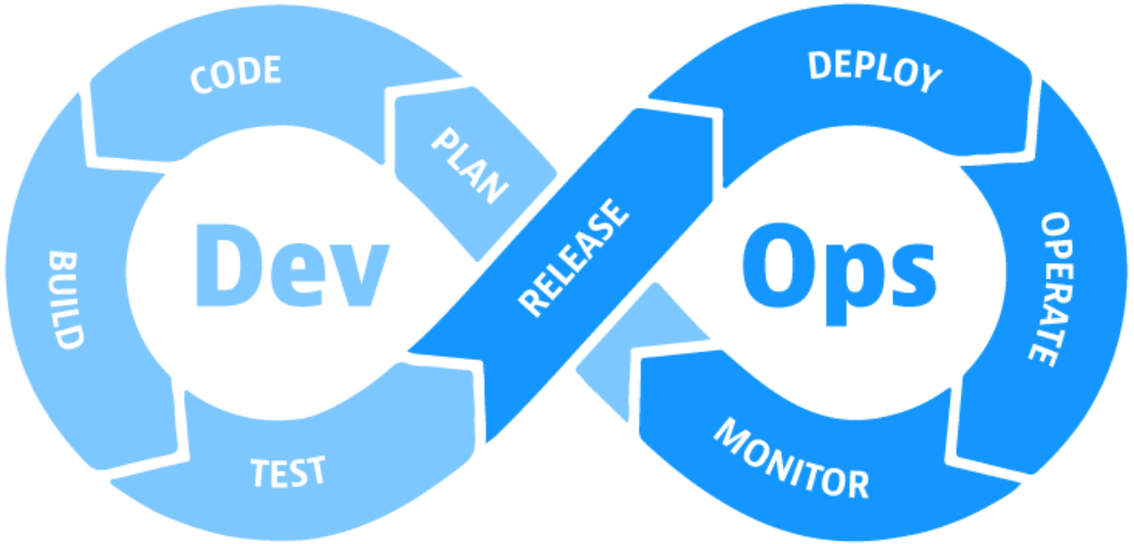
Report in Literature

How Devops?

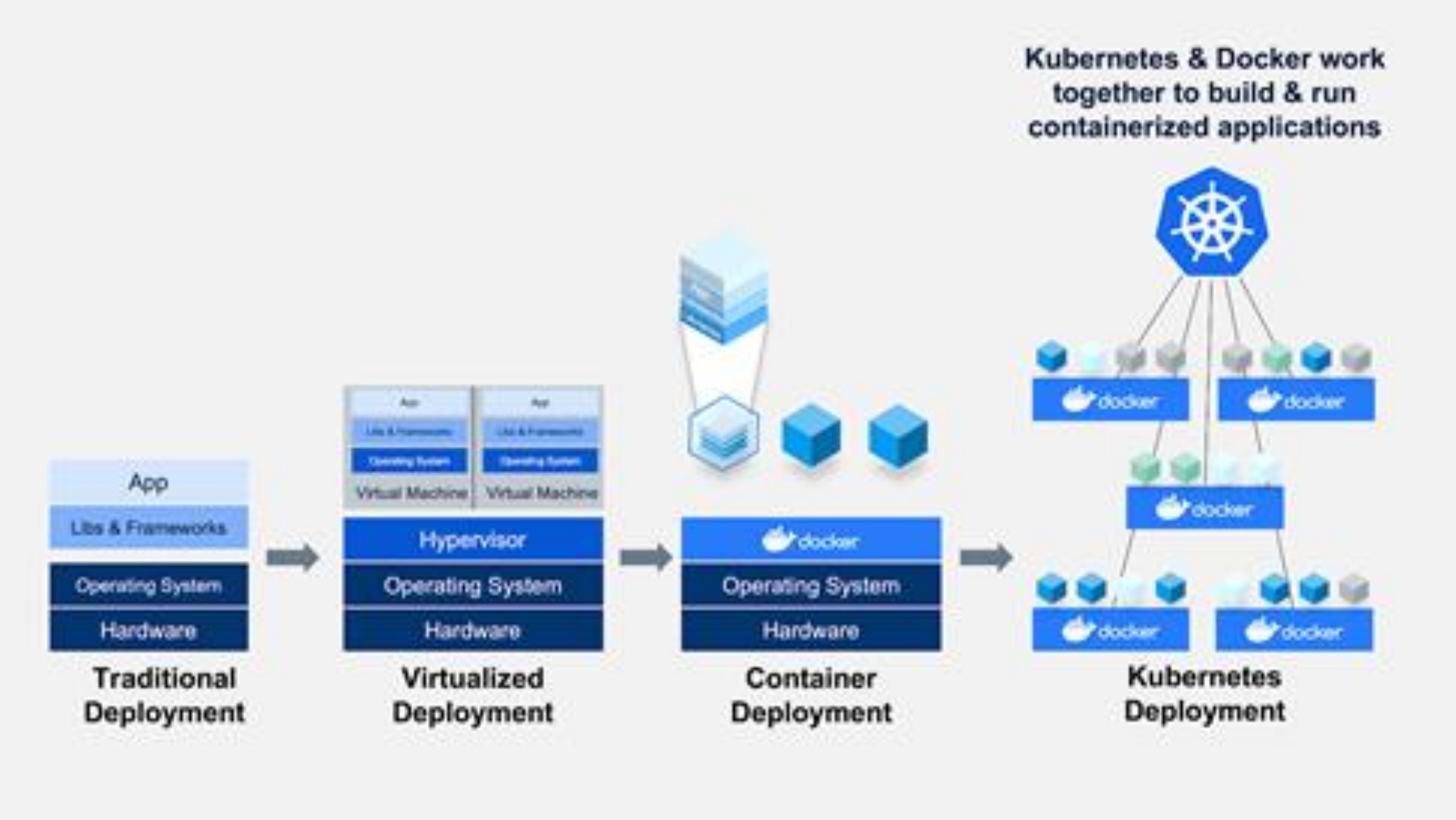

CODE
PLAN
BUILD
Dev
TEST
RELEASE
DEPLOY
Ops
OPERATE
MONITOR

Driver 1: Cloud

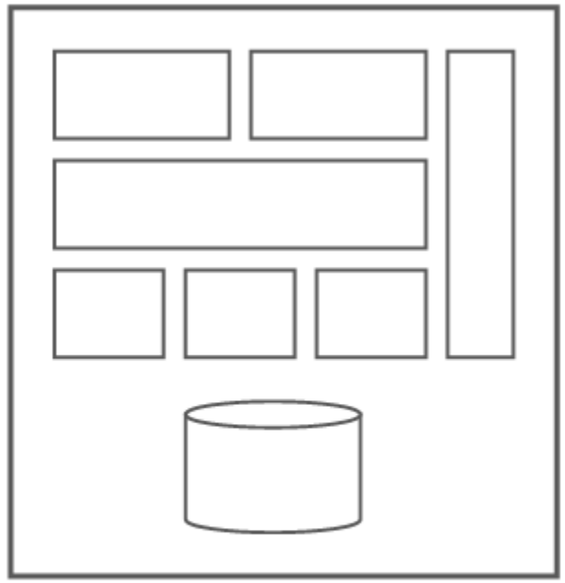
- Cloud is sourcecode
- Cloud is automation
- Cloud is shared responsibility
- Cloud is transparent
- Cloud is scalable



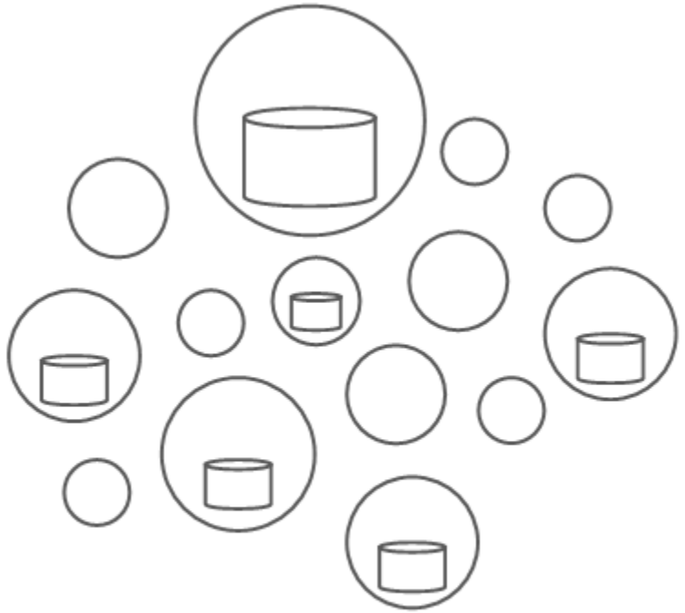
Driver 2: Isolation



Driver 2: Architecture

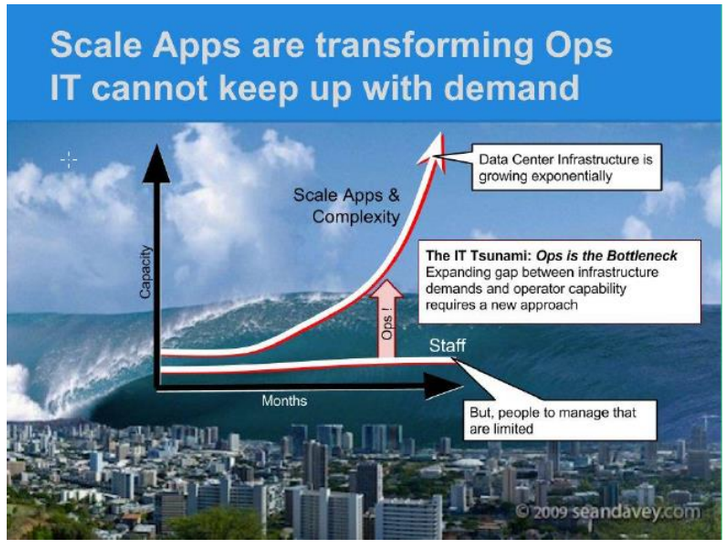


Monolithic / Layered



Micro-services

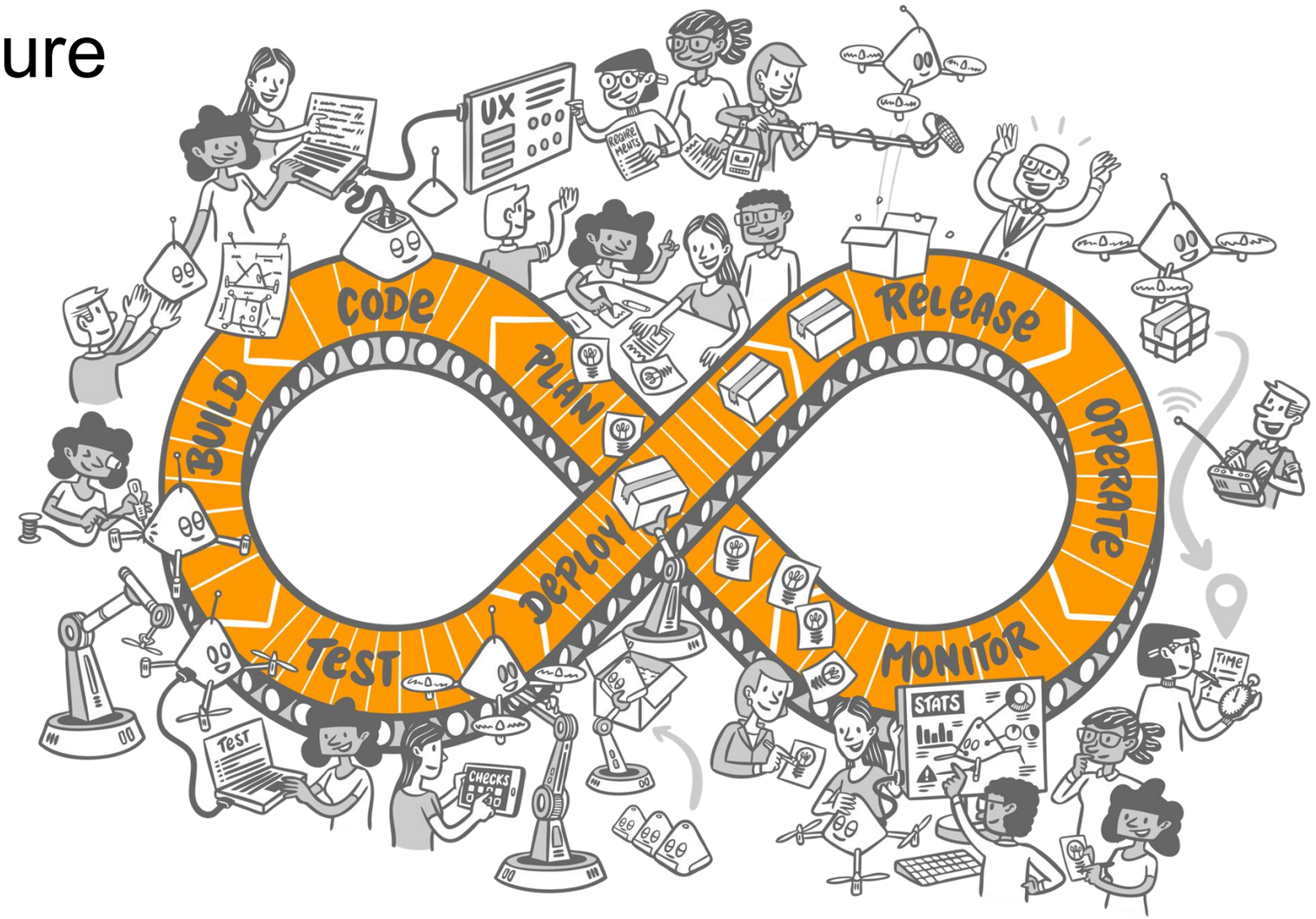
Driver 3: Automate everything / Remove Toil



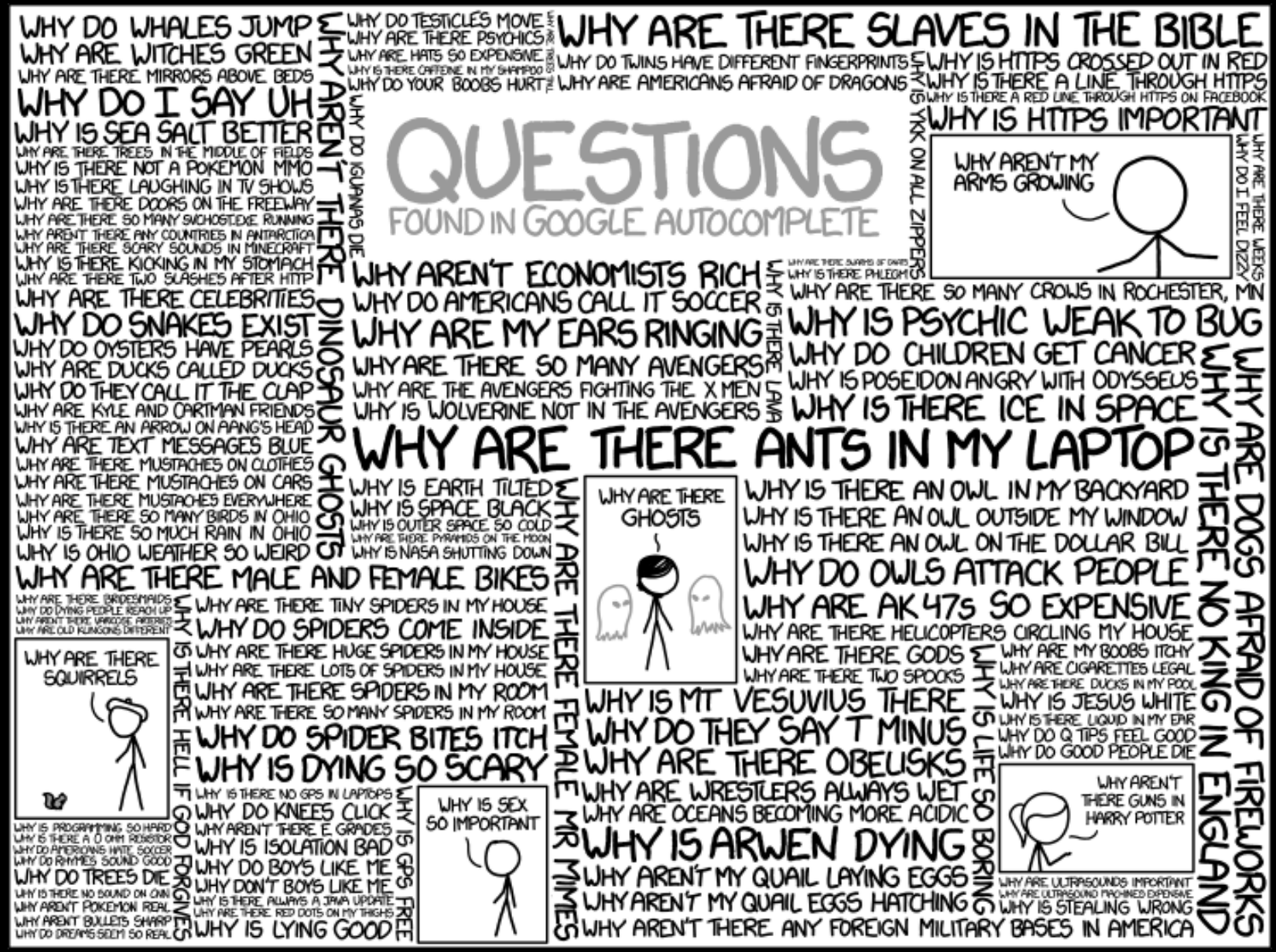
https://www.oreilly.com/content/wp-content/uploads/sites/2/2020/01/7328405210_59fd7fc7c0_o_crop-a5fff67019a264aec040b2129d60bd4d.jpg

Driver 4: Take responsibility

Driver 5: Culture



Credits for this fabulous comic to Zühlke


QUESTIONS
FOUND IN GOOGLE AUTOCOMPLETE
WHY DO WHALES JUMP
WHY ARE WITCHES GREEN
WHY ARE THERE MIRRORS ABOVE BEDS
WHY DO I SAY UH
WHY IS SEA SALT BETTER
WHY ARE THERE TREES IN THE MIDDLE OF FIELDS
WHY IS THERE NOT A POKEMON MMO
WHY IS THERE LAUGHING IN TV SHOWS
WHY ARE THERE DOORS ON THE FREEWAY
WHY ARE THERE SO MANY SYCHOSTICKS RUNNING
WHY AREN'T THERE ANY COUNTRIES IN ANTARCTICA
WHY ARE THERE SCARY SOUNDS IN MINECRAFT
WHY IS THERE KICKING IN MY STOMACH
WHY ARE THERE TWO SLASHES AFTER HTTP
WHY ARE THERE CELEBRITIES
WHY DO SNAKES EXIST
WHY DO OYSTERS HAVE PEARLS
WHY ARE DUCKS CALLED DUCKS
WHY DO THEY CALL IT THE CLAP
WHY ARE KYLE AND CARTMAN FRIENDS
WHY IS THERE AN ARROW ON AANG'S HEAD
WHY ARE TEXT MESSAGES BLUE
WHY ARE THERE MUSTACHES ON CLOTHES
WHY ARE THERE MUSTACHES ON CARS
WHY ARE THERE MUSTACHES EVERYWHERE
WHY ARE THERE SO MANY BIRDS IN OHIO
WHY IS THERE SO MUCH RAIN IN OHIO
WHY IS OHIO WEATHER SO WEIRD
WHY ARE THERE MALE AND FEMALE BIKES
WHY ARE THERE BRIDESMAIDS
WHY DO DYING PEOPLE REARM UP
WHY AREN'T THERE VARICOSE AIRBIKES
WHY ARE OLD KLINGONS DIFFERENT
WHY ARE THERE SQUIRRELS
WHY IS PROGRAMMING SO HARD
WHY IS THERE A 0 OHM RESISTOR
WHY DO AMERICANS HATE SOCCER
WHY DO RHYMES SOUND GOOD
WHY DO TREES DIE
WHY IS THERE NO SOUND ON CNN
WHY AREN'T POKEMON REAL
WHY AREN'T BULLETS SHARP
WHY DO DREAMS SEEM SO REAL
WHY ARE THERE TINY SPIDERS IN MY HOUSE
WHY DO SPIDERS COME INSIDE
WHY ARE THERE HUGE SPIDERS IN MY HOUSE
WHY ARE THERE LOTS OF SPIDERS IN MY HOUSE
WHY ARE THERE SPIDERS IN MY ROOM
WHY ARE THERE SO MANY SPIDERS IN MY ROOM
WHY DO SPIDER BITES ITCH
WHY IS DYING SO SCARY
WHY IS THERE NO GPS IN LAPTOPS
WHY DO KNEES CLICK
WHY AREN'T THERE E GRADES
WHY IS ISOLATION BAD
WHY DO BOYS LIKE ME
WHY DON'T BOYS LIKE ME
WHY IS THERE ALWAYS A JAVA UPDATE
WHY ARE THERE RED DOTS ON MY THIGHS
WHY IS LYING GOOD
WHY DO TESTICLES MOVE
WHY ARE THERE PSYCHICS
WHY ARE HATS SO EXPENSIVE
WHY IS THERE CAFFEINE IN MY SHAMPOO
WHY DO YOUR BOOBS HURT
WHY ARE THERE SLAVES IN THE BIBLE
WHY DO TWINS HAVE DIFFERENT FINGERPRINTS
WHY ARE AMERICANS AFRAID OF DRAGONS
WHY IS HTTPS CROSSED OUT IN RED
WHY IS THERE A LINE THROUGH HTTPS
WHY IS THERE A RED LINE THROUGH HTTPS ON FACEBOOK
WHY IS HTTPS IMPORTANT
WHY AREN'T MY ARMS GROWING
WHY IS YKK ON ALL ZIPPERS
WHY ARE THERE WEEKS
WHY DO I FEEL DIZZY
WHY DO IGUANAS DIE
WHY AREN'T ECONOMISTS RICH
WHY DO AMERICANS CALL IT SOCCER
WHY ARE MY EARS RINGING
WHY ARE THERE SO MANY AVENGERS
WHY ARE THE AVENGERS FIGHTING THE X MEN
WHY IS WOLVERINE NOT IN THE AVENGERS
WHY ARE THERE SWARMS OF GNATS
WHY IS THERE PHLEGM
WHY ARE THERE SO MANY CROWS IN ROCHESTER, MN
WHY IS PSYCHIC WEAK TO BUG
WHY DO CHILDREN GET CANCER
WHY IS POSEIDON ANGRY WITH ODYSSEUS
WHY IS THERE ICE IN SPACE
WHY IS THERE LAVA
WHY ARE THERE ANTS IN MY LAPTOP
WHY IS EARTH TILTED
WHY IS SPACE BLACK
WHY IS OUTER SPACE SO COLD
WHY ARE THERE PYRAMIDS ON THE MOON
WHY IS NASA SHUTTING DOWN
WHY ARE THERE GHOSTS
WHY IS THERE AN OWL IN MY BACKYARD
WHY IS THERE AN OWL OUTSIDE MY WINDOW
WHY IS THERE AN OWL ON THE DOLLAR BILL
WHY DO OWLS ATTACK PEOPLE
WHY ARE AK 47s SO EXPENSIVE
WHY ARE THERE HELICOPTERS CIRCLING MY HOUSE
WHY ARE THERE GODS
WHY ARE THERE TWO SPOOKS
WHY IS MT VESUVIUS THERE
WHY DO THEY SAY T MINUS
WHY ARE THERE OBELISKS
WHY ARE WRESTLERS ALWAYS WET
WHY ARE OCEANS BECOMING MORE ACIDIC
WHY IS ARWEN DYING
WHY AREN'T MY QUAIL LAYING EGGS
WHY AREN'T MY QUAIL EGGS HATCHING
WHY AREN'T THERE ANY FOREIGN MILITARY BASES IN AMERICA
WHY IS SEX SO IMPORTANT
WHY ARE MY BOOBS ITCHY
WHY ARE CIGARETTES LEGAL
WHY ARE THERE DUCKS IN MY POOL
WHY IS JESUS WHITE
WHY IS THERE LIQUID IN MY EAR
WHY DO Q TIPS FEEL GOOD
WHY DO GOOD PEOPLE DIE
WHY AREN'T THERE GUNS IN HARRY POTTER
WHY ARE ULTRASOUNDS IMPORTANT
WHY ARE ULTRASOUND MACHINES EXPENSIVE
WHY IS STEALING WRONG
WHY ARE DOGS AFRAID OF FIREWORKS
WHY IS THERE NO KING IN ENGLAND
WHY IS LIFE SO BORING
WHY IS GPS FREE
WHY ARE THERE FEMALE MR MIMES
WHY IS THERE HELL IF GOD FORGIVES
WHY AREN'T THERE DINOSAUR GHOSTS

Recap Questions

1. Name and describe the 5 DORA metrics
2. Why is Cloud important for DevOps and why is DevOps important for Cloud?
3. Name and explain different targets classical Developer- and Operationsteams have. Why do they have them?
4. Explain why containerization is important for DevOps.
5. Automation is the key for successful DevOps-Workflows. Why is scalability, ongoing with automation so important when it comes especially to deploying microservice architectures? Why is it important with respect to the lead time?