What would happen if you ran your test suite 10 times in a row for every build?

What are some benefits your team would realize if your build times were cut in half? If they doubled?

https://conversations.dora.dev/

Steve McGhee

Reliability Advocate

@stevemcghee

smcghee@google.com

He/Him

Starting your personal lab

Google Cloud | DATADOG

dtdg.co/srelab

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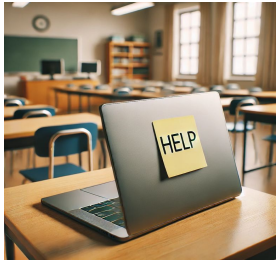
Click submit & access

Click Start

Back to the Presentation

We are here to help!

In-Person



Online: Q&A

my StudyJams

hook

lecture

lab

production

Q: Can you build

99.99% things

on

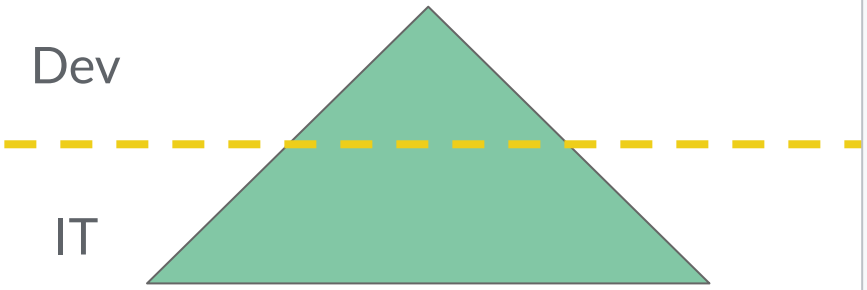
99.9% things?

Q: Can you build 99.99% services on 99.9% infra?

Yes.

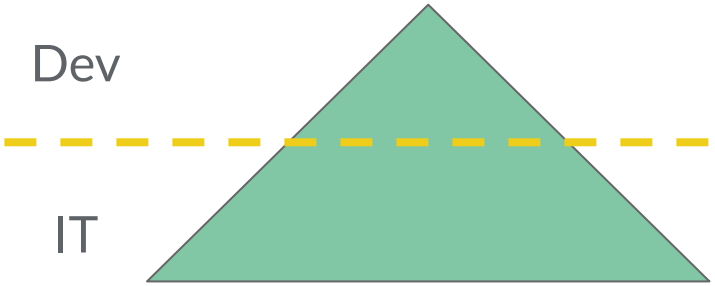
You can build
more reliable things
on top of
less reliable things.

Remember RAID?



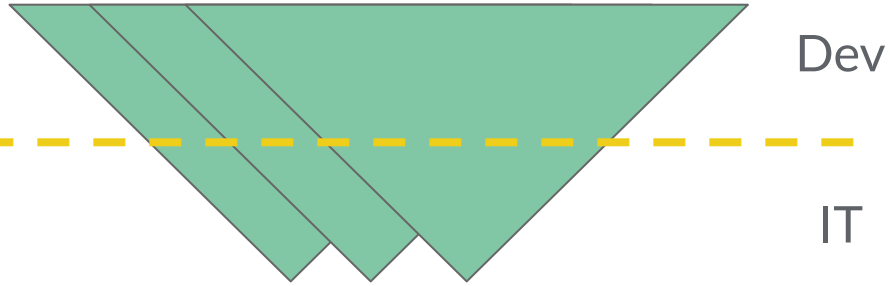
Worked great, for
a long time

Common
mental model



Worked great, for a long time

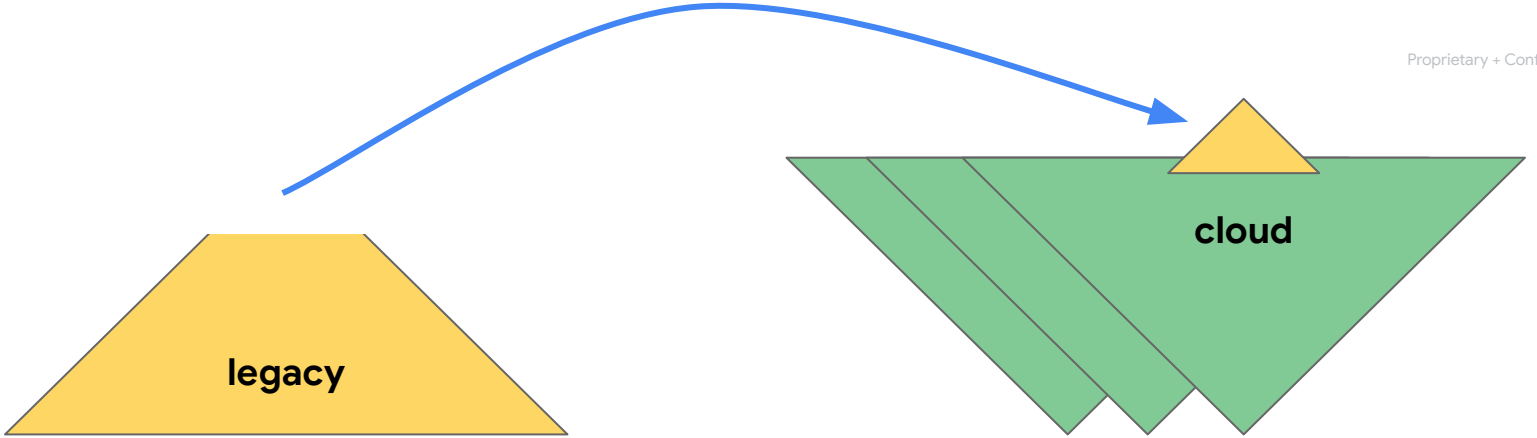
Common mental model



Cloud is here, though.

(because scale, mostly)

((You can't **buy more nines** for your VM in Cloud))



Infrastructure changes **can't fix** the app.

** even though they **used to**.*

Why? Why now?

- Distributed Systems - "Always slightly broken"
- Warehouse **Scale** Computing
- SaaS, global audience
- Consumers expect "*always-on*"

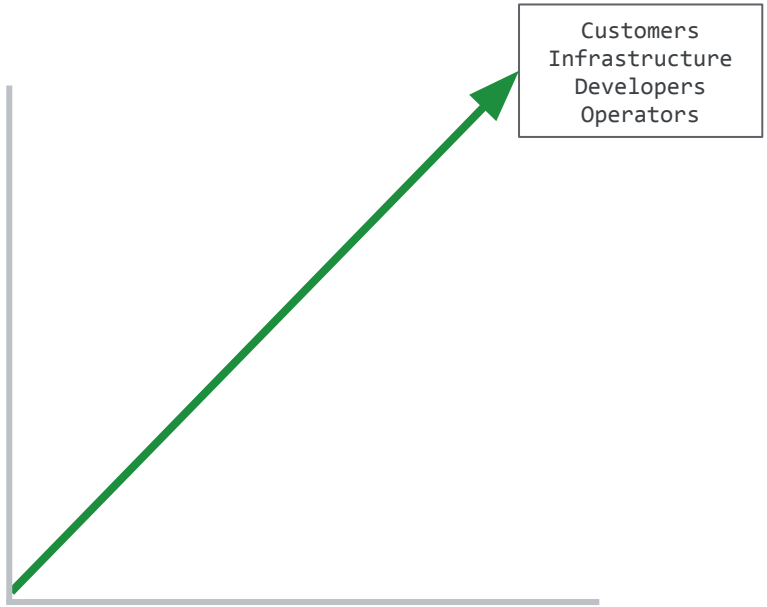
"Operations as a **competitive advantage** (and occasionally a “strategic weapon”).

This advantage is the ability to consistently create and deploy **reliable software** to an **unreliable platform** that **scales horizontally**."

Operations is a competitive advantage... (Secret Sauce for Startups!)

by Jesse Robbins | @jesserobbins | October 23, 2007

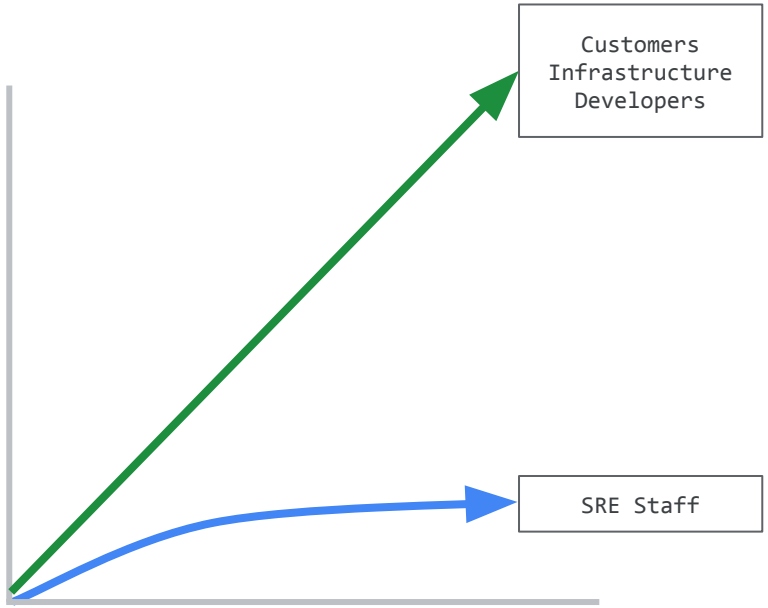
Why SRE? Scaling operations problem



Linear scaling

The number of operators needs to scale proportionally with the size and scope of any product they maintain

Why SRE? Scaling operations problem



Sublinear scaling solution

- Automation -> self-healing
- Standardized tooling
- Community of practice
- Shared responsibility

SLOs in one slide

A **ratio-rate** of good/total, measured over a time duration.

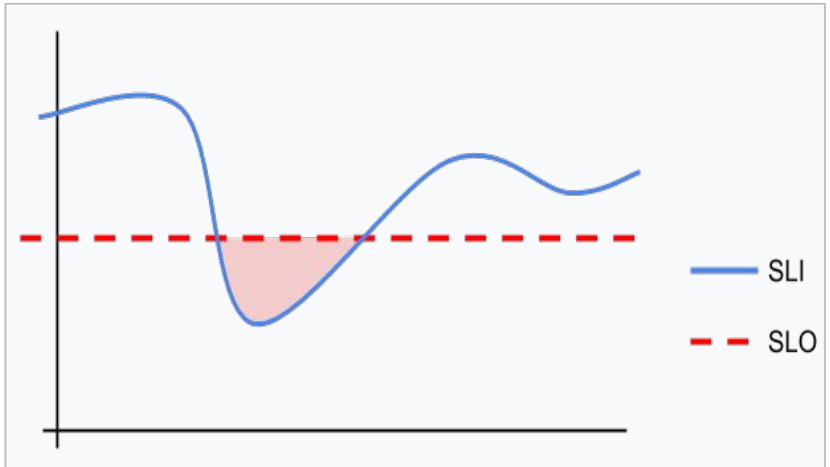
If too much non-good, for too long, tell a human.

SLI is the squiggly line

SLO is the straight one

Area is time **exceeding SLO**

https://cloud.google.com/architecture/defining-SLOs



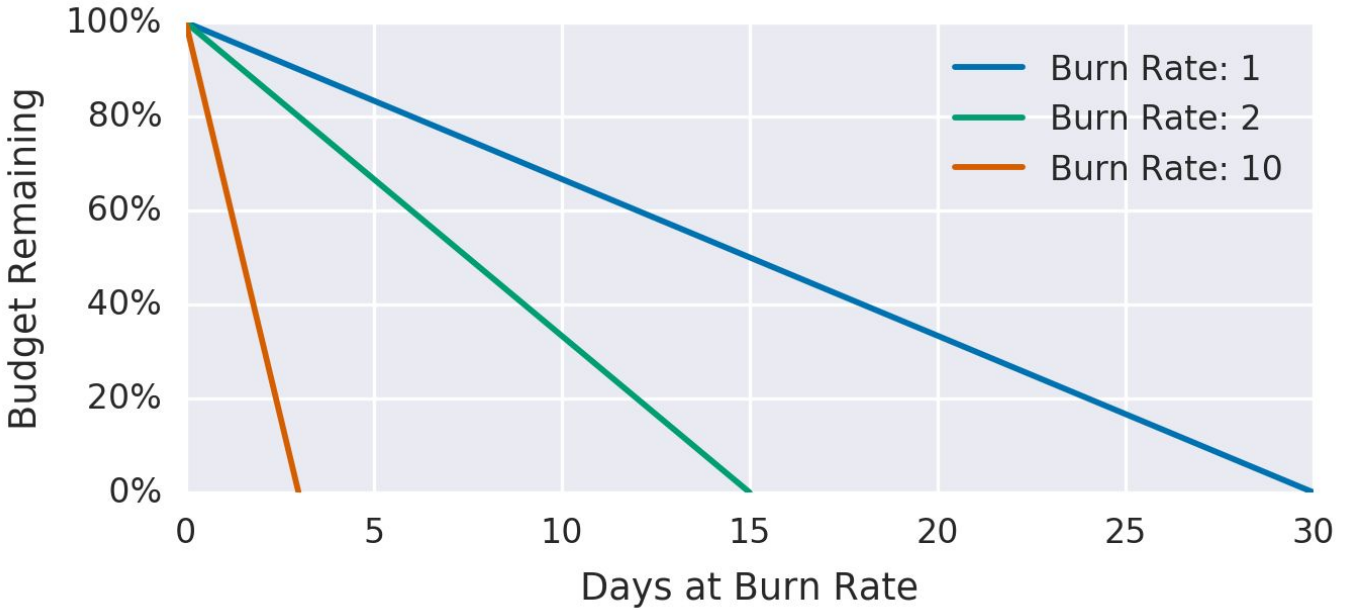
What is a Burn Rate?

Burn rate is how fast, relative to the SLO, the service consumes the error budget.

BR=1 leaves you with **exactly 0 budget** at the end of the SLO's **duration**.

2 leaves you with **half**, and so on.

⇒ Fast Burn vs Slow Burn



Source: https://sre.google/workbook/alerting-on-slos/

DATADOG | Google Cloud

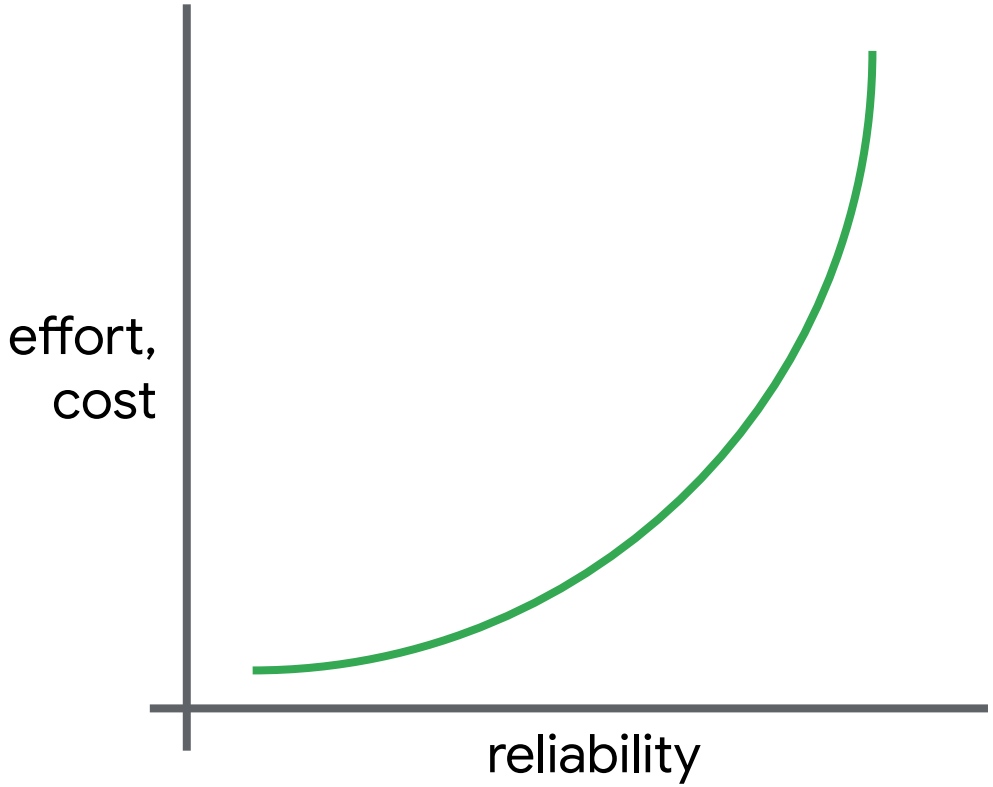
SLI Types

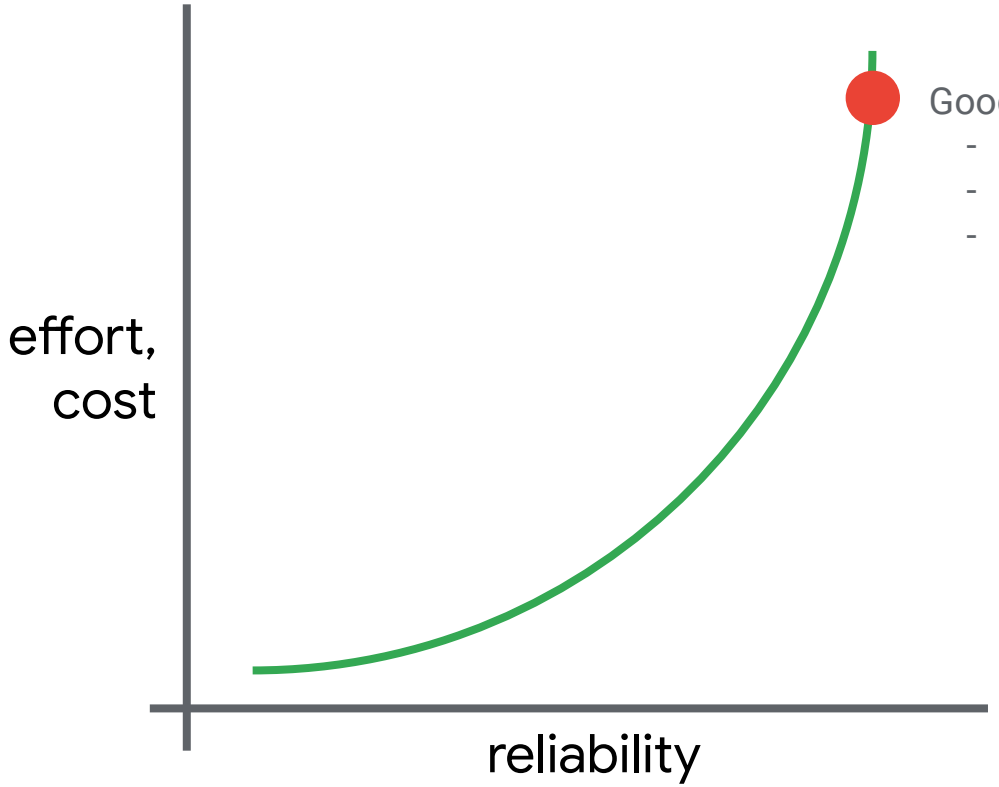
SLI Menu

Request / Response	Availability Latency Quality
Data Processing	Coverage Correctness Freshness Throughput
Storage	Throughput Latency

Google Cloud infrastructure is designed to support the following target levels of availability for most customer workloads:

Deployment location	Availability (uptime) %	Approximate maximum downtime
Single zone	3 nines: 99.9%	43.2 minutes in a 30-day month
Multiple zones in a region	4 nines: 99.99%	4.3 minutes in a 30-day month
Multiple regions	5 nines: 99.999%	26 seconds in a 30-day month


effort,
cost
reliability



Google Ads (ca **2003**)

- seconds matter $$$
- high margins
- huuuuuge scale (growing)

Failure Domains
know your abstractions (zones, regions, clusters, etc)

Avoid:

- **Coordinated Failure** - isolated change
- **Cascading Failure** - plan for containment

Via:

- **Gradual Change** - fail early, fail small

Design for Success - in the face of failure

- Provide **"exit paths"** when failure domains ... ***fail***.

  → **"run from your problems"** ;)

- Avoid **coordinated, cascading failures**

Provide **Generic Mitigations** in your platform:

- ❏ drain, spill, rollback,
- ❏ freeze, degrade, hospitalize,
- ❏ upsize, blocklist

https://www.oreilly.com/content/generic-mitigations

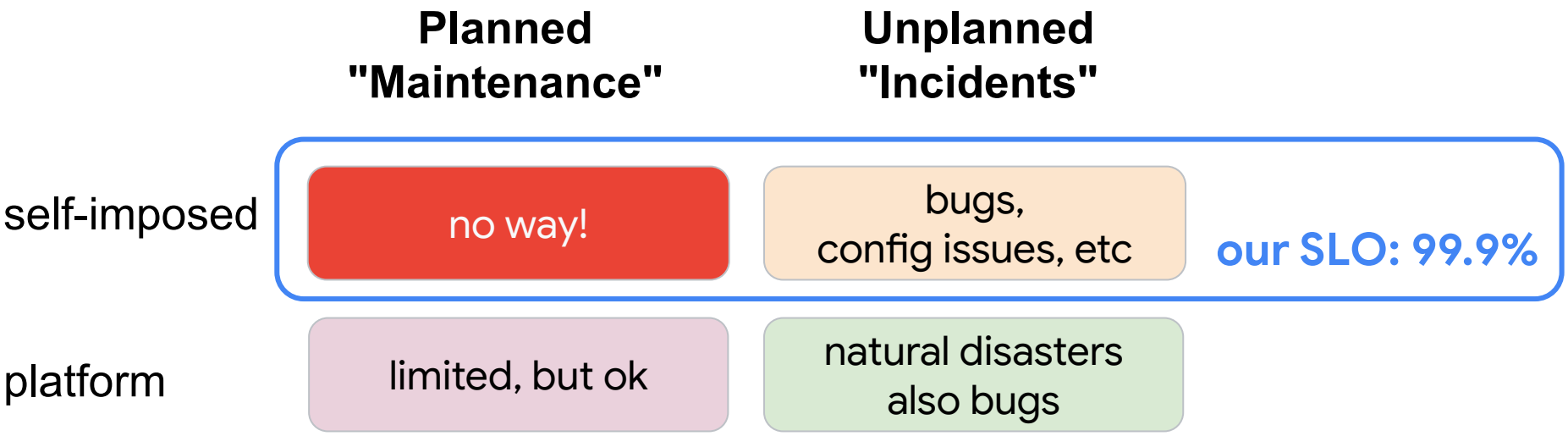
self-imposed

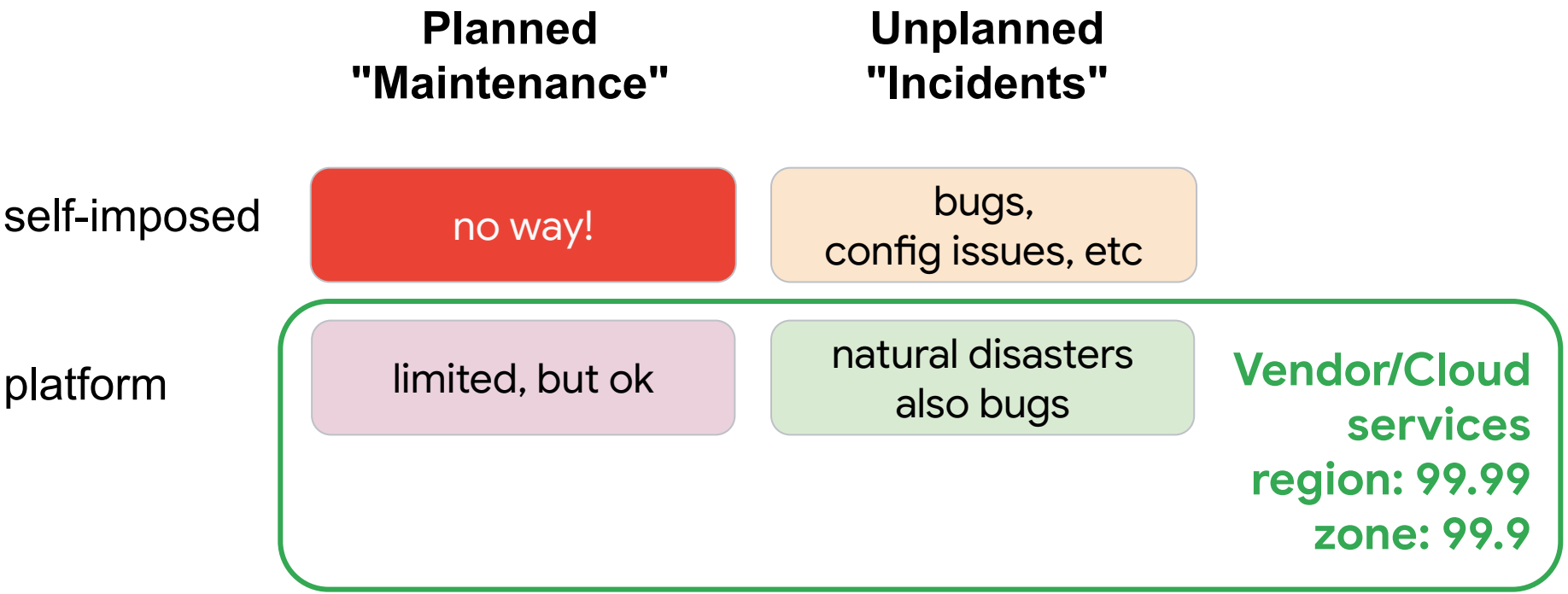
"us" - our code!

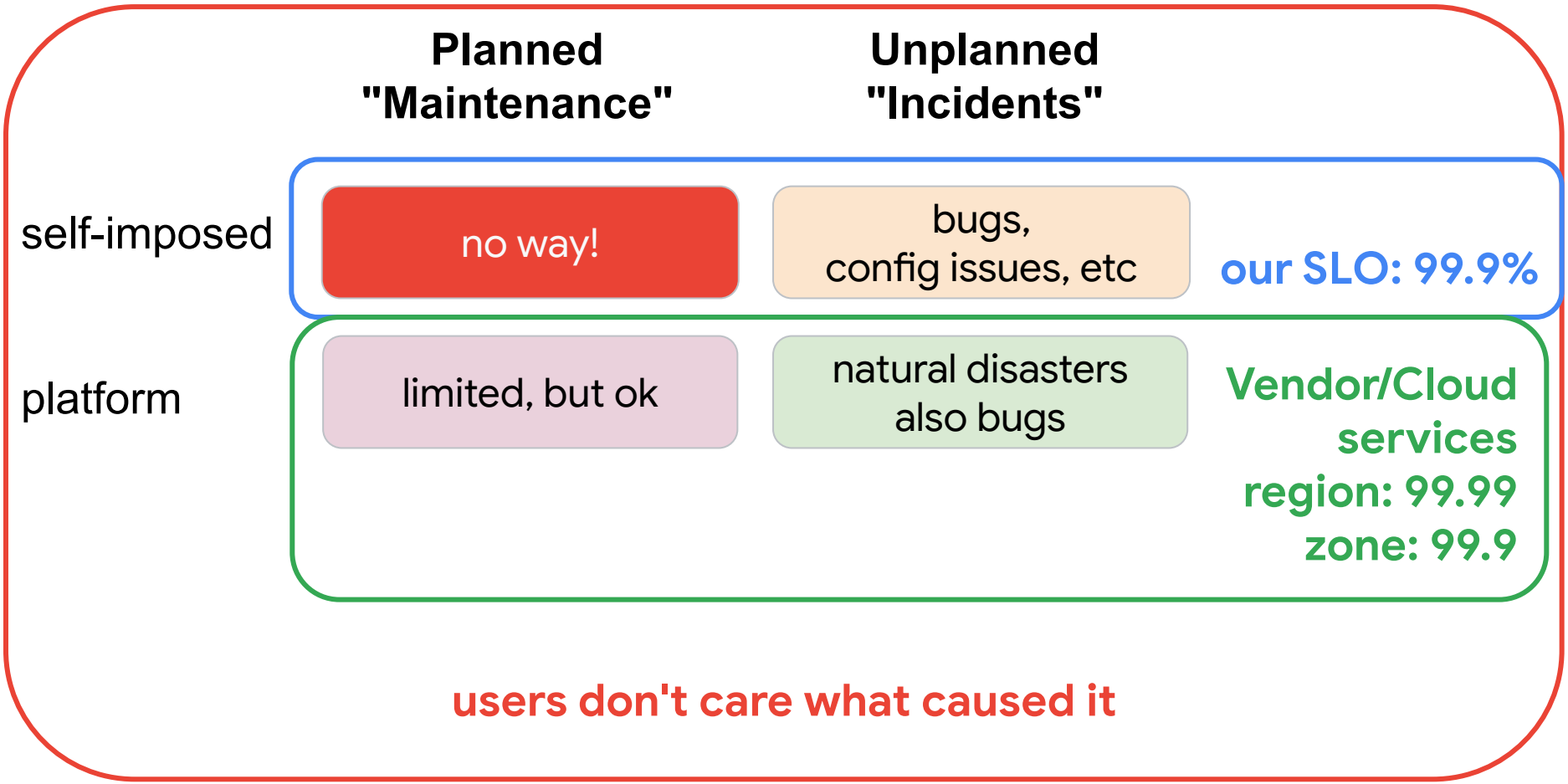
platform

"them" - the cloud, SaaS, backends

	Planned "Maintenance"	**Unplanned "Incidents"**
self-imposed	no way!	bugs, config issues, etc
platform	limited, but ok	natural disasters (also bugs)







"Are we getting better?"

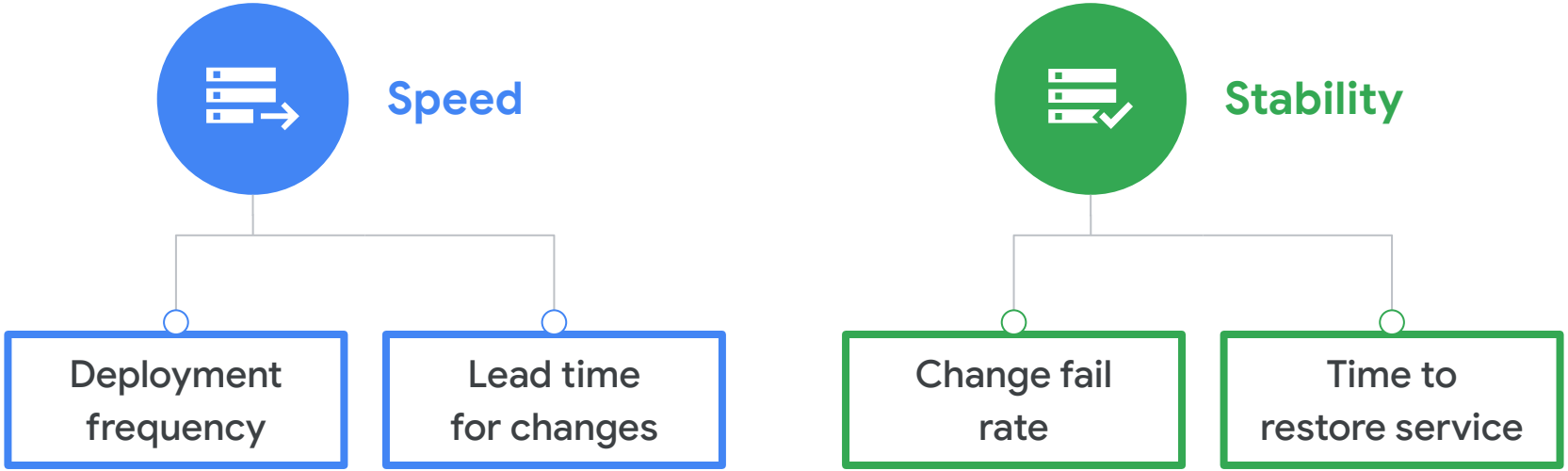
Speed

Stability

DORA
DEVOPS RESEARCH & ASSESSMENT

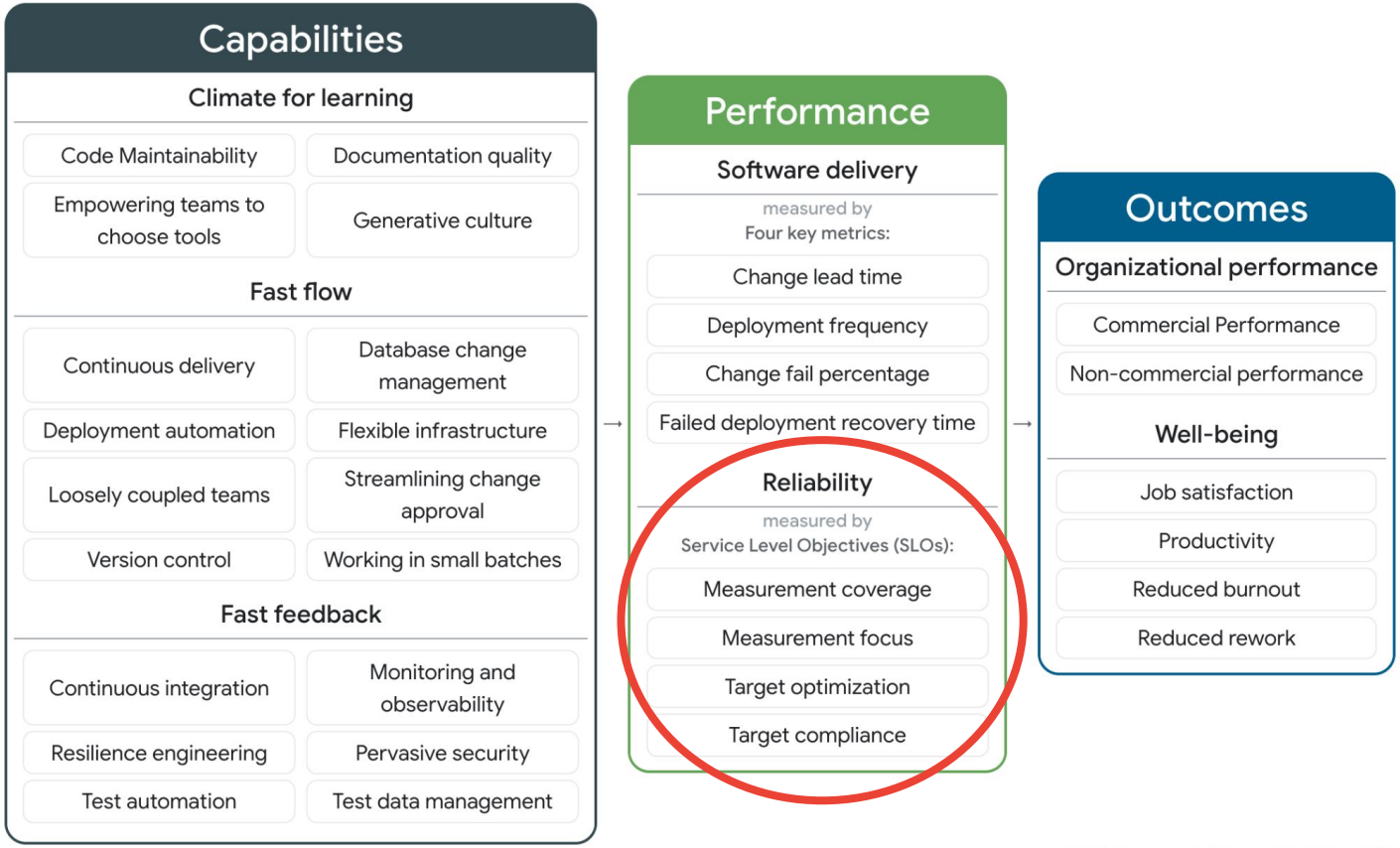
"Are we getting better?"

The 4 DORA Metrics



DORA Core Model

View mode: ○ summary ◉ detail



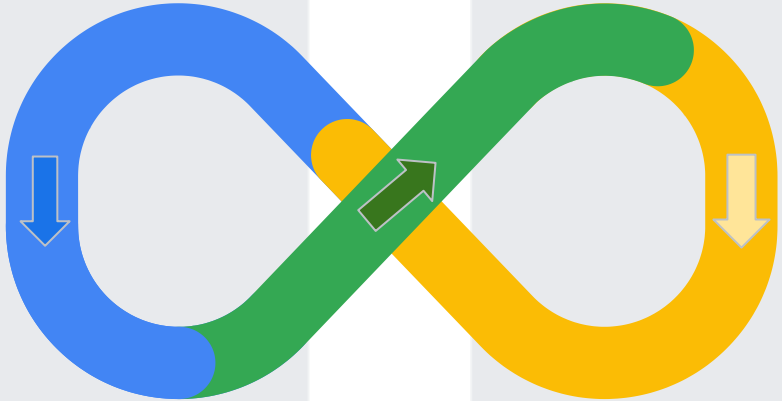
DORA Core model v2.0.0 download as PNG

Measure

1. Measure 4 DORA metrics

2. Determine bottleneck(s)

3. Choose **capability** to improve next



Improve

4. Build / buy capabilities

5. Enable capability in platform, document

6. Gather early dev feedback

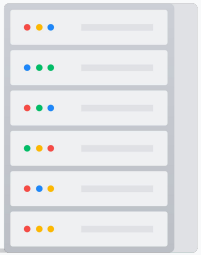
7. Release next version of platform

Platform Engineering

More focus
More creativity
More agility

Software Developer

Platform Engineer

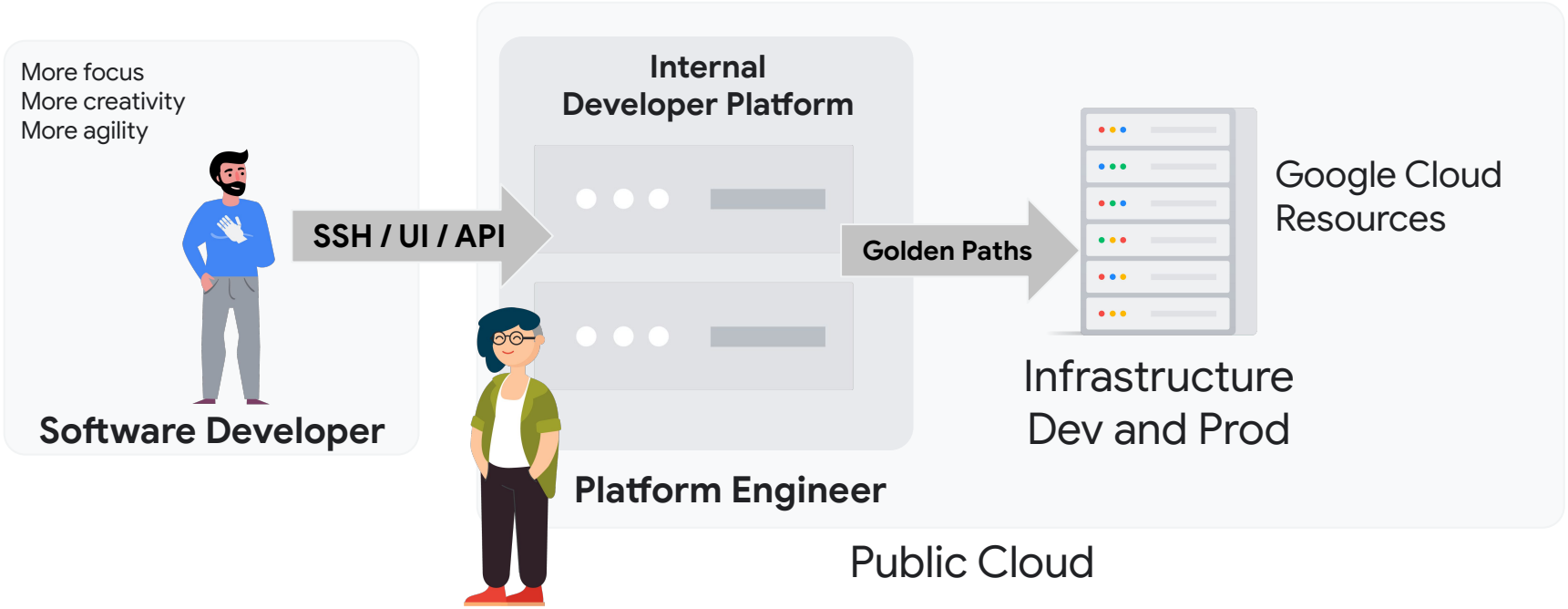


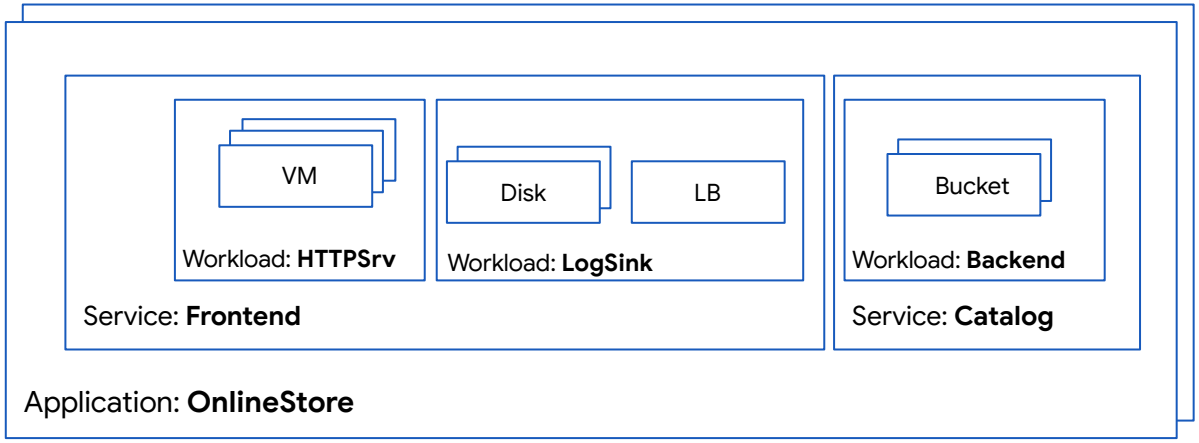
Google Cloud Resources

Infrastructure
Dev and Prod

Public Cloud

Platform Engineering




VM
Workload: HTTPSrv
Disk
LB
Workload: LogSink
Service: Frontend
Bucket
Workload: Backend
Service: Catalog
Application: OnlineStore

Application: **OnlineStore**

Service: **Frontend**

VM

Workload: **HTTPSrv**

Disk

LB

Workload: **LogSink**

Service: **Catalog**

Bucket

Workload: **Backend**

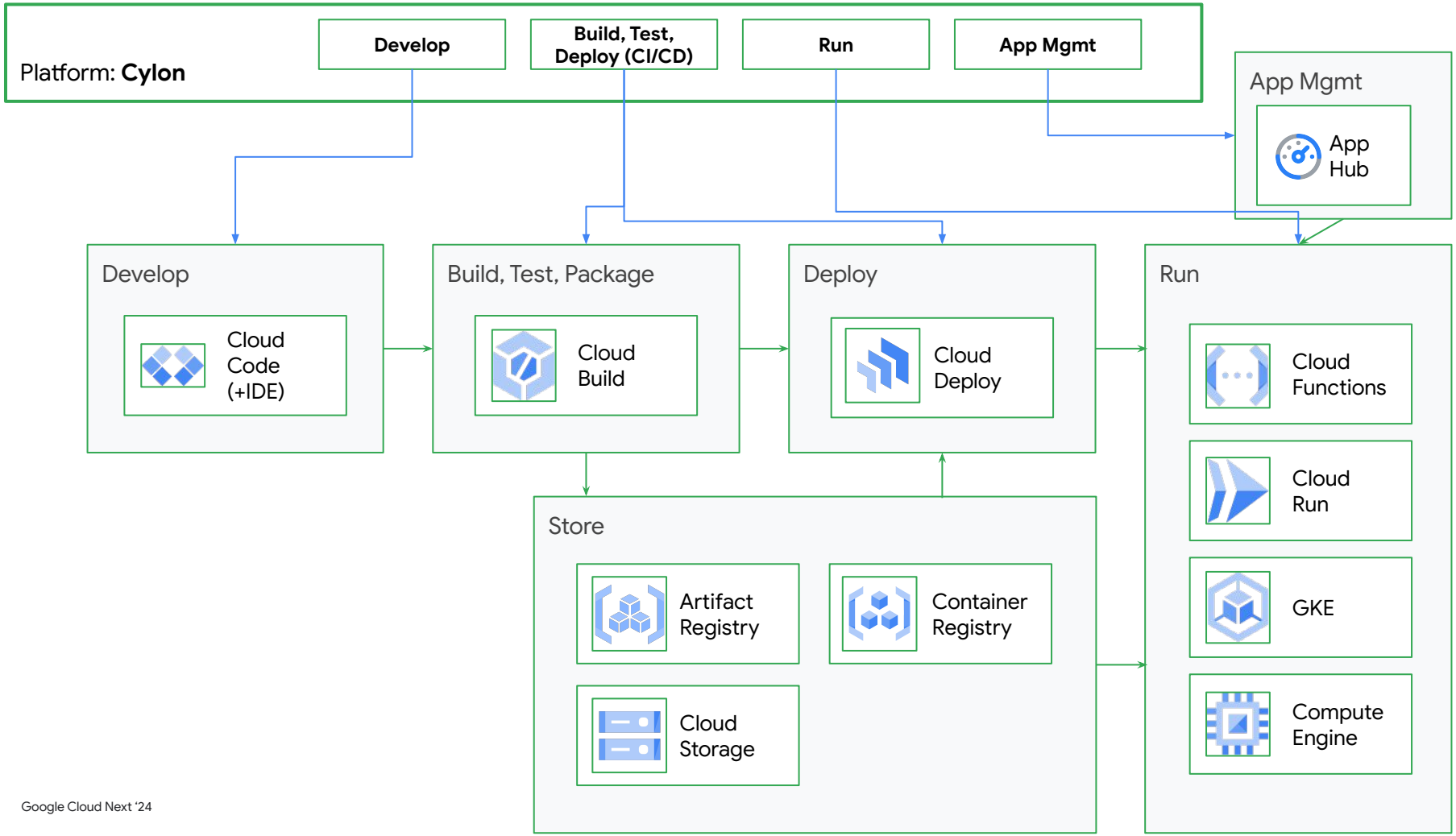
Platform: **Cylon**

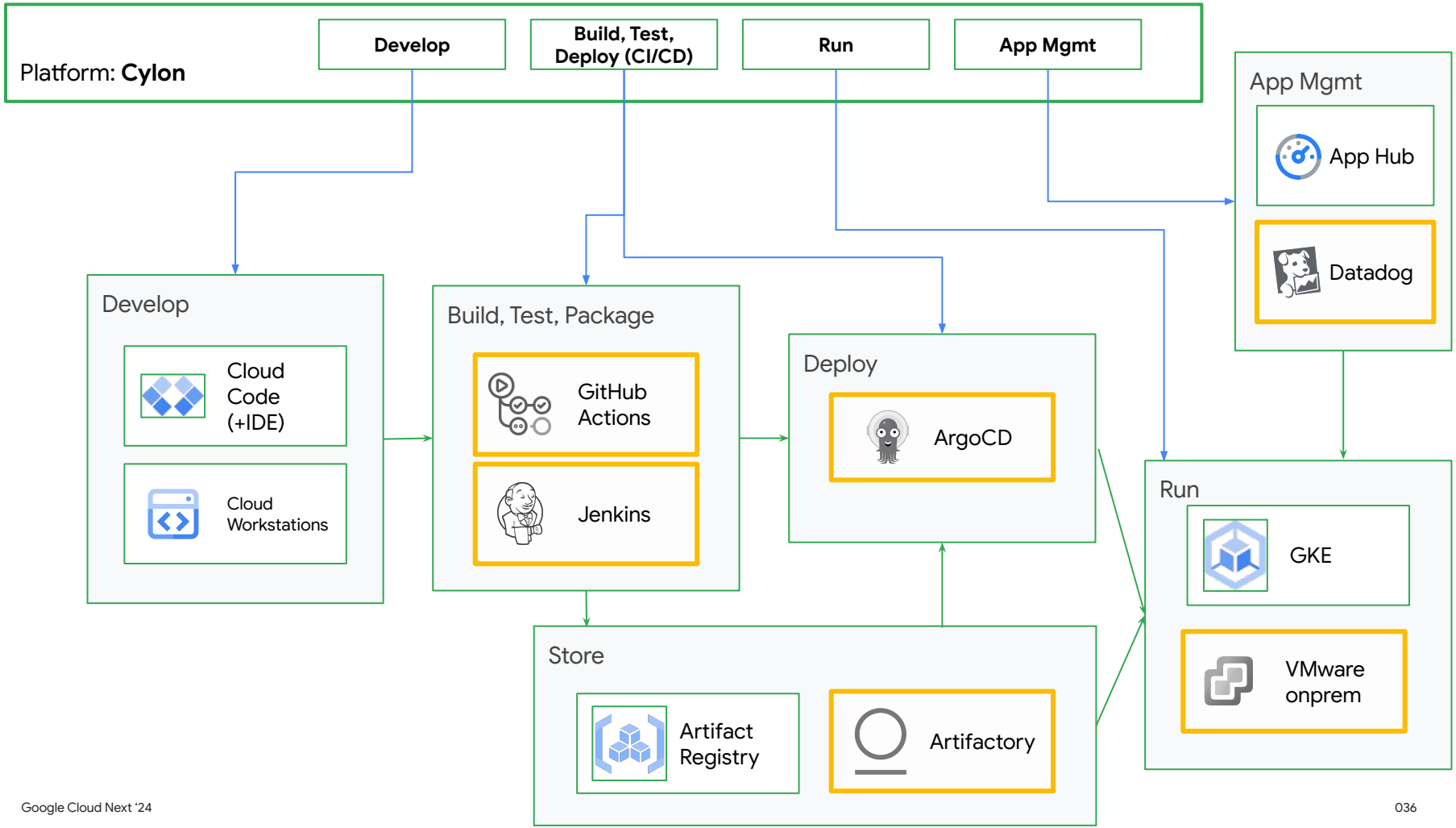
Develop

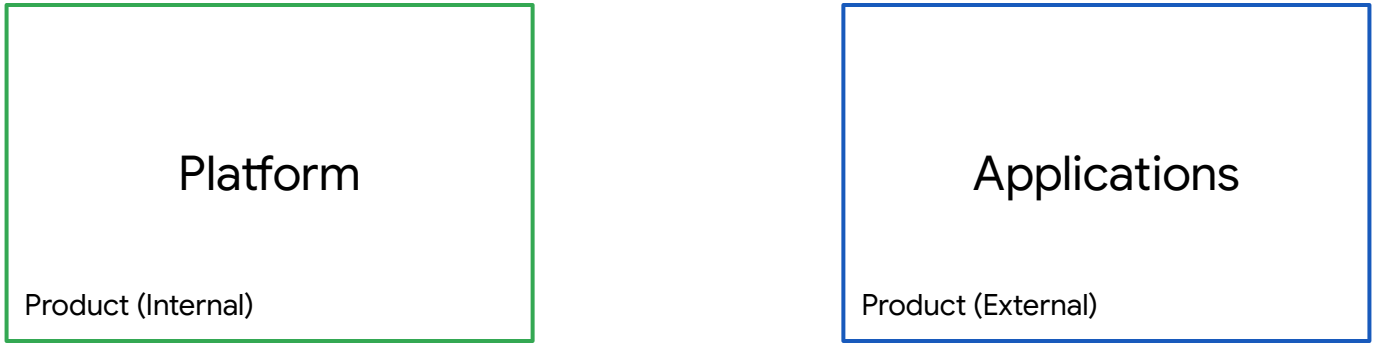
Build, Test, Deploy (CI/CD)

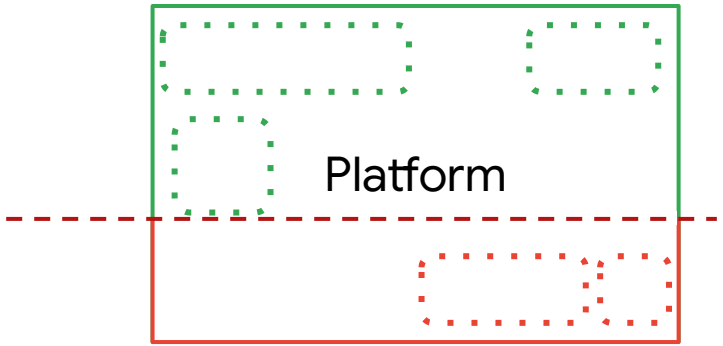
Run

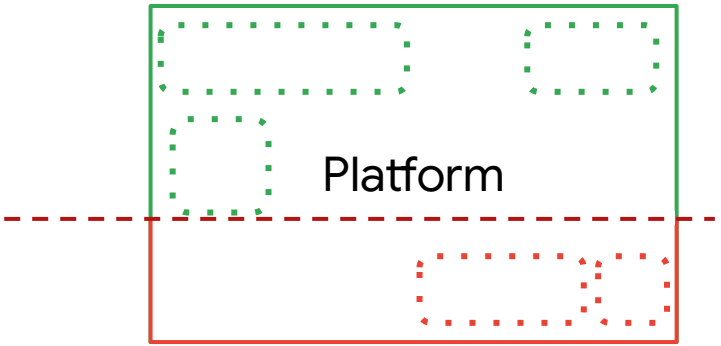
App Mgmt


Platform: Cylon
Develop
Build, Test, Deploy (CI/CD)
Run
App Mgmt
App Mgmt
App Hub
Develop
Cloud Code (+IDE)
Build, Test, Package
Cloud Build
Deploy
Cloud Deploy
Run
Cloud Functions
Cloud Run
GKE
Compute Engine
Store
Artifact Registry
Container Registry
Cloud Storage


Platform: Cylon
Develop
Build, Test, Deploy (CI/CD)
Run
App Mgmt
App Mgmt
App Hub
Datadog
Develop
Cloud Code (+IDE)
Cloud Workstations
Build, Test, Package
GitHub Actions
Jenkins
Deploy
ArgoCD
Run
GKE
VMware onprem
Store
Artifact Registry
Artifactory


Platform
Product (Internal)
Applications
Product (External)


Platform



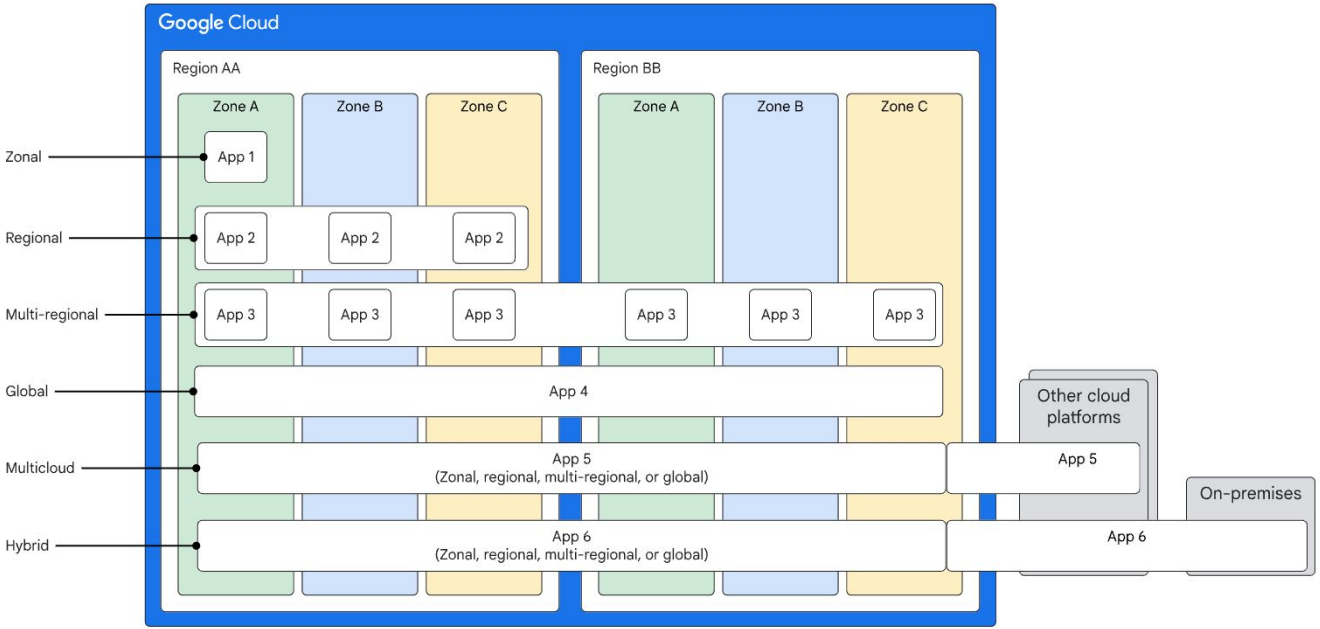
- **Critical** platform capabilities deployed as active-active, dual region
- **Observability** stack also critical
- **Feature toggling** is critical - for outage tiles and disabling UI components

- **CI/CD** not dual-region initially
- **Manual failover** using **break-glass** procedures
- Dual region implementation may come **later**

5 Application Archetypes

goo.gle/app-archetypes

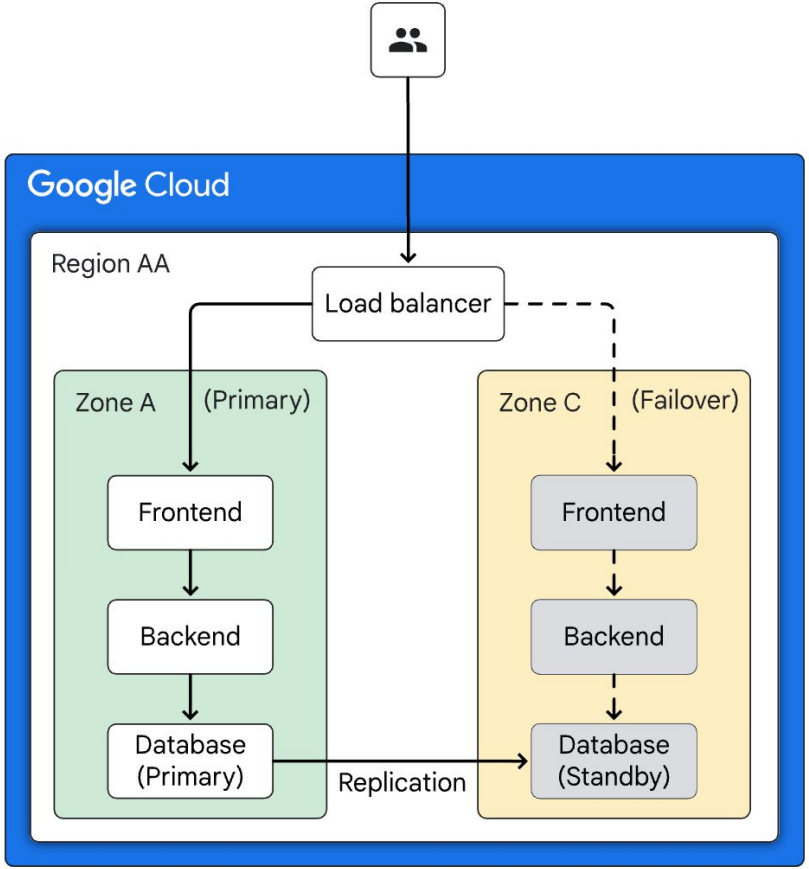
Cloud Architecture Center



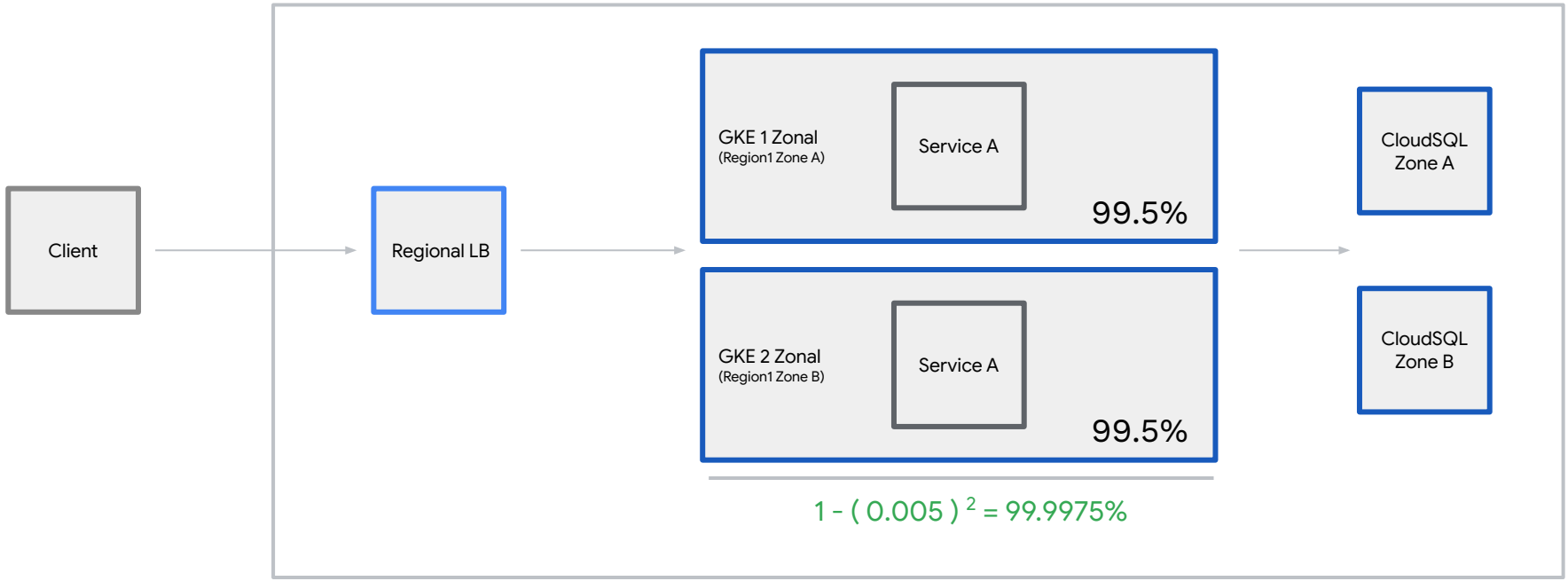
Archetype 1

Active Passive Zones

- **Survives zone** failure.
- **Fail-Ops**: Change LB backend, promote read replica
- **Cost**: 2x serving + 2x data (1 replica)
- **Complexity**: Low
- **App Refactoring**: None (lift and shift)
- **Type**: COTS, licensing

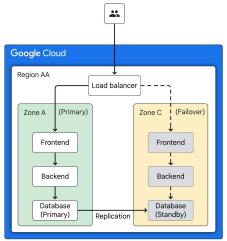


GKE clusters with Cloud SQL HA

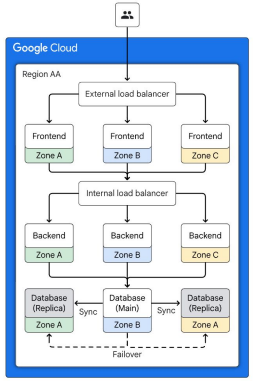


GCP SLAs

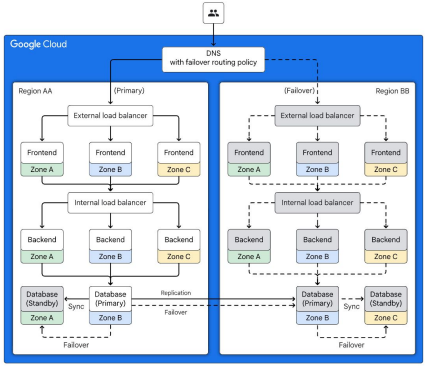
99.98% (Ceiling)
<2h / year !



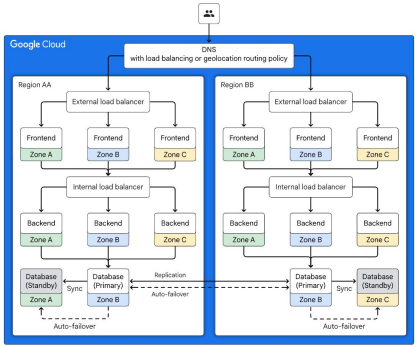
Active Passive Zones



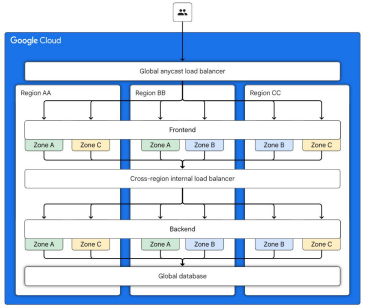
Multi-Zonal



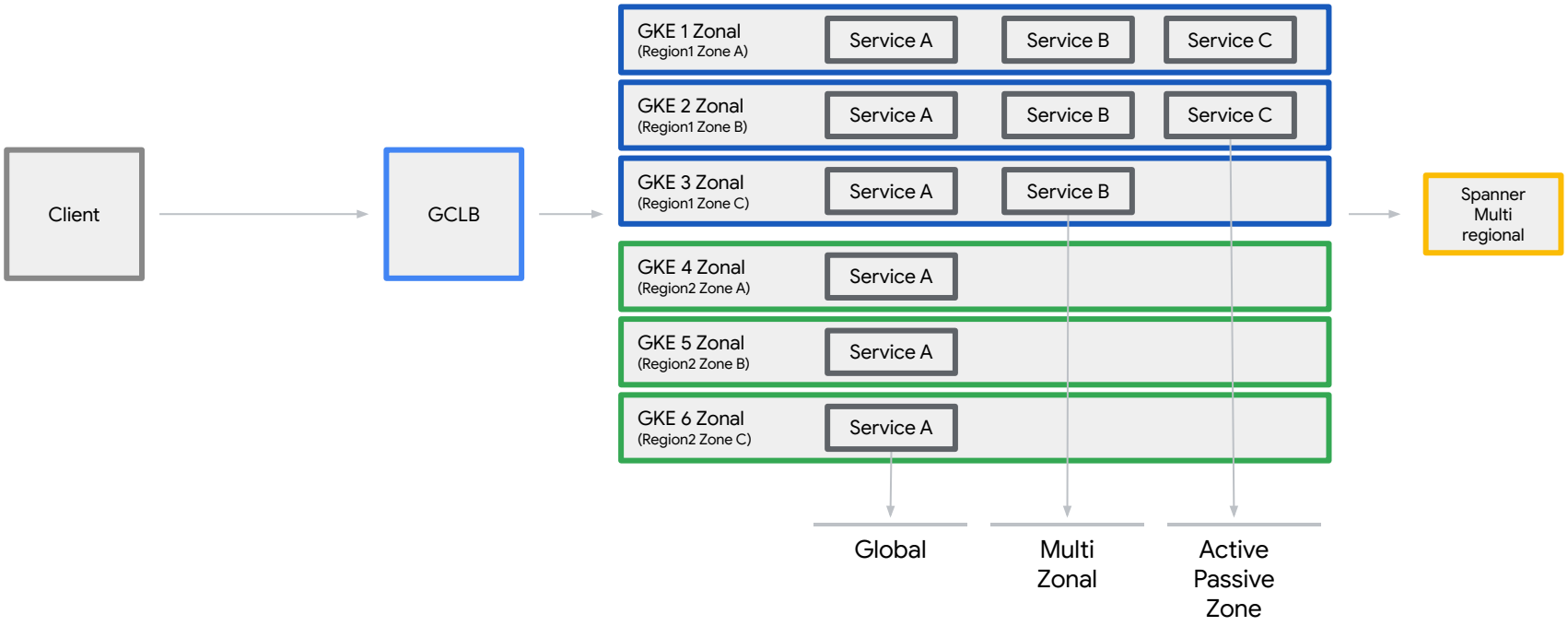
Active Passive Regions

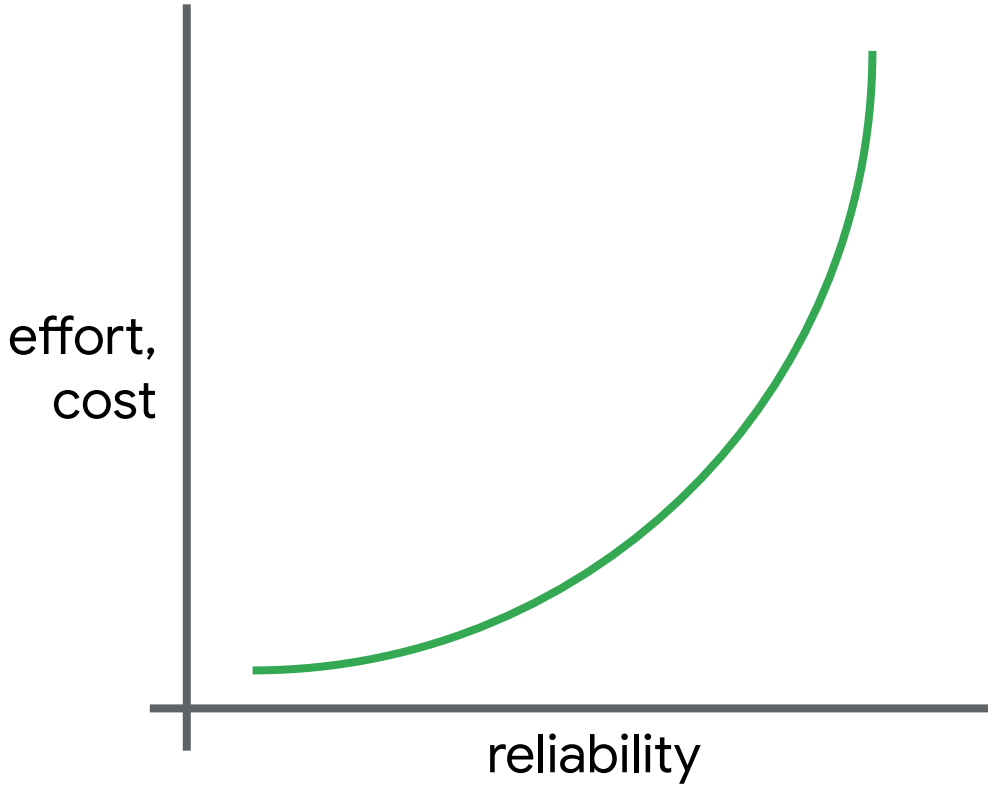


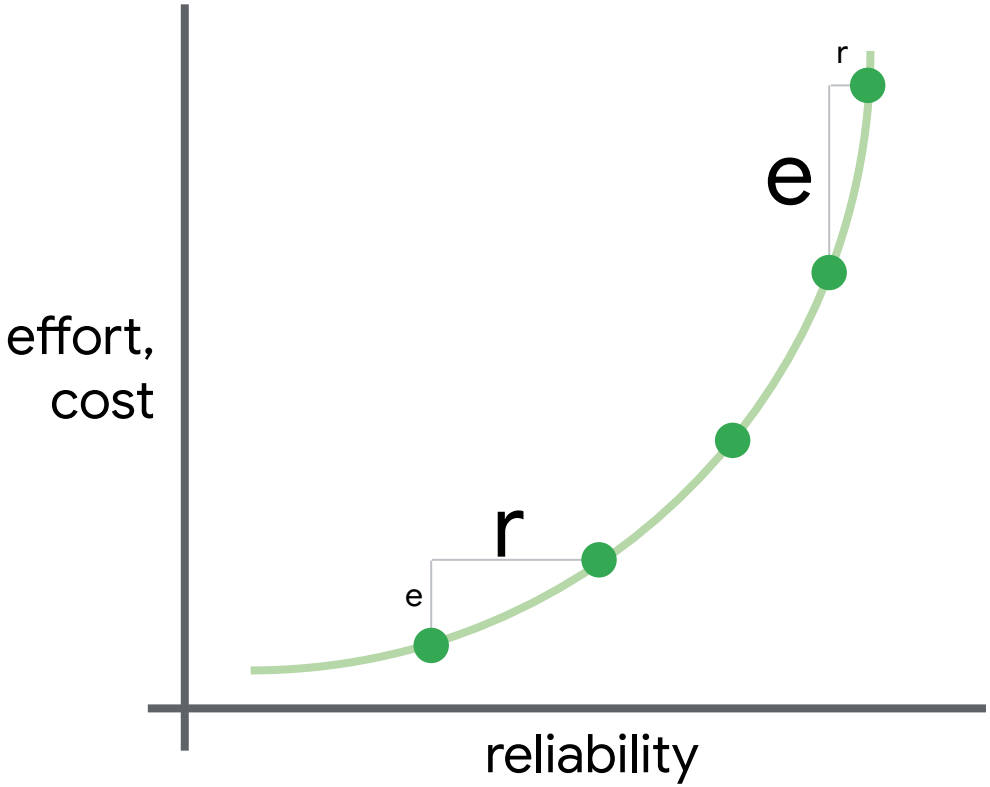
Isolated Regions



Global


Client
GCLB
GKE 1 Zonal
(Region1 Zone A)
Service A
Service B
Service C
GKE 2 Zonal
(Region1 Zone B)
Service A
Service B
Service C
GKE 3 Zonal
(Region1 Zone C)
Service A
Service B
GKE 4 Zonal
(Region2 Zone A)
Service A
GKE 5 Zonal
(Region2 Zone B)
Service A
GKE 6 Zonal
(Region2 Zone C)
Service A
Spanner
Multi
regional
Global
Multi
Zonal
Active
Passive
Zone


effort,
cost
reliability


r
e
effort,
cost
r
e
reliability

03

#lab

Lab != Prod – A place to play

It's hard to try new things in prod!

It's hard to build a new place beyond a `hello_world`!

So we built an **MVP of a platform** for you to play with.

Take-home:

reliable-app-platforms Public

Clone, Fork, Contribute:

goo.gle/reliable-app-platforms

An MVP of a **Platform:**

- CI/CD (Cloud Build, Cloud Deploy)
- Multicluster (GKE)
- Observability (Cloud Observability)
- Still Evolving !

Starting your personal lab

TODAY

dtdg.co/srelab

Turn off ad-/pop-up-blockers

Fill Registration Form

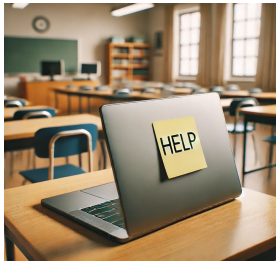
Click submit & access

Click Start

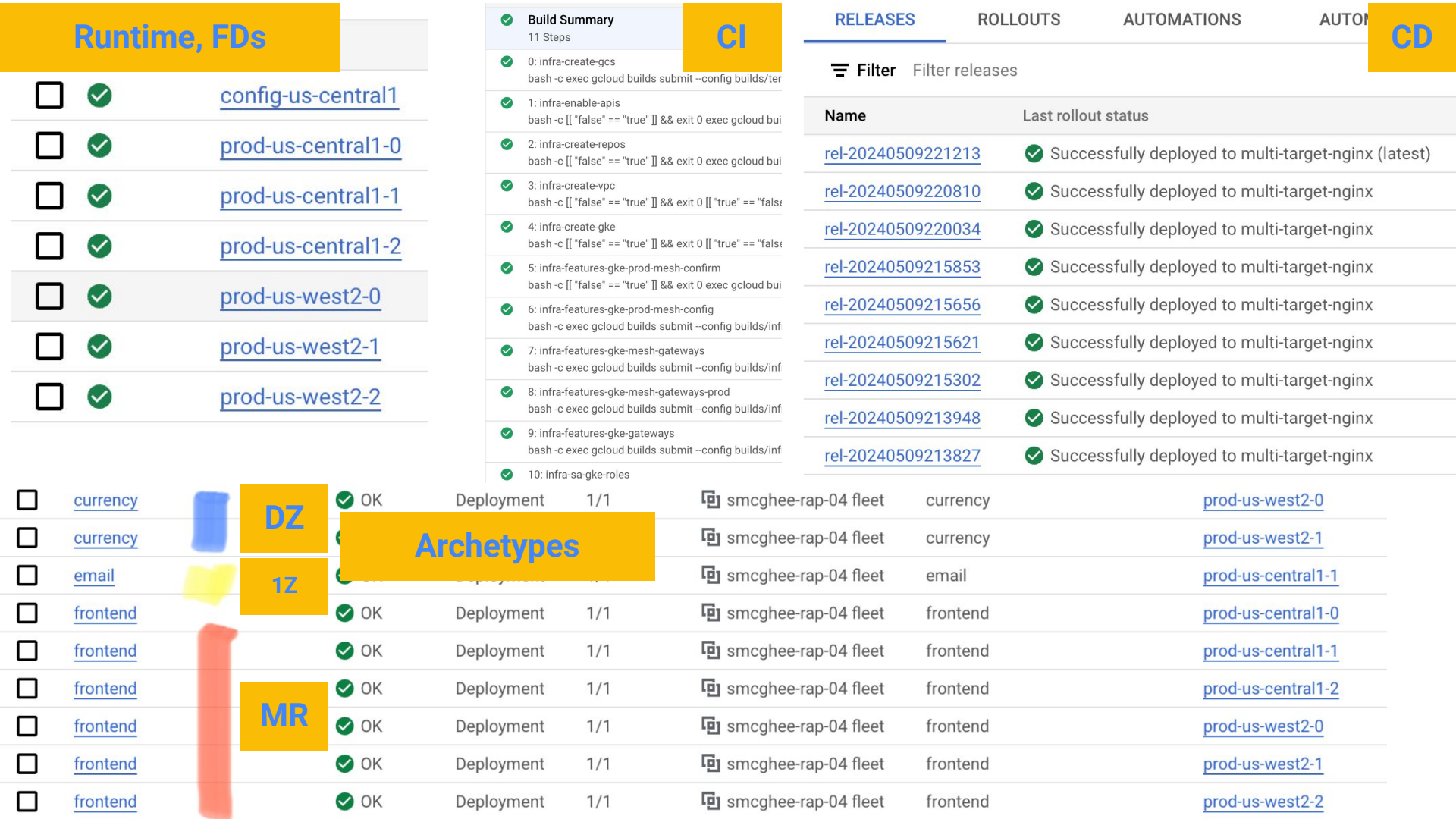
Back to the Presentation

We are here to help!

In-Person **Online: Q&A**



DATADOG | Google Cloud


Runtime, FDs
config-us-central1
prod-us-central1-0
prod-us-central1-1
prod-us-central1-2
prod-us-west2-0
prod-us-west2-1
prod-us-west2-2
CI
Build Summary
11 Steps
0: infra-create-gcs
bash -c exec gcloud builds submit --config builds/ter
1: infra-enable-apis
bash -c [["false" == "true"]] && exit 0 exec gcloud bui
2: infra-create-repos
bash -c [["false" == "true"]] && exit 0 exec gcloud bui
3: infra-create-vpc
bash -c [["false" == "true"]] && exit 0 [["true" == "false
4: infra-create-gke
bash -c [["false" == "true"]] && exit 0 [["true" == "false
5: infra-features-gke-prod-mesh-confirm
bash -c [["false" == "true"]] && exit 0 exec gcloud bui
6: infra-features-gke-prod-mesh-config
bash -c exec gcloud builds submit --config builds/inf
7: infra-features-gke-mesh-gateways
bash -c exec gcloud builds submit --config builds/inf
8: infra-features-gke-mesh-gateways-prod
bash -c exec gcloud builds submit --config builds/inf
9: infra-features-gke-gateways
bash -c exec gcloud builds submit --config builds/inf
10: infra-sa-gke-roles
RELEASES
ROLLOUTS
AUTOMATIONS
AUTON
CD
Filter
Filter releases
Name
Last rollout status
rel-20240509221213
Successfully deployed to multi-target-nginx (latest)
rel-20240509220810
Successfully deployed to multi-target-nginx
rel-20240509220034
Successfully deployed to multi-target-nginx
rel-20240509215853
Successfully deployed to multi-target-nginx
rel-20240509215656
Successfully deployed to multi-target-nginx
rel-20240509215621
Successfully deployed to multi-target-nginx
rel-20240509215302
Successfully deployed to multi-target-nginx
rel-20240509213948
Successfully deployed to multi-target-nginx
rel-20240509213827
Successfully deployed to multi-target-nginx
DZ
1Z
MR
Archetypes
currency OK Deployment 1/1 smcghee-rap-04 fleet currency prod-us-west2-0
currency OK Deployment 1/1 smcghee-rap-04 fleet currency prod-us-west2-1
email OK Deployment 1/1 smcghee-rap-04 fleet email prod-us-central1-1
frontend OK Deployment 1/1 smcghee-rap-04 fleet frontend prod-us-central1-0
frontend OK Deployment 1/1 smcghee-rap-04 fleet frontend prod-us-central1-1
frontend OK Deployment 1/1 smcghee-rap-04 fleet frontend prod-us-central1-2
frontend OK Deployment 1/1 smcghee-rap-04 fleet frontend prod-us-west2-0
frontend OK Deployment 1/1 smcghee-rap-04 fleet frontend prod-us-west2-1
frontend OK Deployment 1/1 smcghee-rap-04 fleet frontend prod-us-west2-2

04

#production

Separate Apps from Platforms

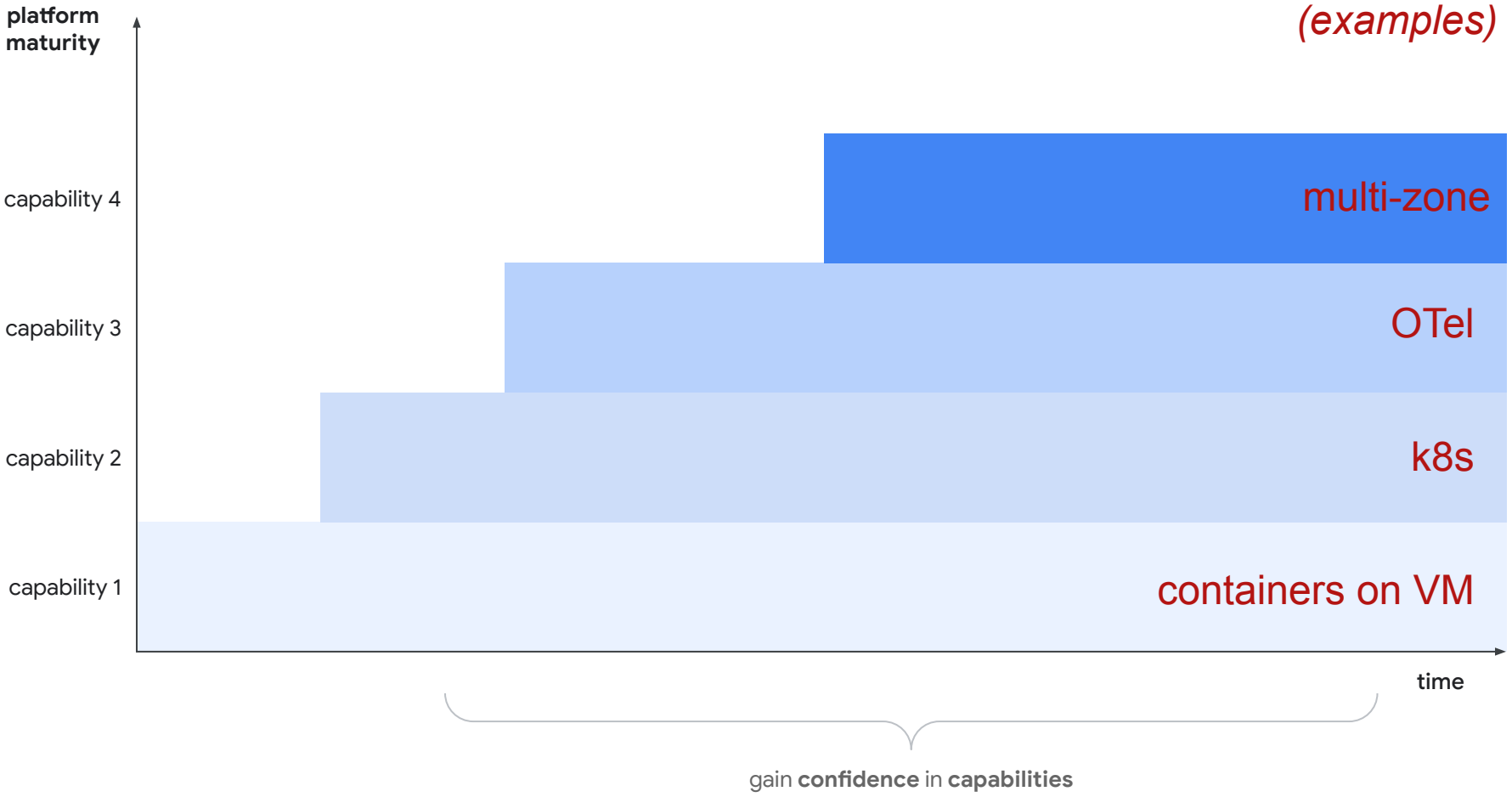
You don't need to handle every app/service/product from the very start.

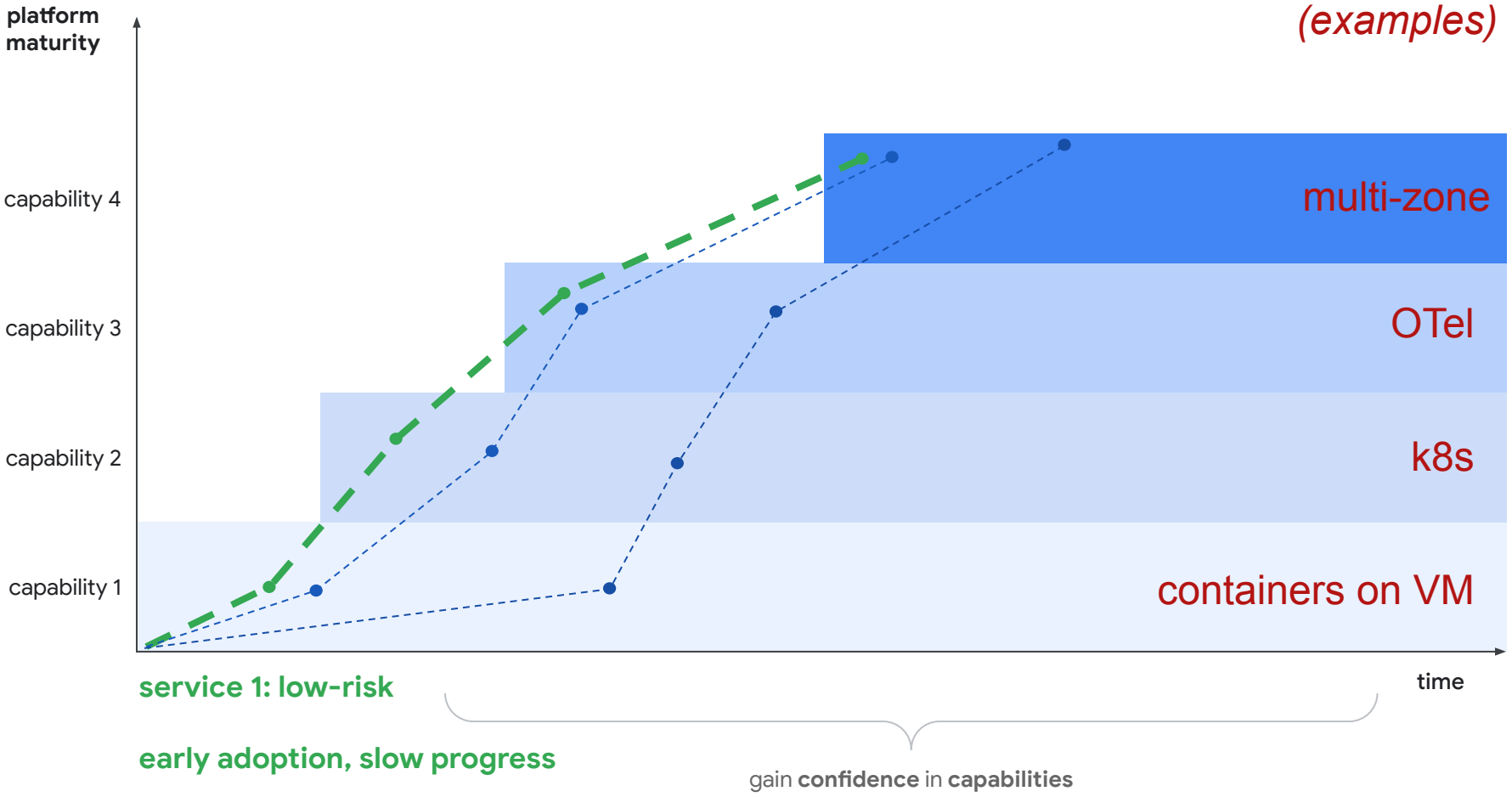
DO

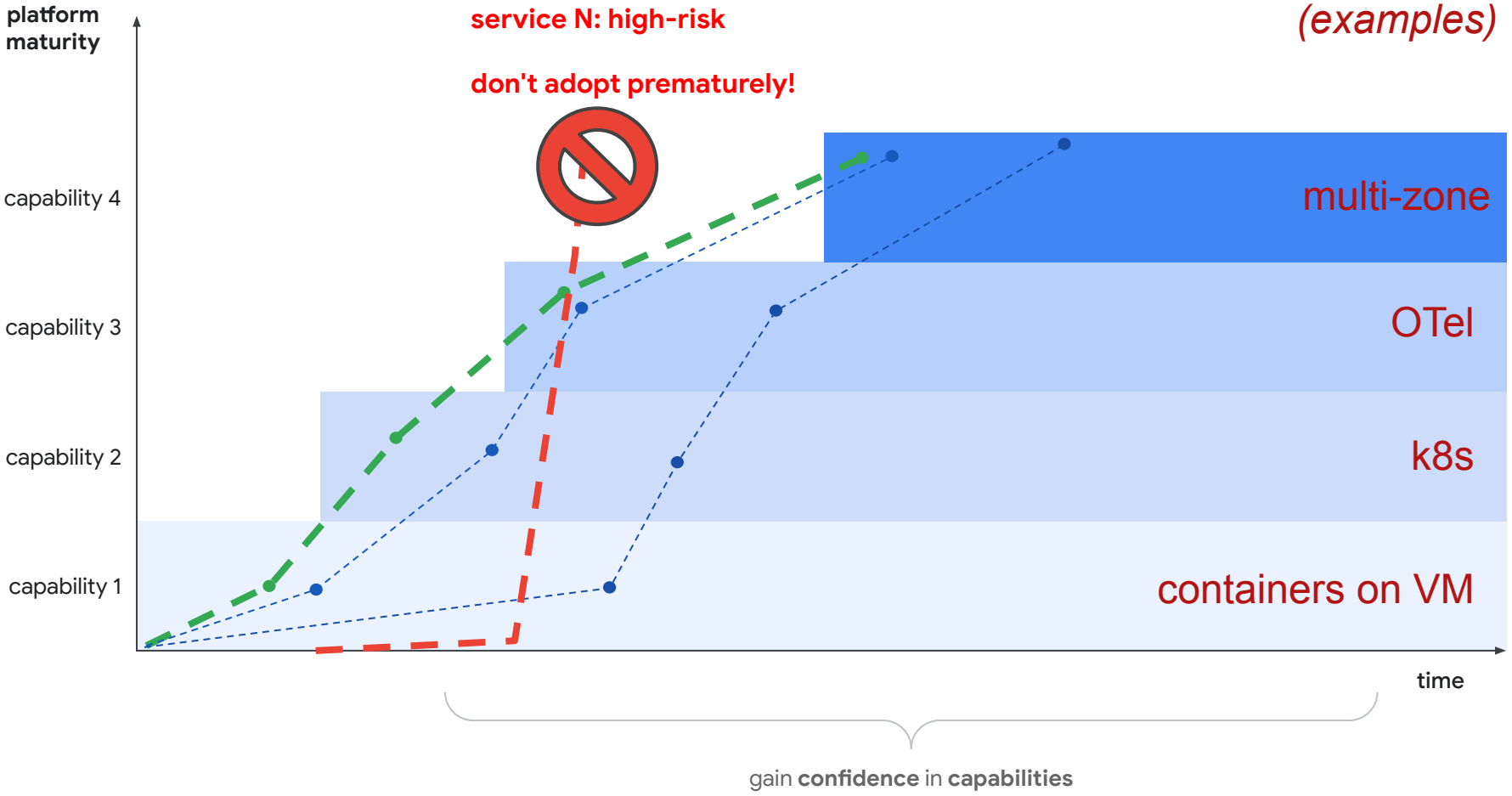
- Let teams adopt the platform at their own pace
- Celebrate early-adopters publicly, **share wins**
- Listen to dev teams **as your customers**

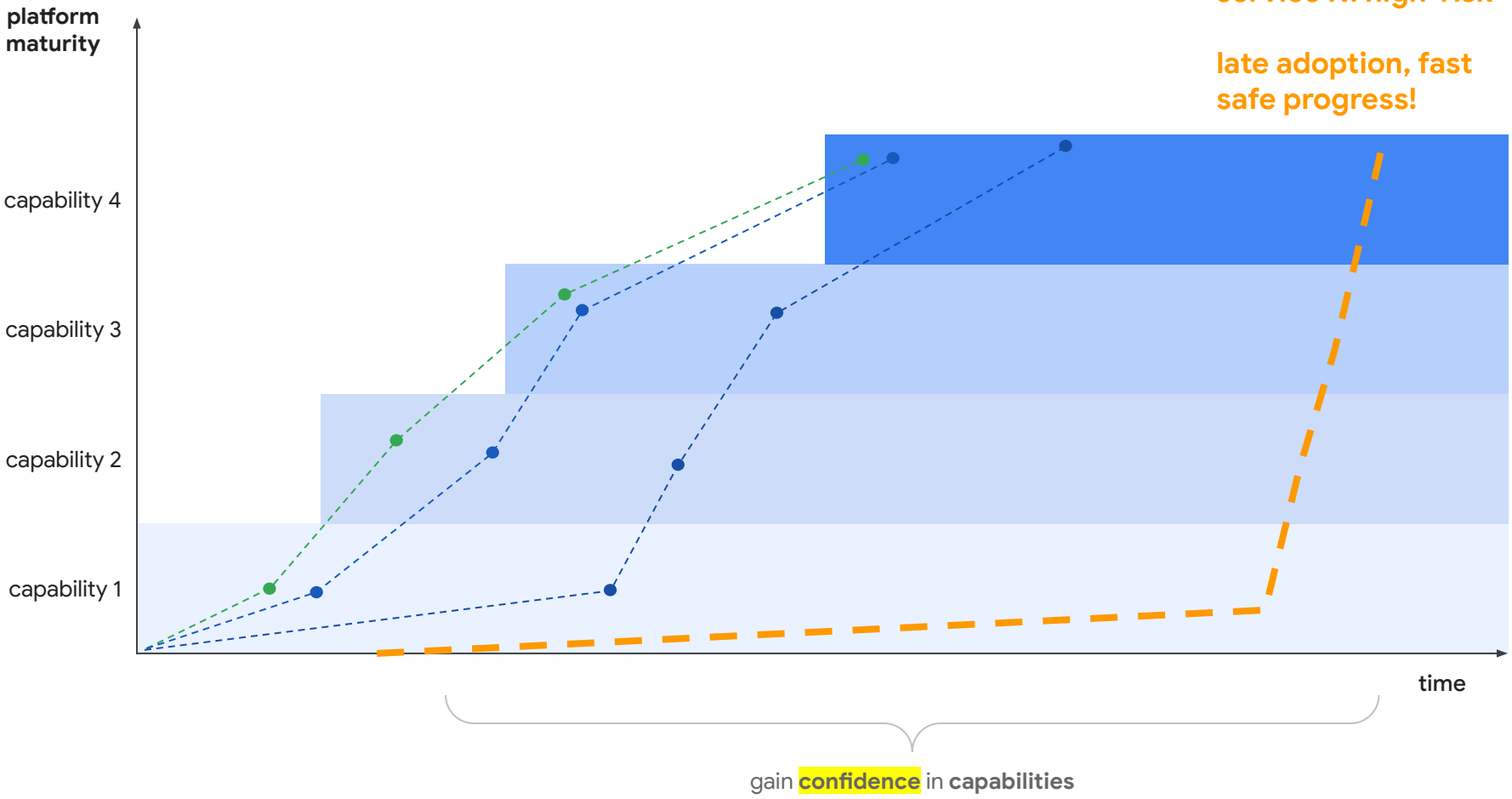
DON'T

- Don't force / demand / set % adoption targets!
- Don't start with the most critical apps!
- Don't waterfall !


platform maturity
(examples)
capability 4
multi-zone
capability 3
OTel
capability 2
k8s
capability 1
containers on VM
time
gain confidence in capabilities


platform maturity
(examples)
capability 4
capability 3
capability 2
capability 1
multi-zone
OTel
k8s
containers on VM
time
service 1: low-risk
early adoption, slow progress
gain confidence in capabilities


platform maturity
service N: high-risk
don't adopt prematurely!
(examples)
capability 4
capability 3
capability 2
capability 1
multi-zone
OTel
k8s
containers on VM
time
gain confidence in capabilities


platform maturity
capability 4
capability 3
capability 2
capability 1
time
service N: high-risk
late adoption, fast safe progress!
gain confidence in capabilities

Parting Shots

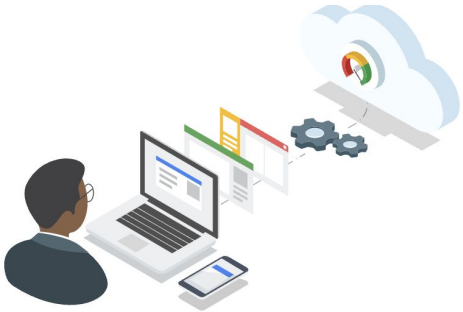
- DORA metrics, GBGB
- SLOs ("front door")
- Gradual Change @ Failure Domains
- Capabilities through Platforms
  - "SRE adjacency"
- Practice in the #Lab
- Learn, Write it down

# hook	the pyramids
↓	
# lecture	this whole talk
↓	
# lab	RAP + DD lab
↓	
# production	Back at work!
	→ DORA, PE

FIN !

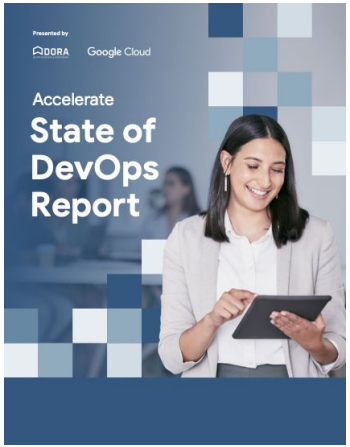
Next steps with DORA

Take the Quick Check



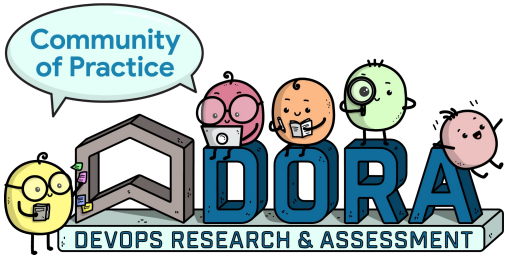
dora.dev/quickcheck

Read the Research



dora.dev/report

Join the Community



dora.community

DORA
DEVOPS RESEARCH & ASSESSMENT

"Are we getting better?"

The 4 DORA Metrics