Google Cloud

DO, RE, Me

Measuring the effectiveness of Site Reliability Engineering

Dave Stanke @davidstanke
Developer Relations Engineer, Google Cloud

SRE `implements` DevOps

SRE `implements` DevOps

okay... prove it.

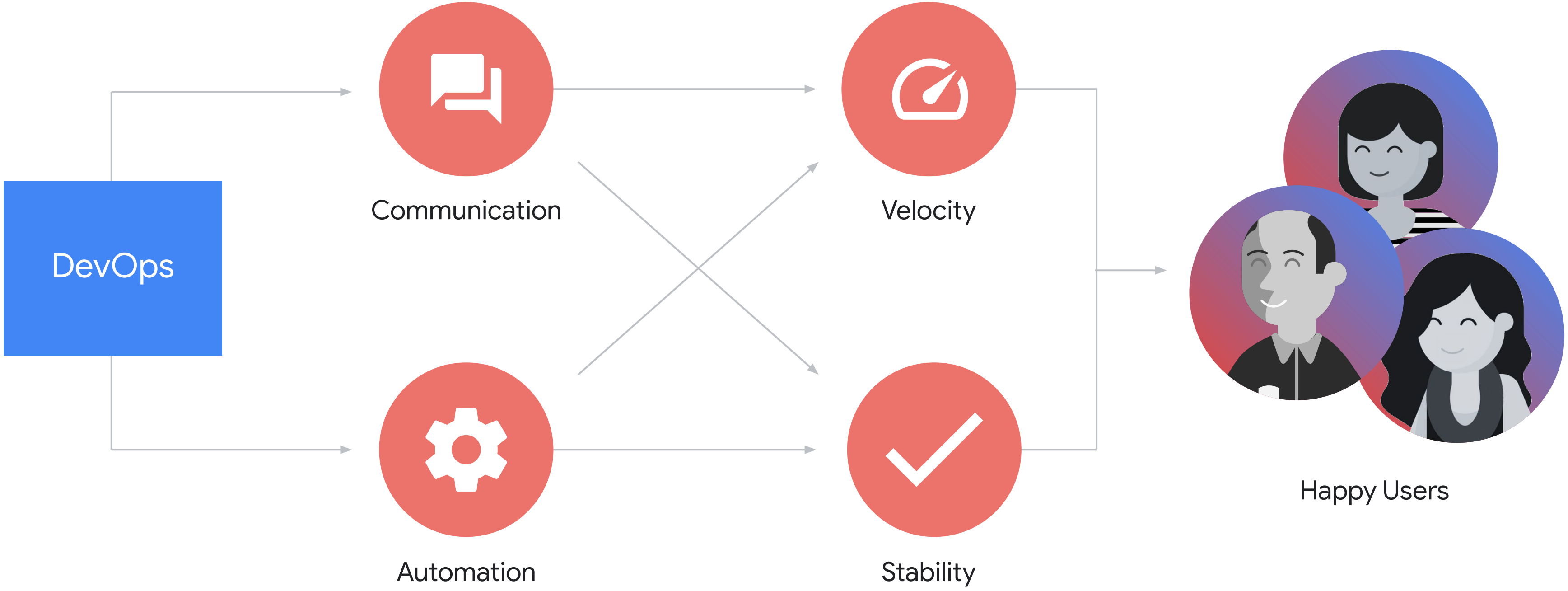
Who's this guy?

@davidstanke

Dave Stanke is a Developer Relations Engineer at Google, where he advises customers on best practices for adopting DevOps and SRE. Throughout his career, he has worn all the hats, including startup CTO, product manager, customer support, software developer, sysadmin, and graphic designer. He holds an MS in Technology Management from Columbia University.

Dave wrote about DevOps and SRE in the 2021 State of DevOps report.

What’s DevOps?



DevOps

Communication

Automation

Velocity

Stability

Happy Users

Cool, but...

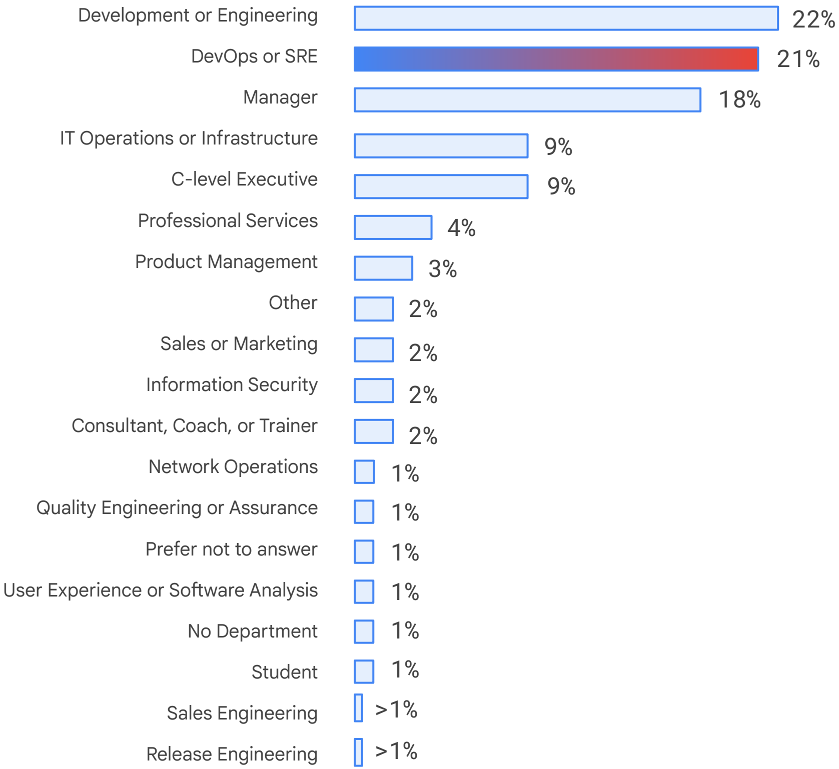
What do we do with that?

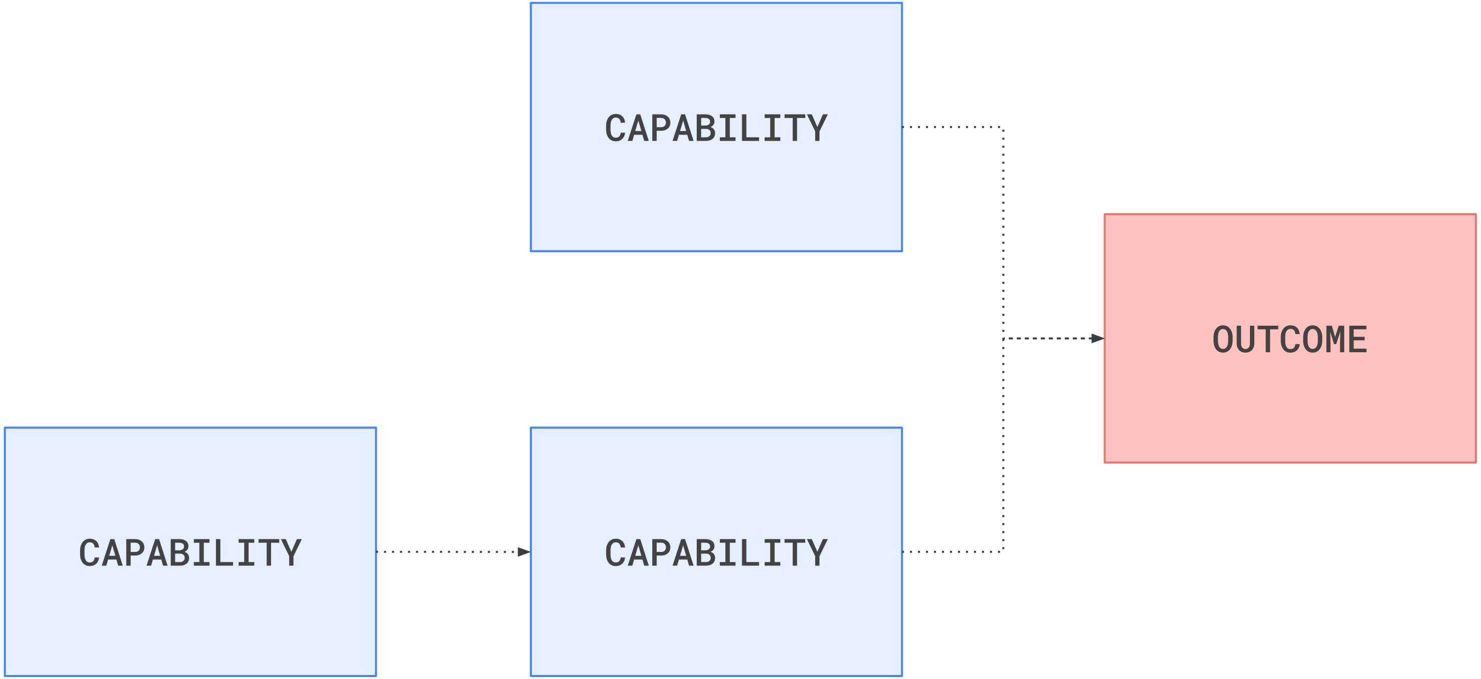
DORA
DEVOPS RESEARCH & ASSESSMENT
+
G

Who do we study?

With **seven years of research** and more than **32,000 survey responses** from industry professionals, the State of DevOps Report showcases the software development and DevOps practices that make teams and organizations most successful.

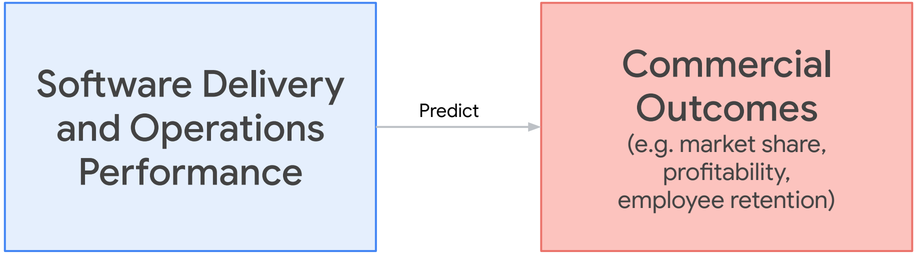
For this year's report, **1200 working professionals from a variety of industries around the globe** shared their experiences to help grow our understanding of the factors that drive higher performance.

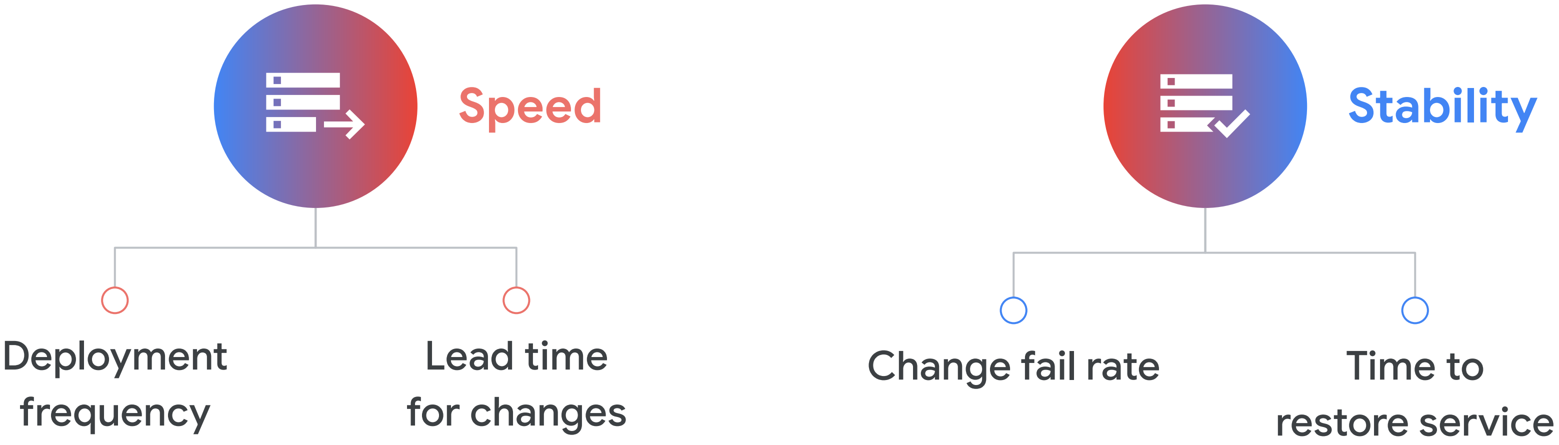



CAPABILITY
CAPABILITY
CAPABILITY
OUTCOME

But why?

Commercial Outcomes
(e.g. market share,
profitability,
employee retention)


Software Delivery and Operations Performance
Predict
Commercial Outcomes
(e.g. market share, profitability, employee retention)



Speed

Deployment frequency

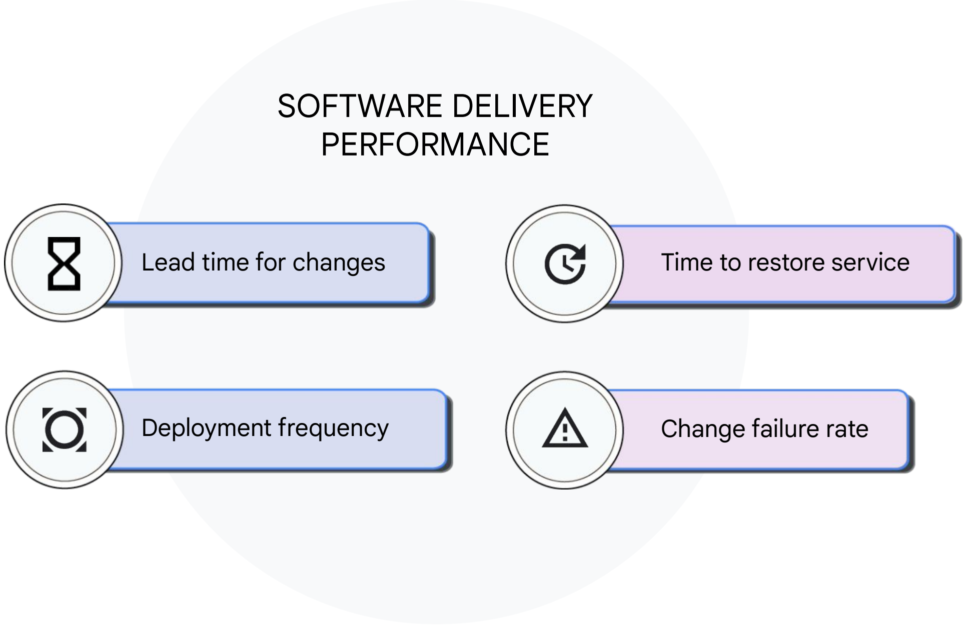
Lead time for changes

Stability

Change fail rate

Time to restore service

Four Keys to Software Delivery success



SOFTWARE DELIVERY PERFORMANCE

- Lead time for changes
- Time to restore service
- Deployment frequency
- Change failure rate

Software delivery performance at a glance

Aspect of Software Delivery Performance	Elite	High	Medium	Low
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?	On-demand (multiple deploys per day)	Between once per week and once per month	Between once per month and once every 6 months	Fewer than once per six months
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)?	Less than one hour	Between one day and one week	Between one month and six months	More than six months
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)?	Less than one hour	Less than one day	Between one day and one week	More than six months
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)?	0%-15%	16%-30%	16%-30%	16%-30%

What's so special about Elite performers?

973x

more frequent
code deployments

6570x

faster lead time
to deploy

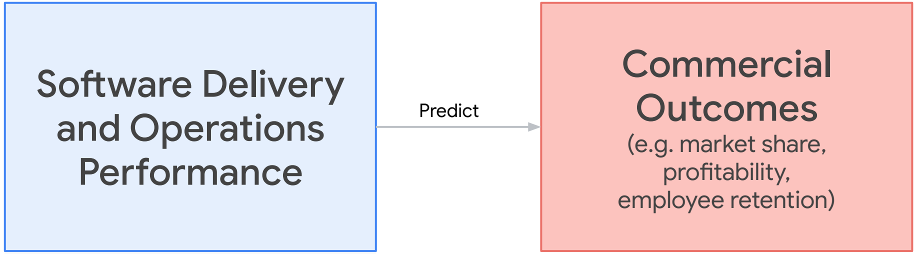
Yes, you read correctly.
This is not an error.

3x

lower change failure rate
(changes are 1/3 as likely to fail)

6570x

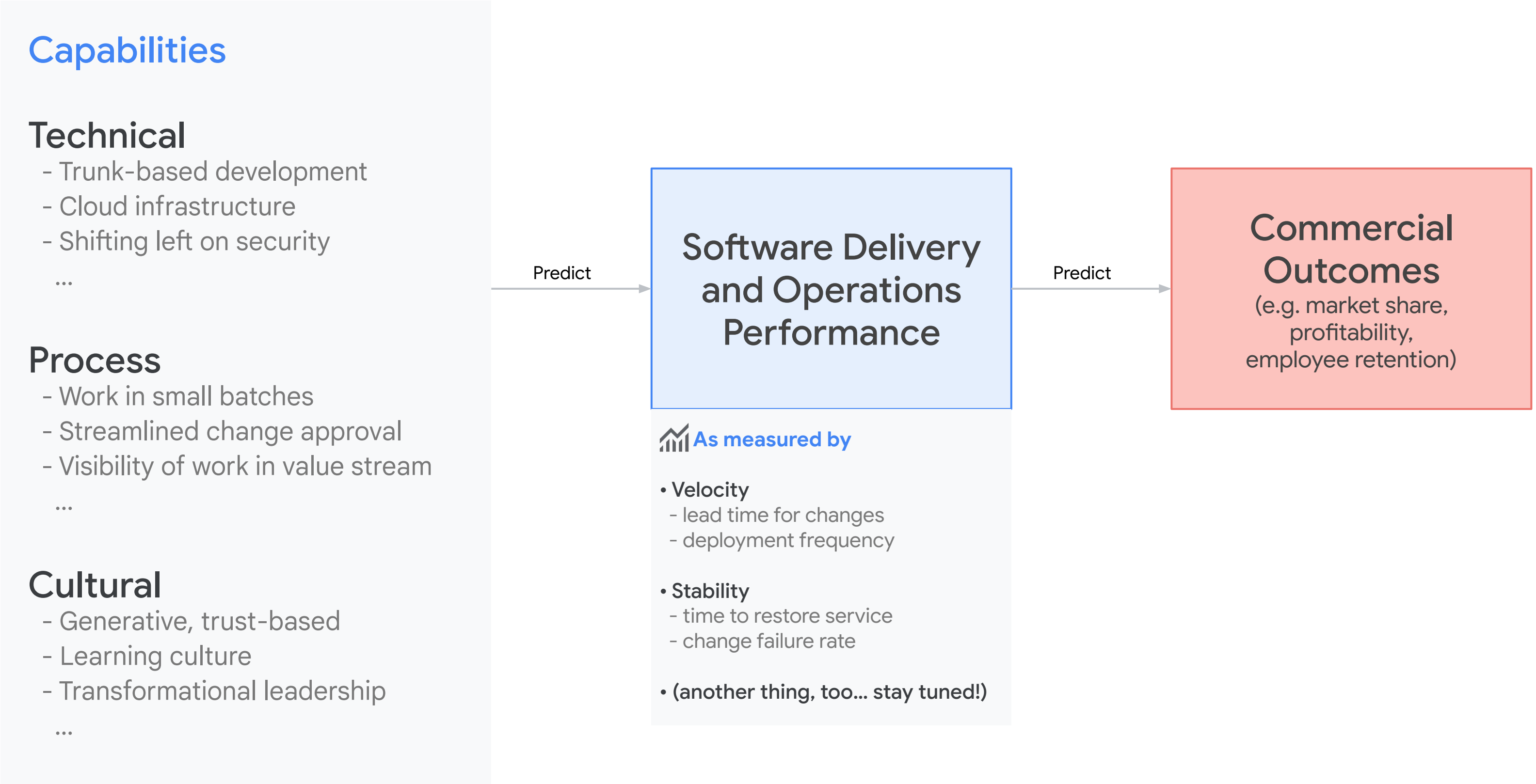
faster time to recover
from incidents



Software Delivery and Operations Performance
Predict
Commercial Outcomes
(e.g. market share, profitability, employee retention)

As measured by

- Velocity
  - lead time for changes
  - deployment frequency
- Stability
  - time to restore service
  - change failure rate
- (another thing, too... stay tuned!)



Capabilities

Technical

- Trunk-based development
- Cloud infrastructure
- Shifting left on security

...

Process

- Work in small batches
- Streamlined change approval
- Visibility of work in value stream

...

Cultural

- Generative, trust-based
- Learning culture
- Transformational leadership

...

Predict

Software Delivery and Operations Performance

As measured by

- **Velocity**
  - lead time for changes
  - deployment frequency
- **Stability**
  - time to restore service
  - change failure rate
- (another thing, too... stay tuned!)

Predict

Commercial Outcomes

(e.g. market share, profitability, employee retention)

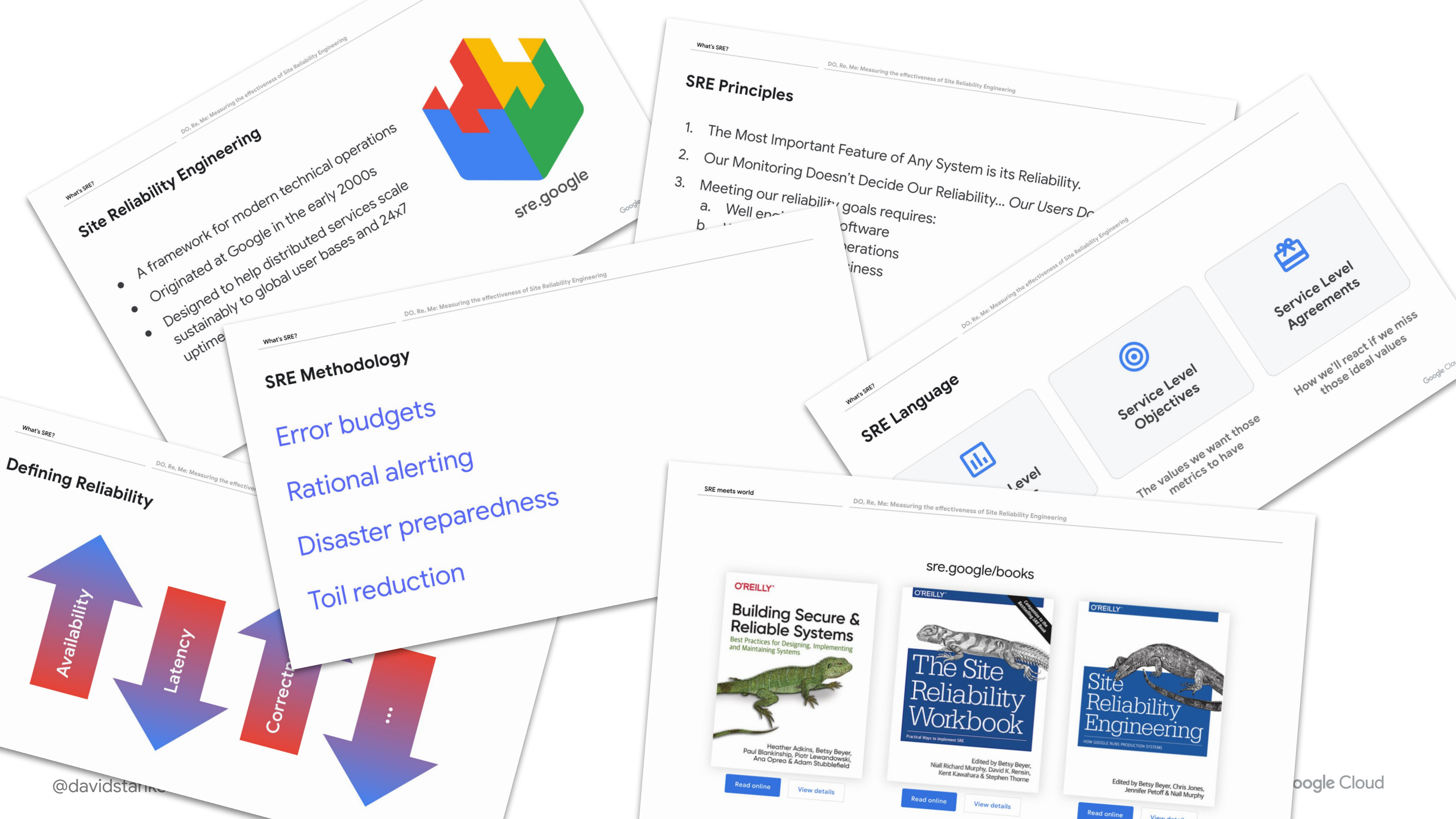
Google Cloud

State of DevOps 2021

Sponsored by armory circleci redgate Deloitte. GitLab Liquibase PagerDuty CD.FOUNDATION

bit.ly/dora-sodr

What’s SRE?



What's SRE?

DO, Re, Me: Measuring the effectiveness of Site Reliability Engineering

Site Reliability Engineering

- A framework for modern technical operations
- Originated at Google in the early 2000s
- Designed to help distributed services scale sustainably to global user bases and 24x7 uptime

sre.google

What's SRE?

DO, Re, Me: Measuring the effectiveness of Site Reliability Engineering

SRE Principles

1. The Most Important Feature of Any System is its Reliability.
2. Our Monitoring Doesn't Decide Our Reliability... Our Users Dc
3. Meeting our reliability goals requires:
   a. Well en oftware
   b. erations
   iness

What's SRE?

DO, Re, Me: Measuring the effectiveness of Site Reliability Engineering

SRE Methodology

Error budgets

Rational alerting

Disaster preparedness

Toil reduction

What's SRE?

DO, Re, Me: Measuring the effectiveness of Site Reliability Engineering

SRE Language

Level

Service Level Objectives

The values we want those metrics to have

Service Level Agreements

How we'll react if we miss those ideal values

Google Clou

What's SRE?

DO, Re, Me: Measuring the effectiv

Defining Reliability

SRE meets world

DO, Re, Me: Measuring the effectiveness of Site Reliability Engineering

sre.google/books

O'REILLY

Building Secure & Reliable Systems

Best Practices for Designing, Implementing and Maintaining Systems

Heather Adkins, Betsy Beyer, Paul Blankinship, Piotr Lewandowski, Ana Oprea & Adam Stubblefield

Read online View details

O'REILLY

The Site Reliability Workbook

Practical Ways to Implement SRE

Edited by Betsy Beyer, Niall Richard Murphy, David K. Rensin, Kent Kawahara & Stephen Thorne

Read online View details

O'REILLY

Site Reliability Engineering

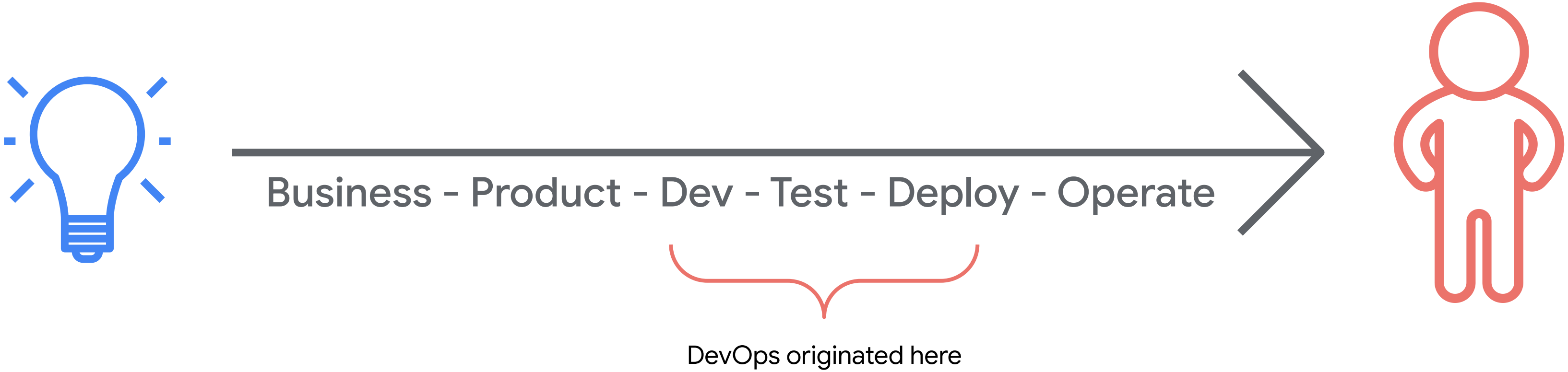
HOW GOOGLE RUNS PRODUCTION SYSTEMS

Edited by Betsy Beyer, Chris Jones, Jennifer Petoff & Niall Murphy

Read online View detail

SRE vs(?) DevOps

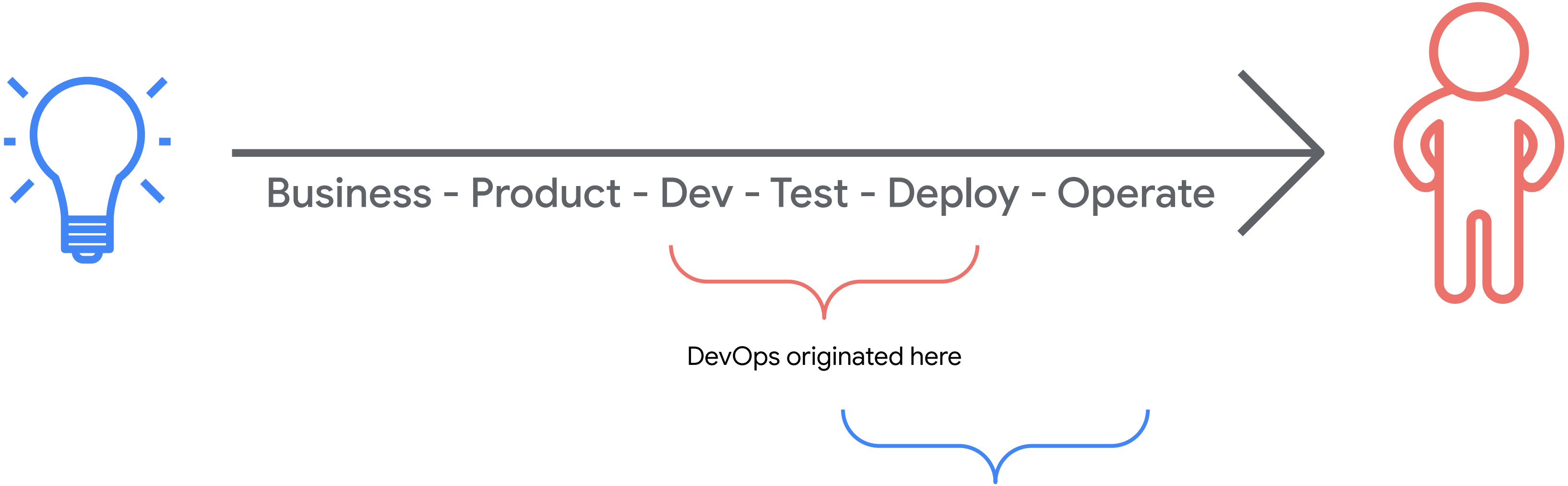
DevOps' original scope



Business - Product - Dev - Test - Deploy - Operate

DevOps originated here

DevOps' original scope



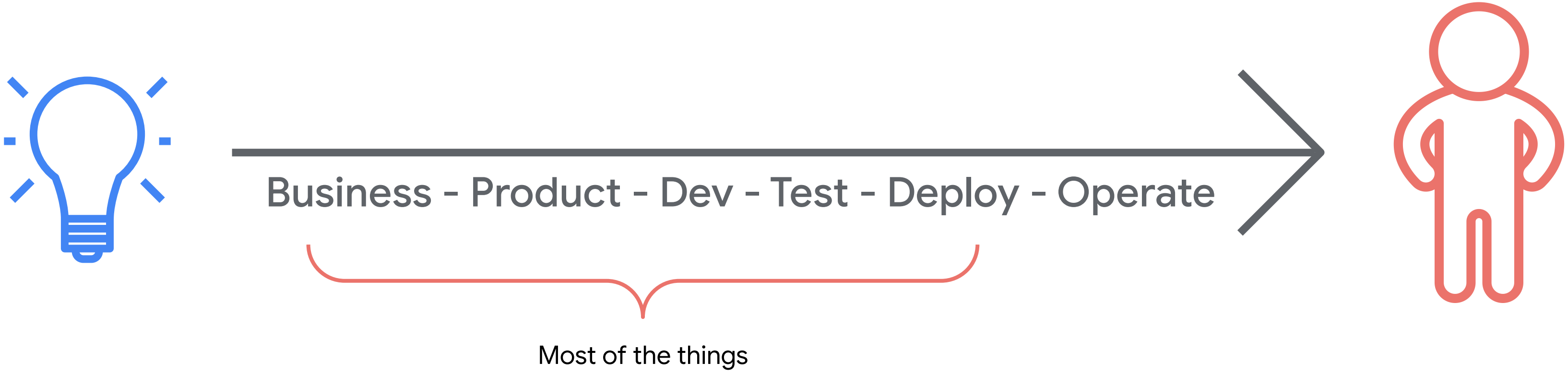
Business - Product - Dev - Test - Deploy - Operate

DevOps originated here

SRE lives mostly around here

DevOps scope creep

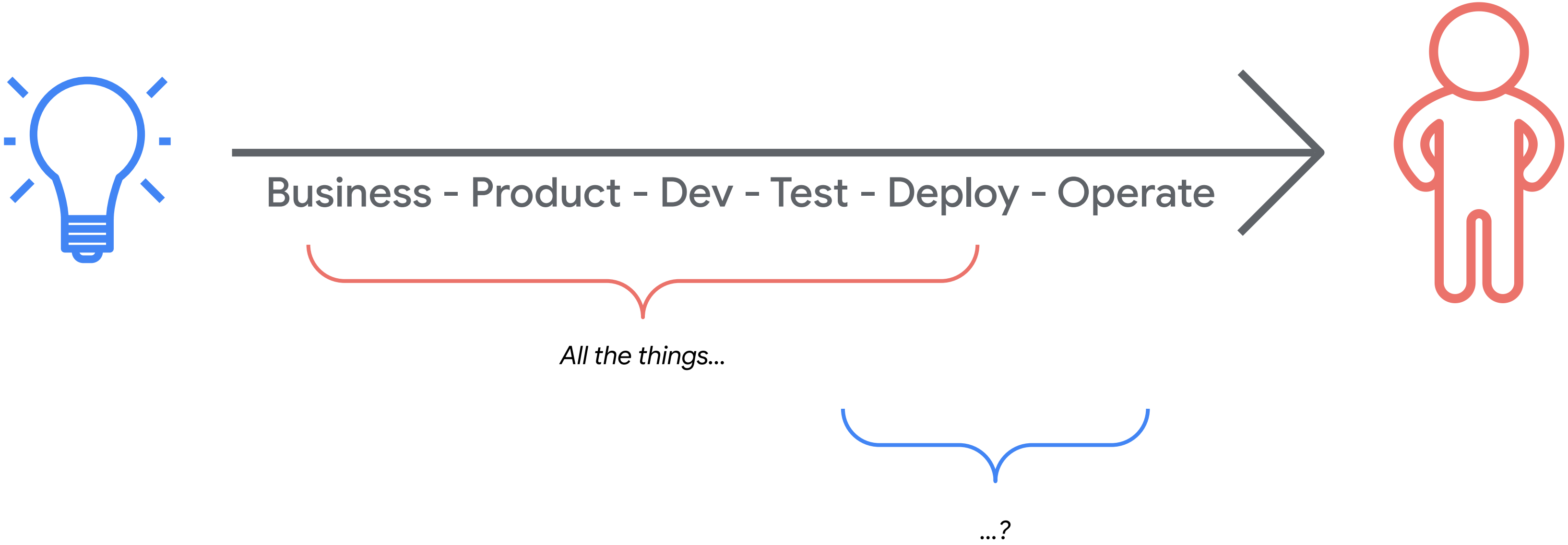
(BizDevOps, DevSecOps, etc)



Business - Product - Dev - Test - Deploy - Operate

Most of the things

Is DevOps *all the things?*



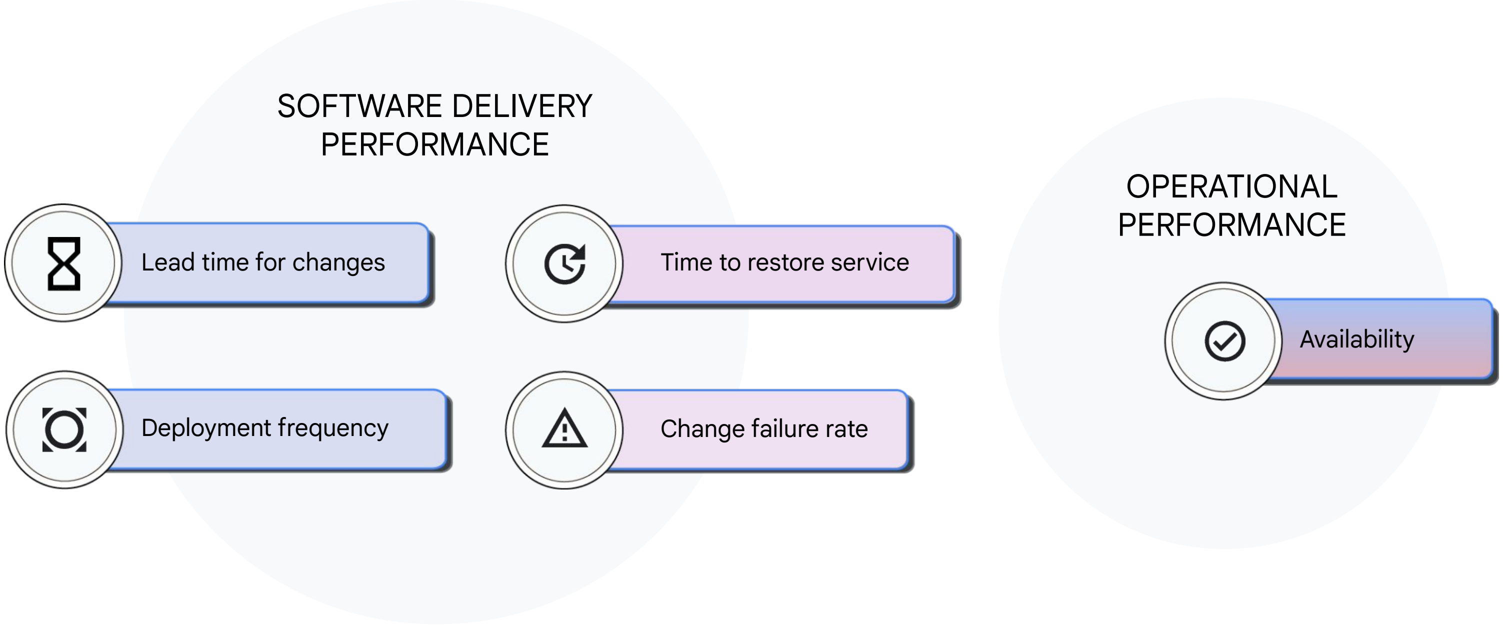
Business - Product - Dev - Test - Deploy - Operate

All the things...

...?

2021: DORA tackles SRE

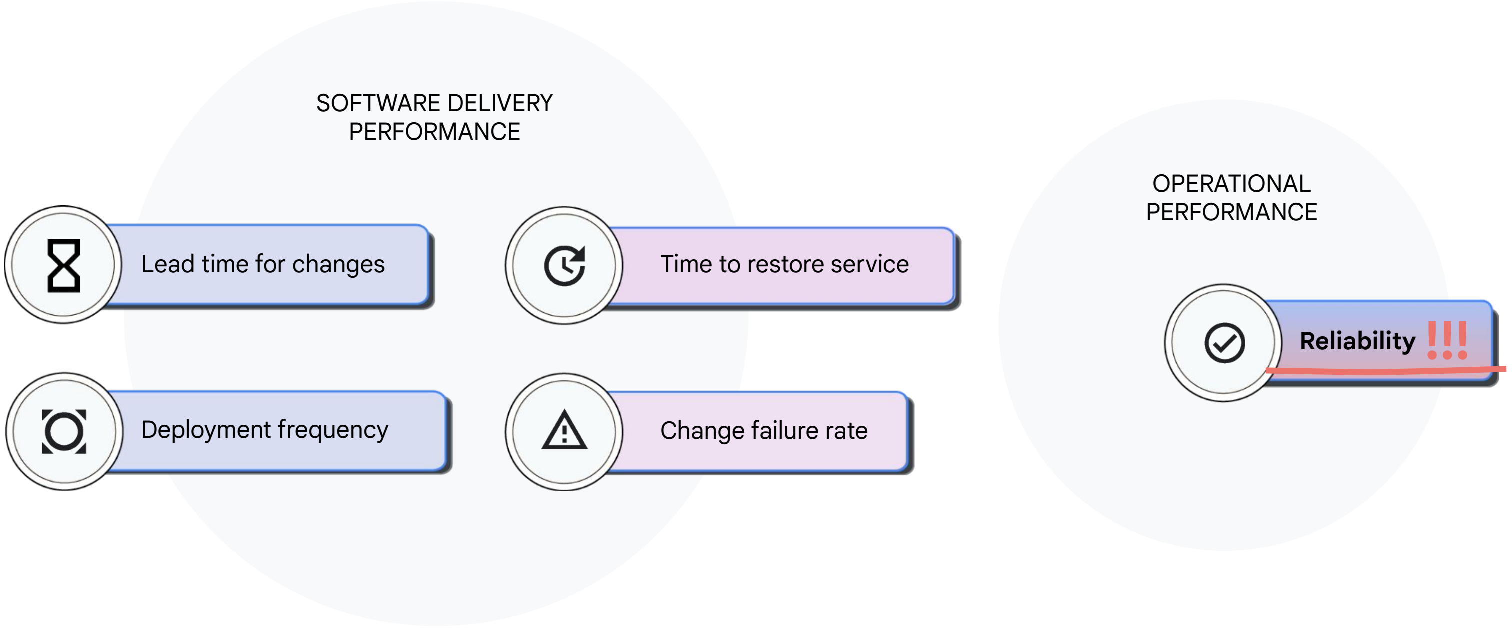
Four + 1
The keys to Software Delivery and Operations



Availability → Reliability

Four + 1

The keys to Software Delivery and Operations



SOFTWARE DELIVERY PERFORMANCE

Lead time for changes

Deployment frequency

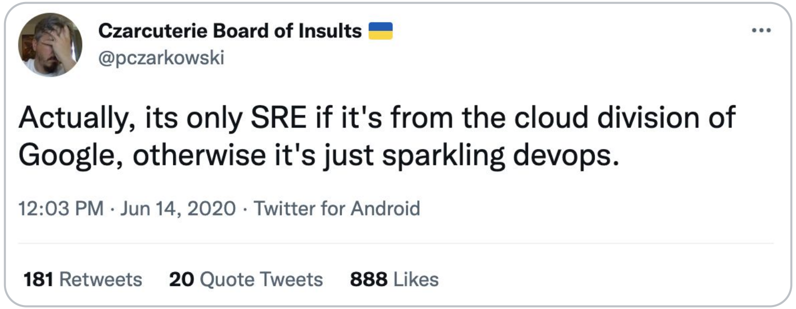
Time to restore service

Change failure rate

OPERATIONAL PERFORMANCE

Reliability !!!

How do we know
if a team is doing SRE?

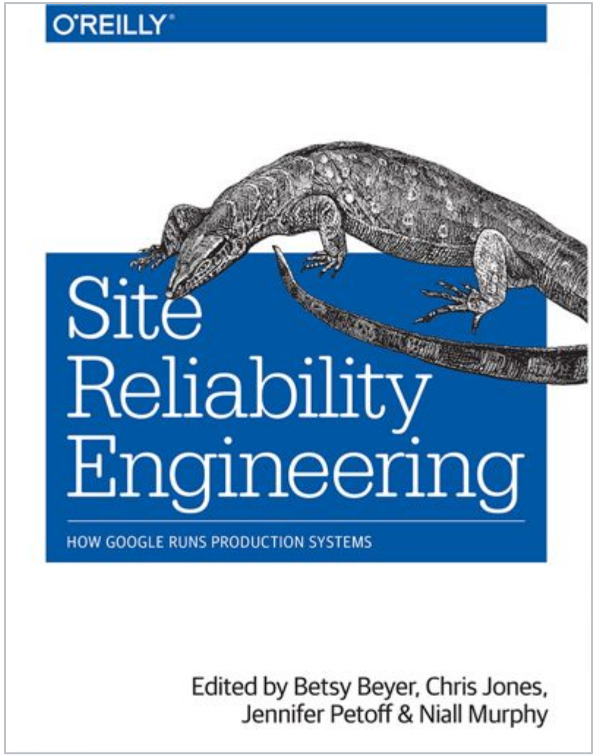


Czarcuterie Board of Insults 🇺🇦
@pczarkowski

Actually, its only SRE if it's from the cloud division of Google, otherwise it's just sparkling devops.

12:03 PM · Jun 14, 2020 · Twitter for Android

181 Retweets **20** Quote Tweets **888** Likes



O'REILLY

Site Reliability Engineering

HOW GOOGLE RUNS PRODUCTION SYSTEMS

Edited by Betsy Beyer, Chris Jones,
Jennifer Petoff & Niall Murphy

Alerts are generated based on service degradation from the perspective of end users or dependent systems (as opposed to system metrics like CPU %, ICMP latency, or disk IO).

My team actively identifies and eliminates, automates, or streamlines repetitive manual work.

My team is empowered to maintain reliability standards throughout the product development process.

Alerts are configured so that humans are only paged when an immediate response is needed.

My team has well-defined protocols and tools for responding to production incidents.

Reliability reviews are performed throughout the development process for all major features on the applications I work on.

My team regularly practices incident response procedures.

My team regularly reviews and revises reliability targets based on evidence.

My team proactively plans for capacity demand using data from multiple sources.

When we miss our availability targets, we perform improvement work and/or re-prioritize.

What did we learn?

1. SRE is widely practiced

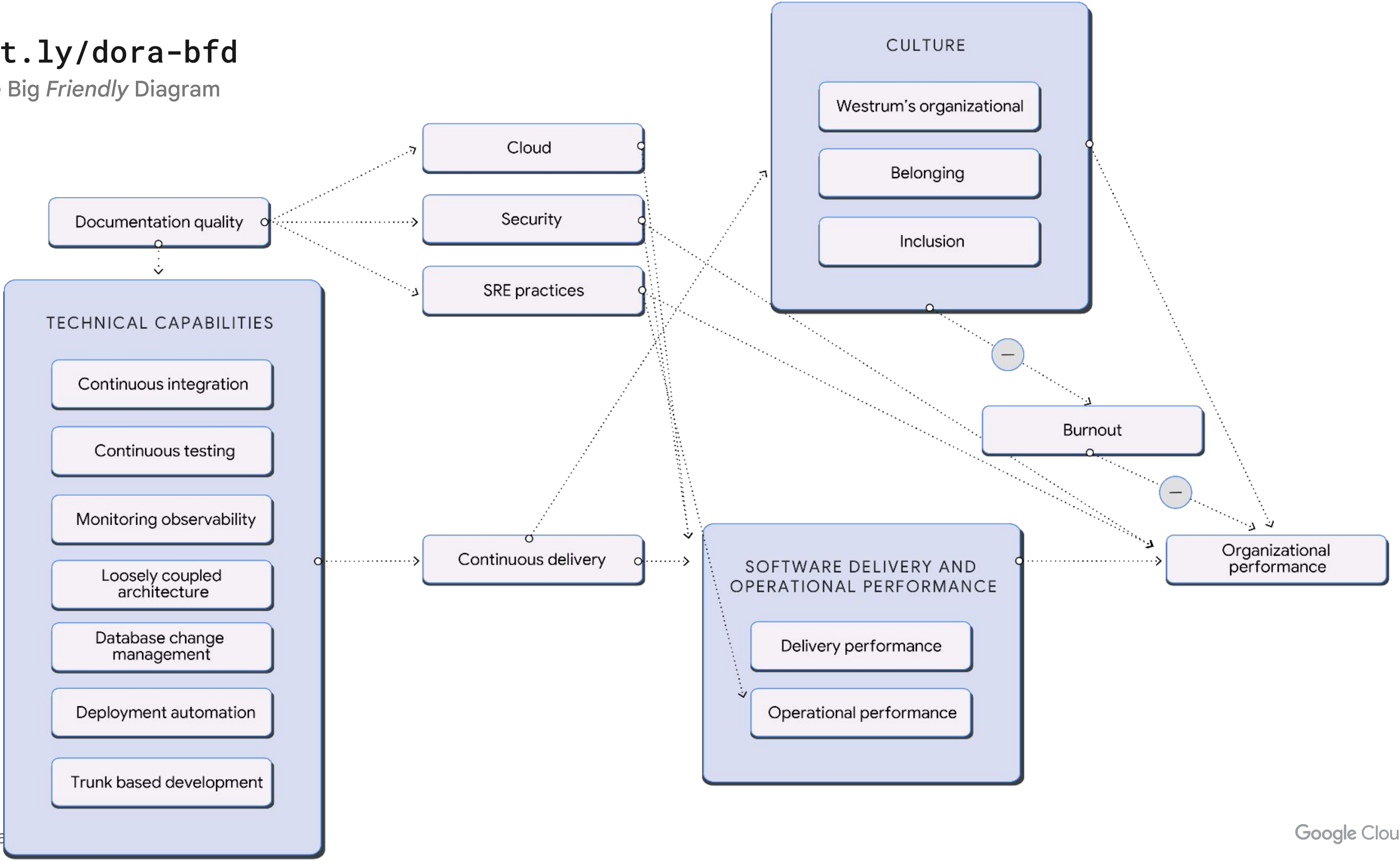
52% of respondents reported the use of SRE practices

(to some degree)

2. SRE is good for humans and systems

bit.ly/dora-bfd

The Big *Friendly* Diagram



Cloud

Security

SRE practices

Documentation quality

TECHNICAL CAPABILITIES

Continuous integration

Continuous testing

Monitoring observability

Loosely coupled architecture

Database change management

Deployment automation

Trunk based development

Continuous delivery

CULTURE

Westrum's organizational

Belonging

Inclusion

Burnout

SOFTWARE DELIVERY AND OPERATIONAL PERFORMANCE

Delivery performance

Operational performance

Organizational performance

Humans

- SRE mitigates burnout
- SRE enables balance between coding and “ops” work

Systems

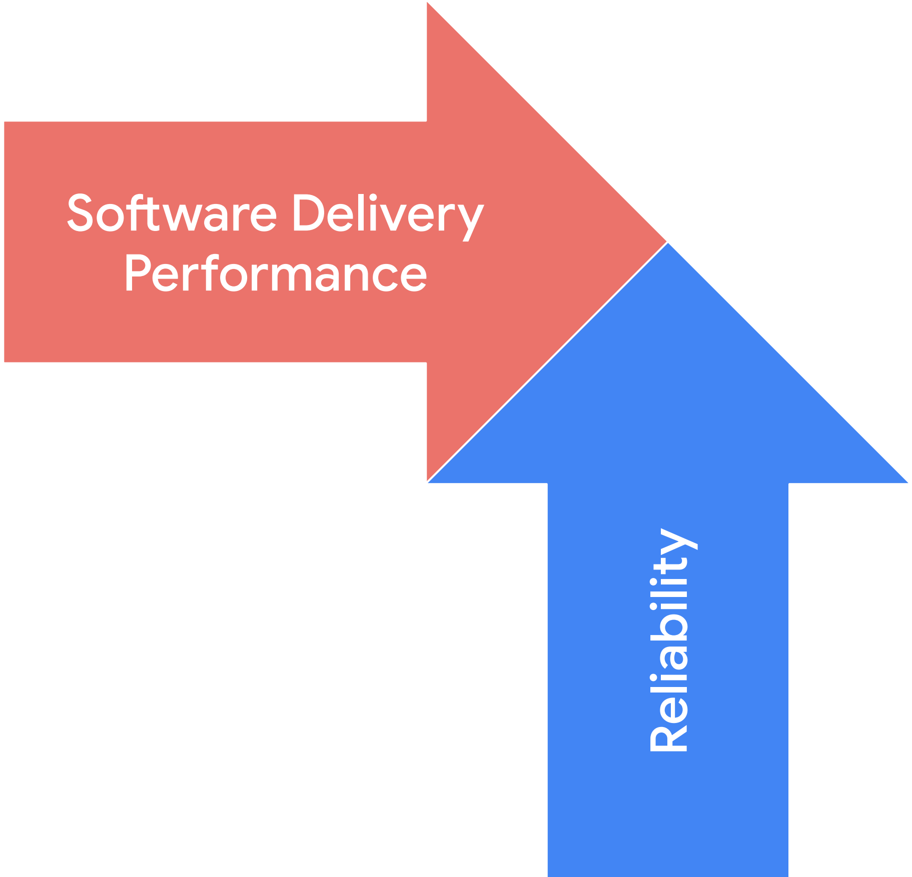
- “Shared responsibility” for operations predicts better r9y outcomes
- SRE predicts higher reliability

Business

- Higher reliability predicts better business outcomes

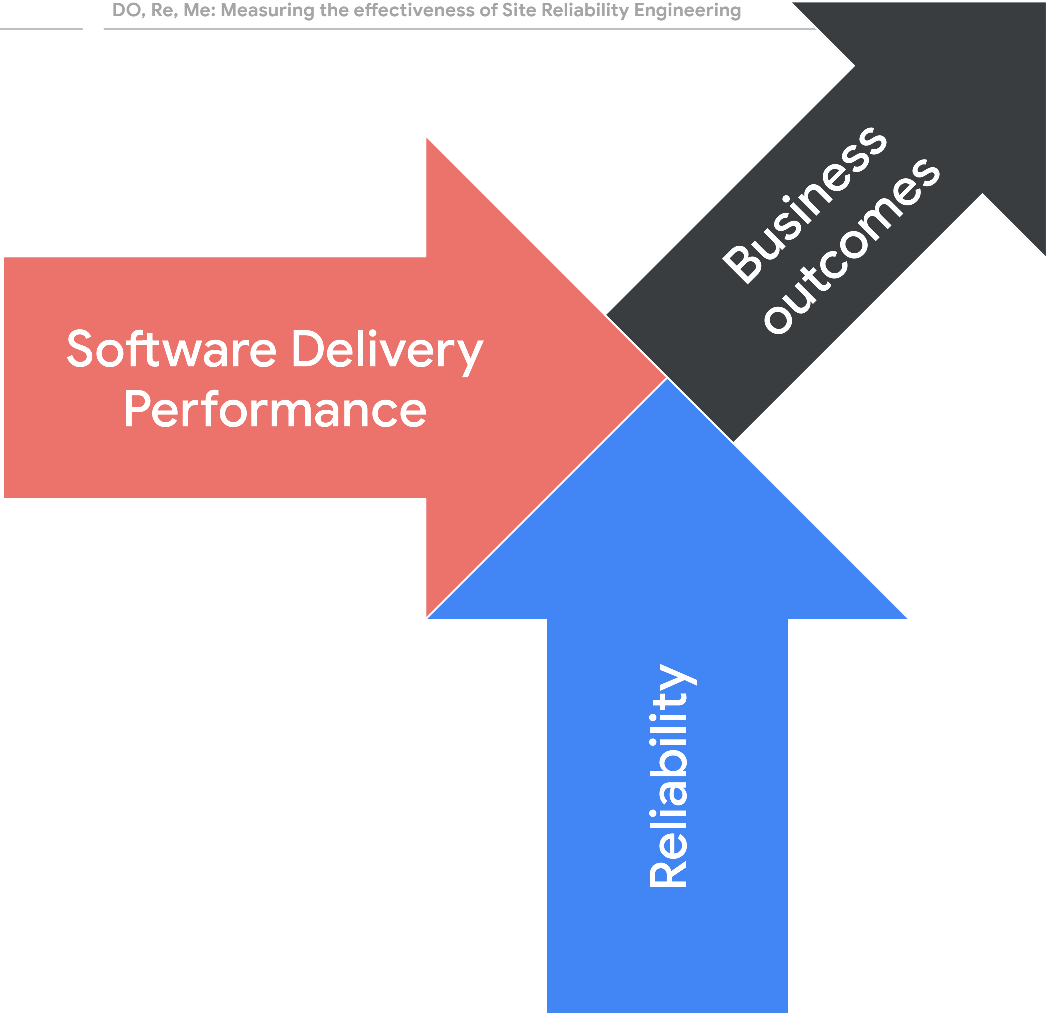
3. Reliability is a force multiplier

Software Delivery Performance



Software Delivery Performance

Reliability


Software Delivery Performance
Reliability
Business outcomes

4. There’s room for growth

Dave’s Hot Takes

Dave's Hot Take #1:

SRE implements part of DevOps

Dave’s Hot Take #2:

DevOps culture ≈ SRE culture ≈ TPS ≈ psych safety ≈ [...]

Dave’s Hot Take #3:

Ops is still Ops

Thank you.

What questions do you have?

Want more?

bit.ly/dora-sodr

The Accelerate State of DevOps report 2021

sre.google

Books, articles, resources

bit.ly/r9y-discuss

Reliability Engineering Discussion Group