

How to be *Wrong*

or ... “How to be Great at Being Wrong”

Russ Miles - @russmiles











We're going **(insert latest trend here)!**

So, what's the **problem**?

Stage	NO PROCESS	WATERFALL	AGILE	CLOUD NATIVE	NEXT
CULTURE What is the culture of the organisation?	Individualist	Predictive	Iterative	Collaborative	Experimental
PROD/SERVICE DESIGN What drives design decisions?	Arbitrary	Feature-driven	Functional	Market driven	Data driven, strategic
TEAM How is the team organised?	No organisation, single contributor	Hierarchy	Cross-functional teams	DevOps / SRE	Multi-disciplinary, de-centralized
PROCESS What is the collaboration process like?	Random	Waterfall	Scrum/Kanban	Cloud Native	Distributed, self-organized
ARCHITECTURE What is the application architecture?	Emerging	Tightly coupled monolith	Client server	Microservices	Functions
MAINTENANCE How is the app monitored and maintained?	Respond to users complaints	Ad-hoc monitoring	Alerting	Comprehensive monitoring	Self healing
DELIVERY How is the software and updates delivered?	Major version release	Monthly releases	Continuous Integration	Continuous Delivery	Continuous Deployment
PROVISIONING How is infrastructure set up?	Manual	Scripted	Puppet/Chef /Ansible	Orchestration, Kubernetes, Mesos	Serverless
INFRASTRUCTURE What infrastructure is the app running on?	Single server	Multiple servers	VMS	Hybrid cloud	Unikernels

And even when you “get there”...

A stylized, symmetrical sun or starburst graphic with a dark blue silhouette of a creature in the center. The sun has a bright yellow and orange core with sharp, flame-like rays extending outwards. The creature is a dark blue silhouette of a creature, possibly a dragon or a large beast, with its wings spread and its head turned towards the left. The creature is positioned in the center of the sun, creating a high-contrast image.

THE NIGHT IS DARK AND
FULL OF TERRORS

Why?



Photo by Nikolas Noonan on Unsplash

COMPLEX

PROBE - SENSE - RESPOND

Emergent

COMPLICATED

SENSE - ANALYZE - RESPOND

Good Practice

DISORDER

CHAOTIC

ACT - SENSE - RESPOND

Novel

OBVIOUS

SENSE - CATEGORIZE - RESPOND

Best Practice

COMPLEX

PROBE - SENSE - RESPOND

Emergent

COMPLICATED

SENSE - ANALYZE - RESPOND

Good Practice

DISORDER

YOU ARE NOT HERE

CHAOTIC

ACT - SENSE - RESPOND

Novel

OBVIOUS

SENSE - CATEGORIZE - RESPOND

Best Practice

COMPLEX

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Good Practice

ARE YOU HERE?

DISORDER

CHAOTIC

ACT - SENSE - RESPOND

Novel

OBVIOUS

SENSE - CATEGORIZE - RESPOND

Best Practice

Distributed systems?

External dependencies?

COMPLEX

PROBE - SENSE - RESPOND

Emergent

ARE YOU HERE?

COMPLICATED

SENSE - ANALYZE - RESPOND

Good Practice

DISORDER

CHAOTIC

ACT - SENSE - RESPOND

Novel

OBVIOUS

SENSE - CATEGORIZE - RESPOND

Best Practice

Systems that evolve quickly?

COMPLEX

PROBE - SENSE - RESPOND

Emergent

COMPLICATED

SENSE - ANALYZE - RESPOND

Good Practice

DISORDER

YOU ARE HERE

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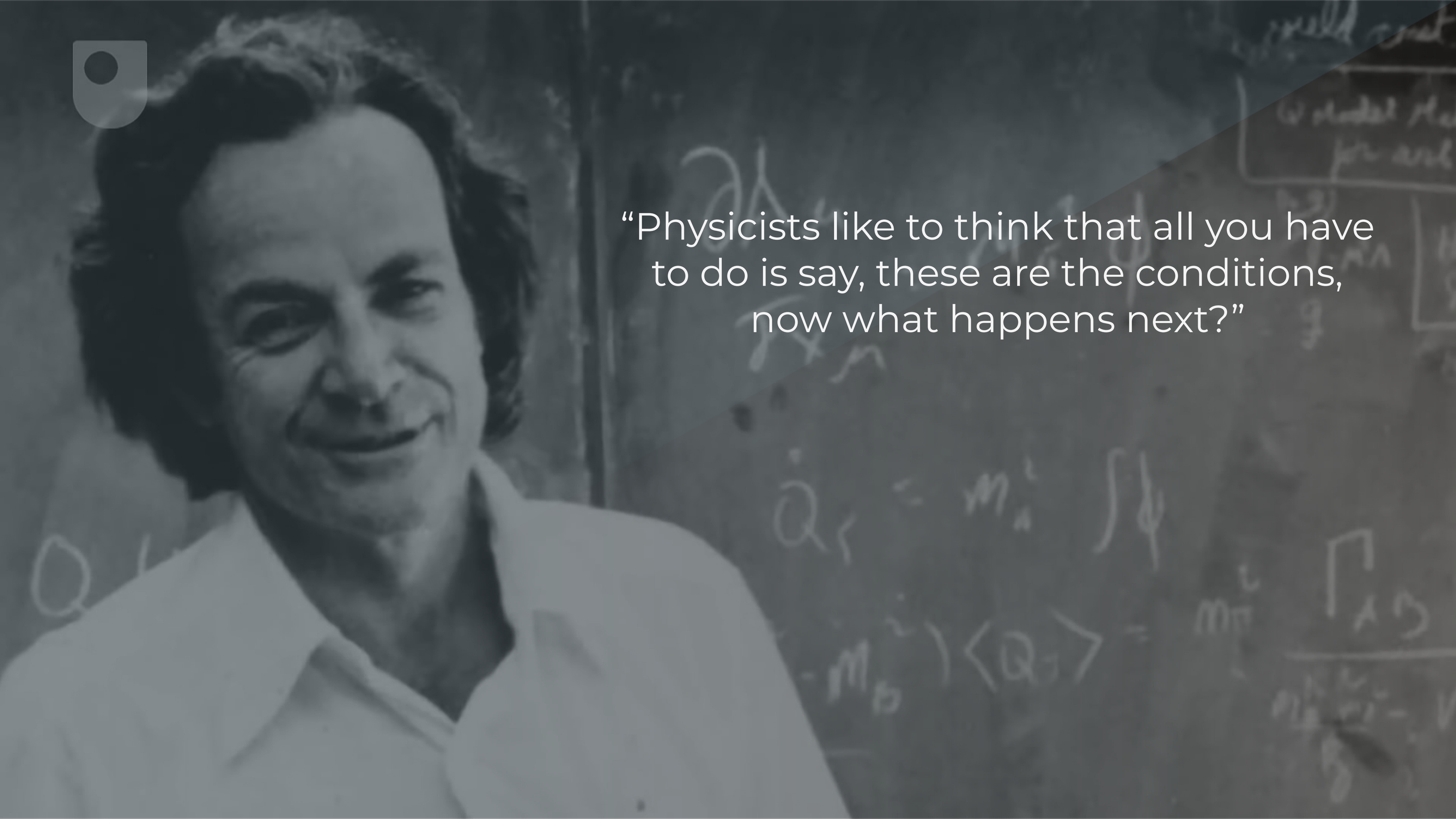


“The things that change the world, according to Chaos theory, are the tiny things. A butterfly flaps its wings in the Amazonian jungle, and subsequently a storm ravages half of Europe.”

Good Omens,
Terry Pratchett and Neil Gaiman

You're working with **non-linear, dynamic systems...**

And you want them to **know** they **work**...



“Physicists like to think that all you have to do is say, these are the conditions, now what happens next?”

But... “Incidents”

What is “*Wrong*”?

And why are we ***scared*** of it?

“not correct or true; incorrect.”

**“an injurious, unfair, or unjust
act”...**

...“action or conduct *inflicting harm without due provocation or just cause*”

“a *violation* or *invasion* of the
legal rights of another”

When are **we *ever*** wrong?

“the state of being mistaken or
incorrect”






I've got some bad news for you...



We're wrong all the time.

October 21 post-incident analysis

 Oct 30, 2018  jasoncwarner  Engineering

Last week, GitHub experienced [an incident](#) that resulted in degraded service for 24 hours and 11 minutes. While portions of our platform were not affected by this incident, multiple internal systems were affected which resulted in our displaying of information that was out of date and inconsistent. Ultimately, no user data was lost; however manual reconciliation for a few seconds of database writes is still in progress. For the majority of the incident, GitHub was also unable to serve webhook events or build and publish GitHub Pages sites.

All of us at GitHub would like to sincerely apologize for the impact this caused to each and every one of you. We're aware of the trust you place in GitHub and take pride in building resilient systems that enable our platform to remain highly available. With this incident, we failed you, and we are deeply sorry. While we cannot undo the problems that were created by GitHub's platform being unusable for an extended period of time, we can explain the events that led to this incident, the lessons we've learned, and the steps we're taking as a company to better ensure this doesn't happen again.

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Why is wrong *scary*?

Risk?

Consequences.

Why *us*?!

Two factors

Feature Velocity

Striving for Reliability

Feature Velocity ***VS.*** Reliability

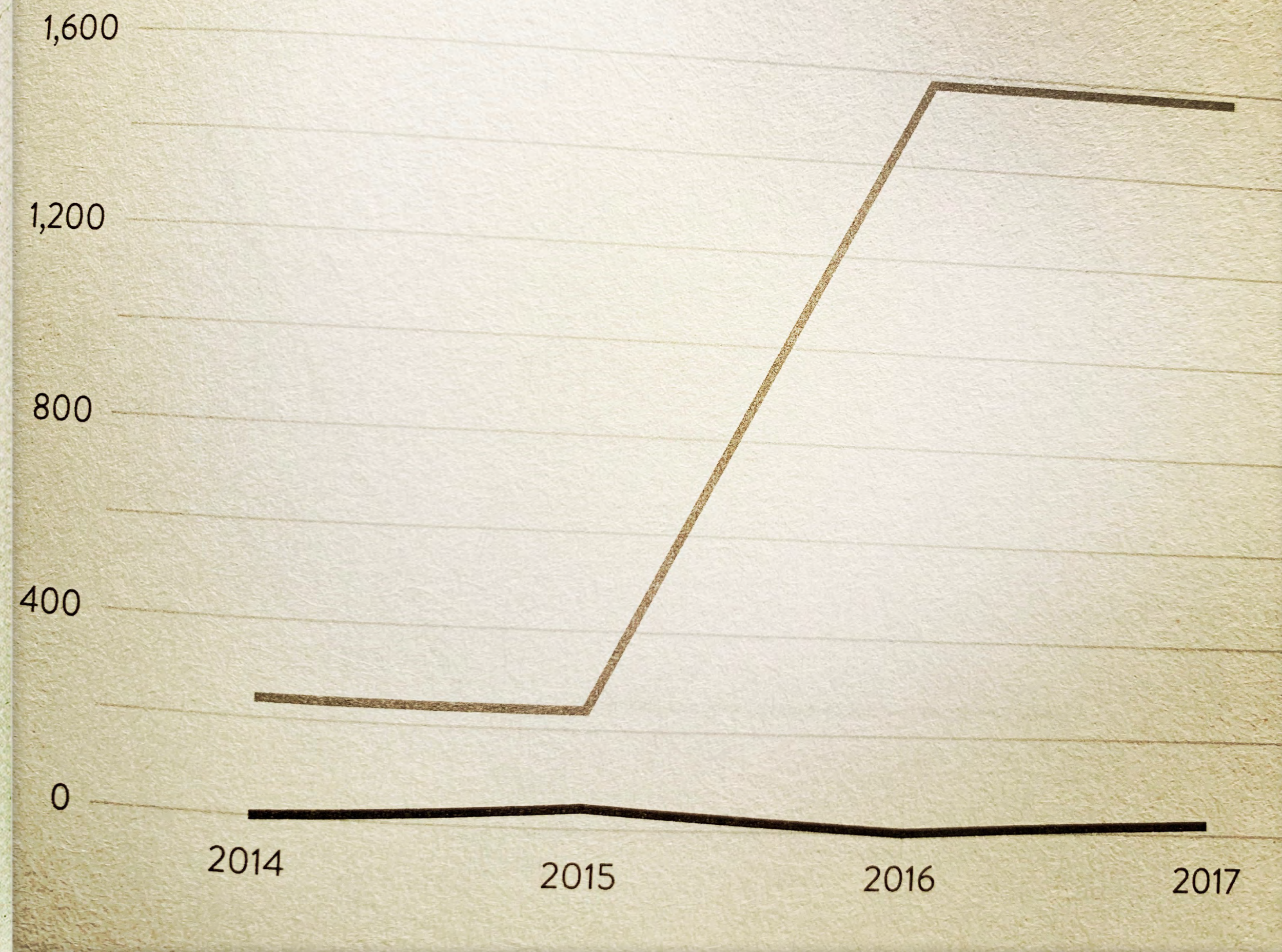
Good news!

No conflict!

Feature Velocity ***VS.*** Reliability

Feature Velocity \neq Reliability

DEPLOY FREQUENCY (# OF DEPLOYS PER YEAR)



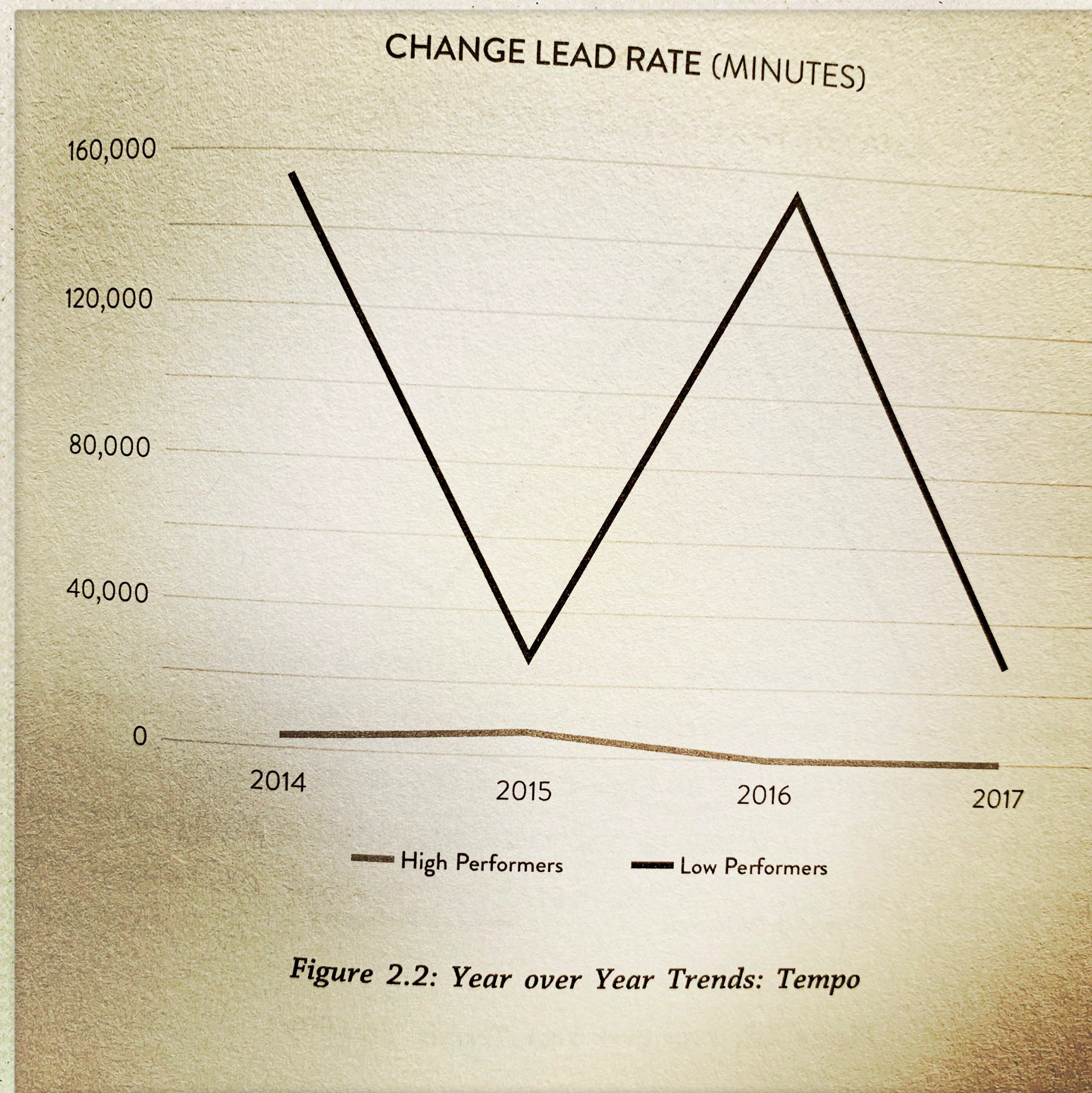
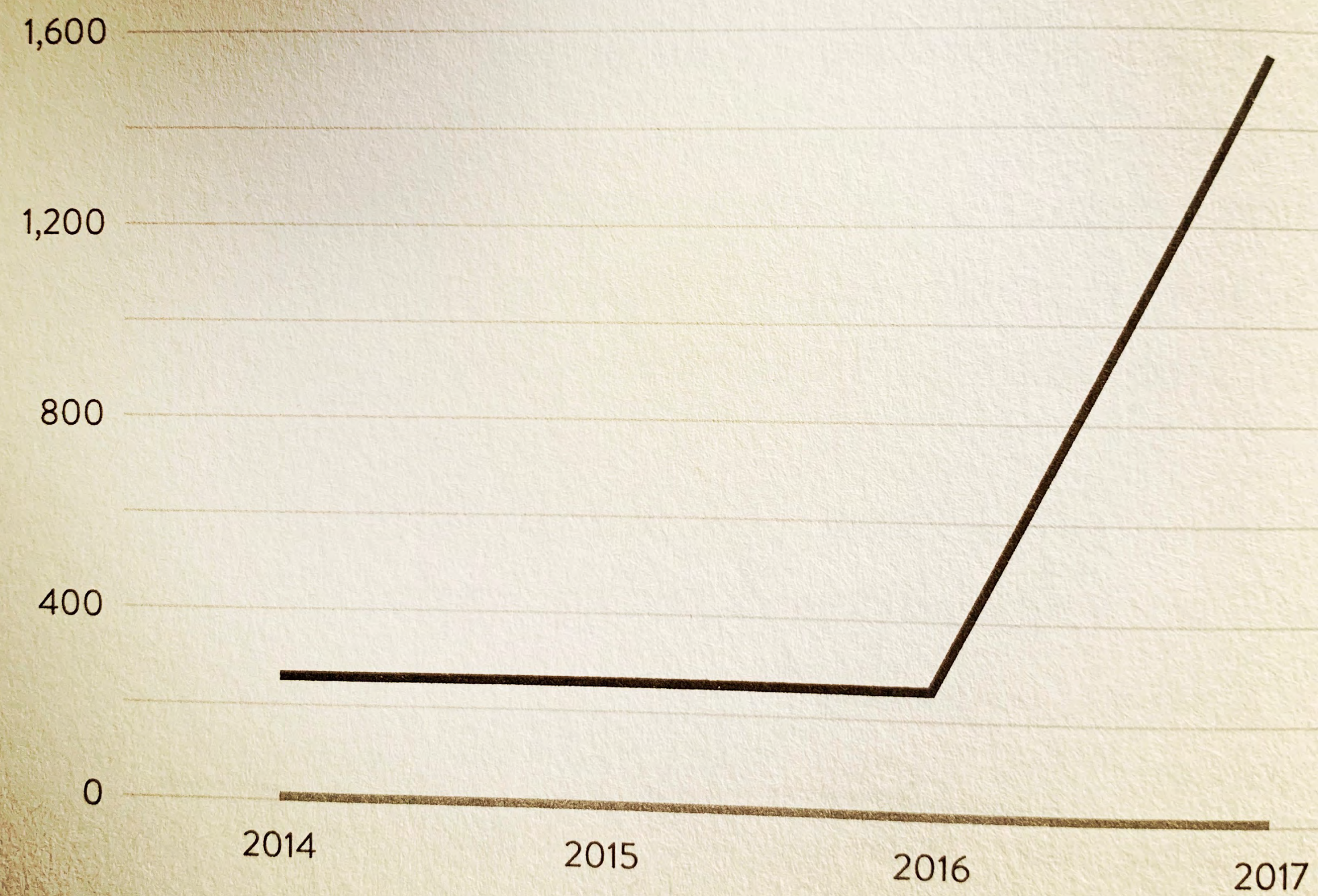


Figure 2.2: Year over Year Trends: Tempo

MEAN TIME TO RECOVERY (HOURS)



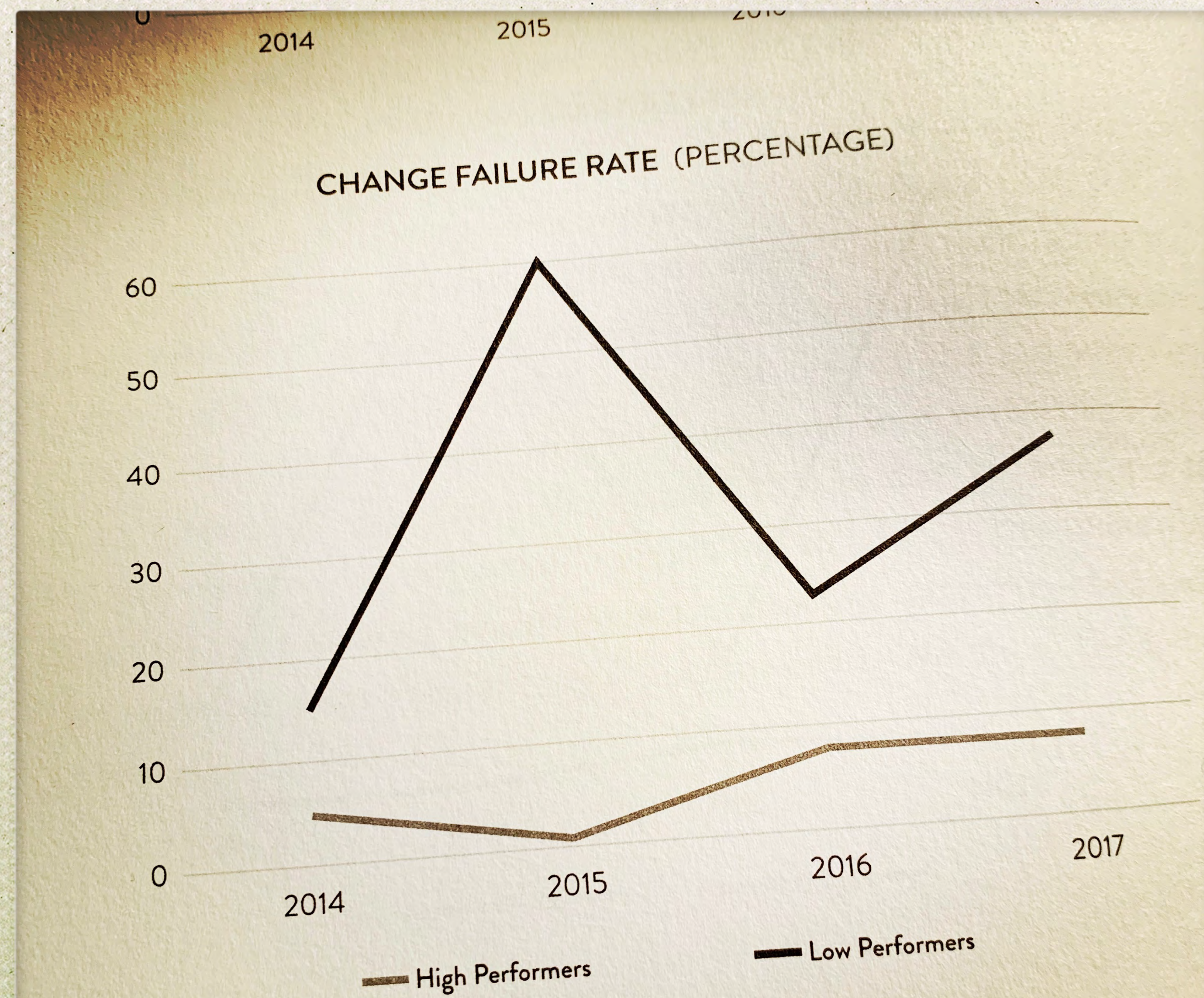
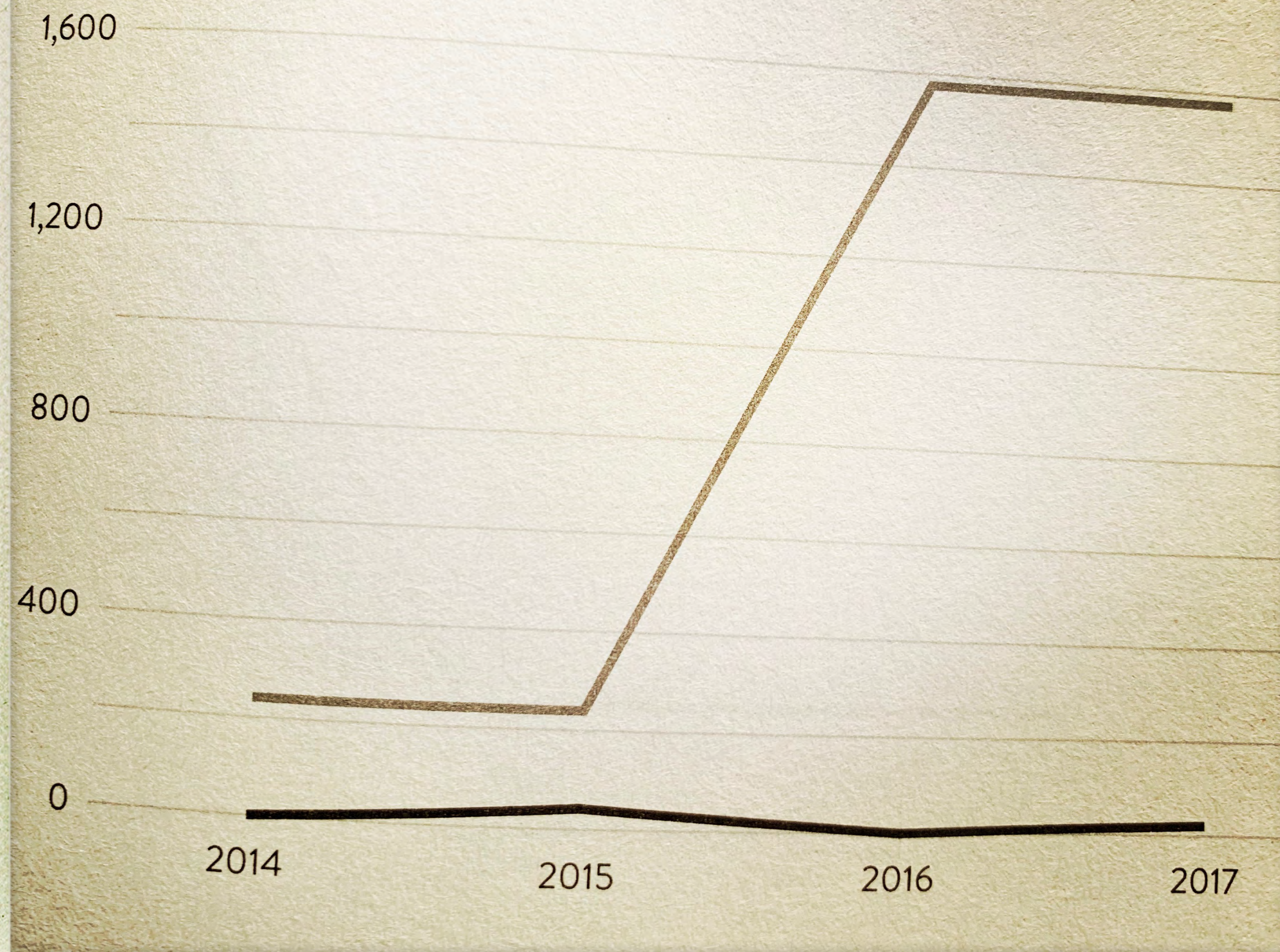


Figure 2.3: Year over Year Trends: Stability

Feature Velocity ***VS.*** Reliability

Feature Velocity \neq Reliability

DEPLOY FREQUENCY (# OF DEPLOYS PER YEAR)



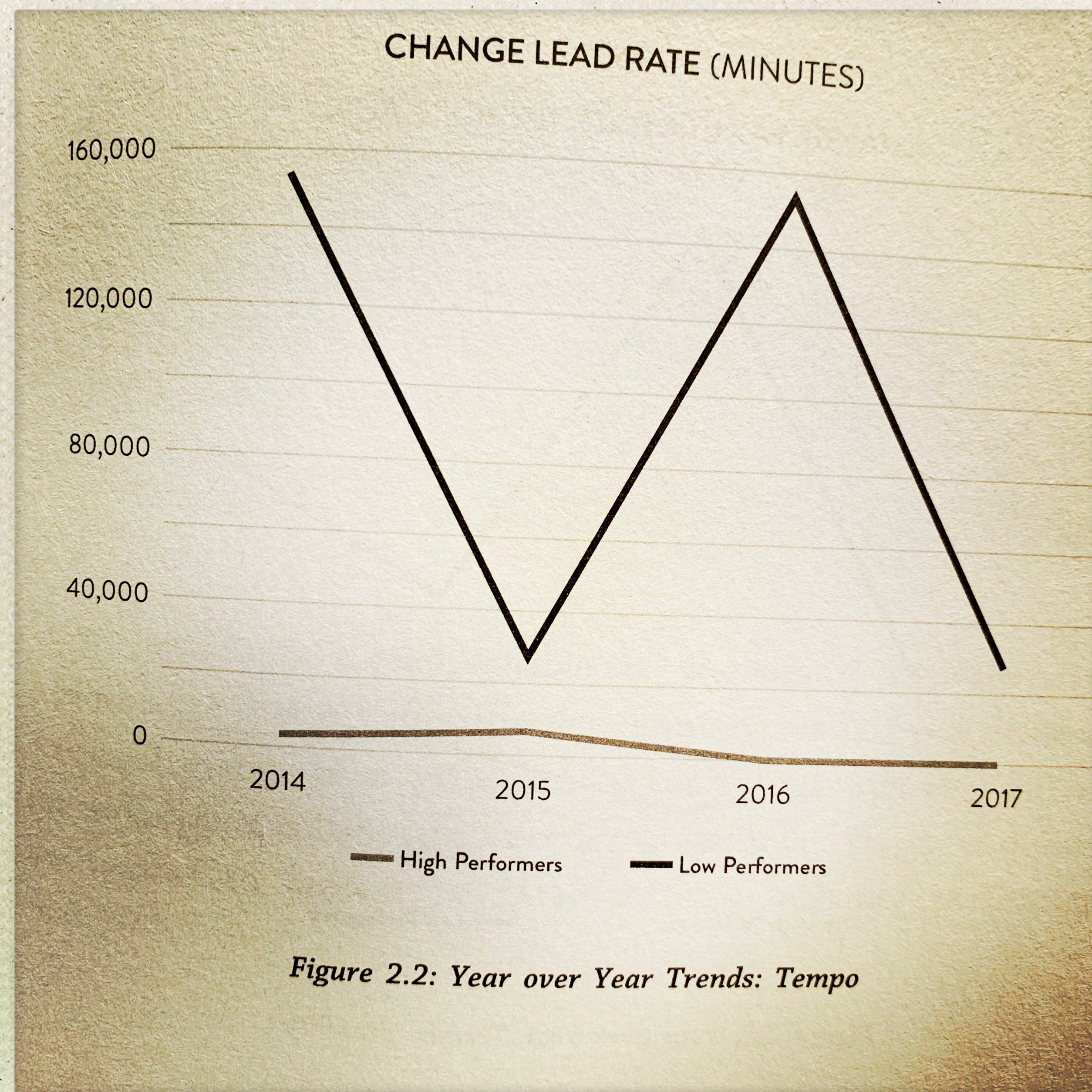
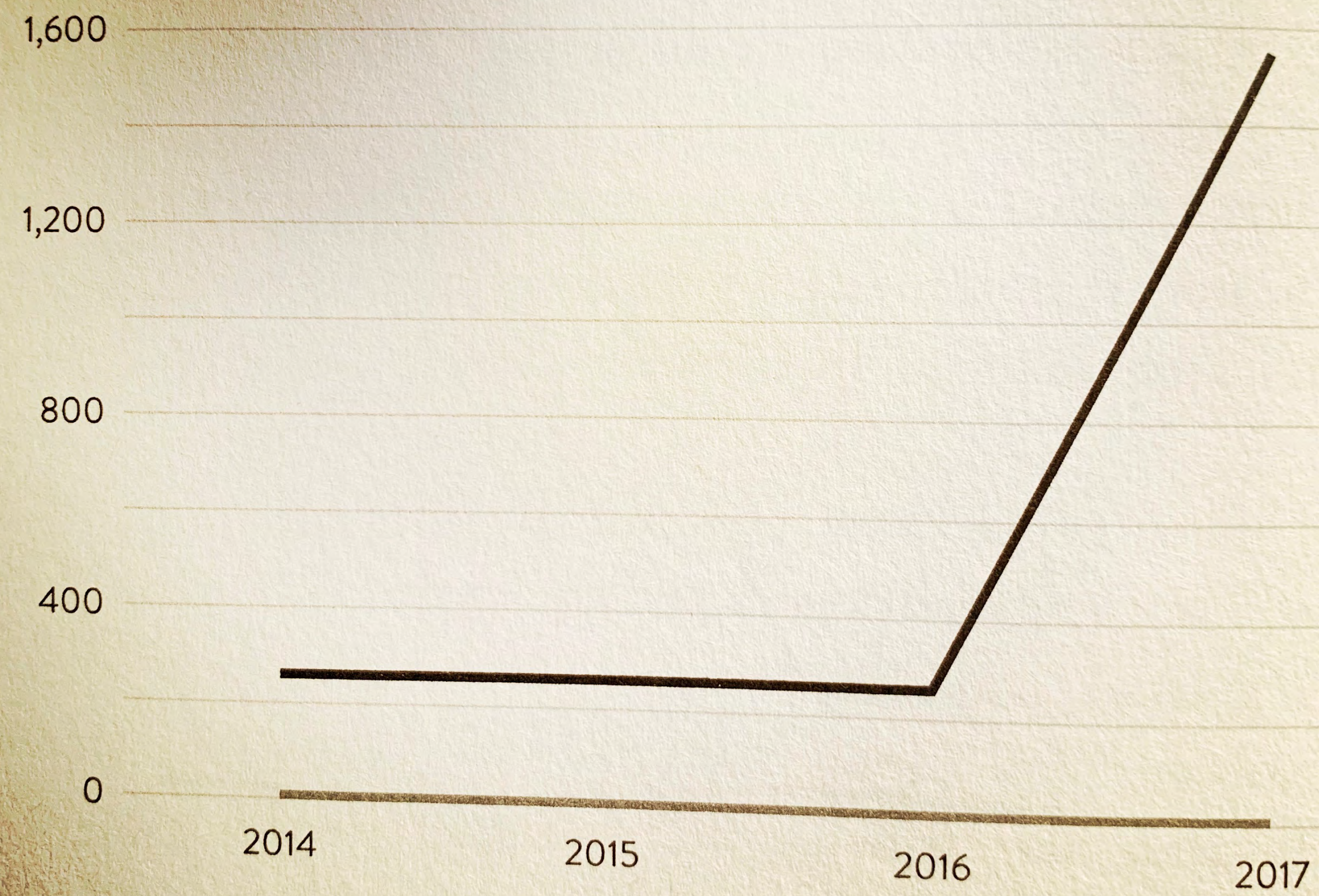


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MEAN TIME TO RECOVERY (HOURS)



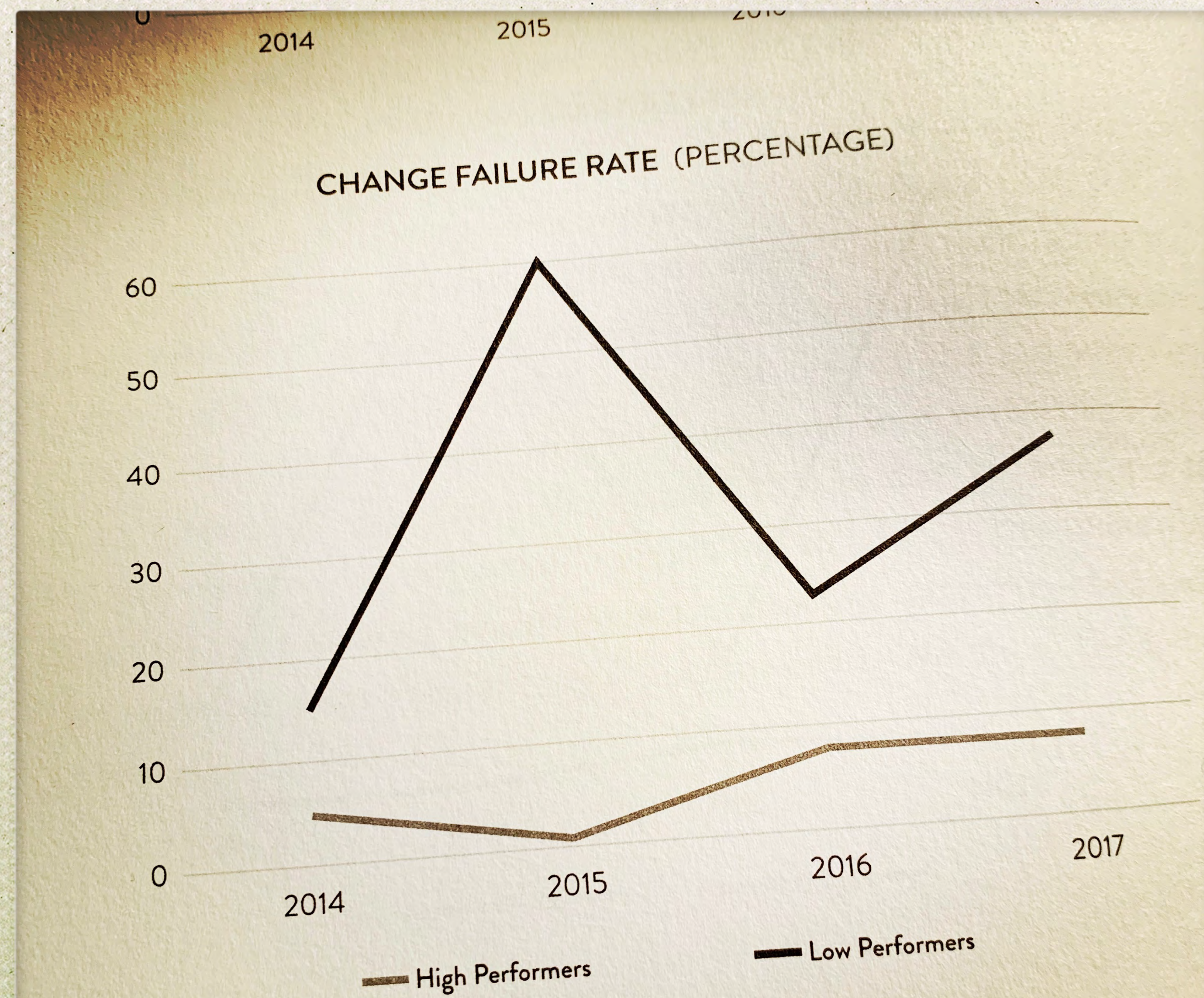


Figure 2.3: Year over Year Trends: Stability

But ... ***Microservices!***?

What about *tests?* *gates?*
pipelines? *isolation?*



We're covered...

A Story...







And it gets worse...

Dark Debt...



Aaron Rinehart and sueallspaw liked

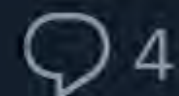


John Allspaw @allspaw · 4h

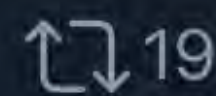
Reminder that "dark debt" *cannot* be anticipated or prevented. It is a natural byproduct of complexity.

I understand this is uncomfortable, especially for engineers. But that is the concept. If it can be prevented, it's not "dark debt" - it's something else.

Dark debt is found in complex systems and the anomalies it generates are complex system failures. Dark debt is not recognizable at the time of creation. Its impact is not to foil development but to generate anomalies. It arises from the unforeseen interactions of hardware or software with other parts of the framework. There is no specific countermeasure that can be used against dark debt because it is invisible until an anomaly reveals its presence.



4



19



50



And over to the business...

*“One Hour of Downtime Costs >
\$100K For 95% of Enterprises”*

*“lost revenue and lost end user
productivity”*

“not take into account the cost of additional penalties for **regulatory non-compliance** or **“good will” gestures** made to the organization’s customers and business partners that were negatively impacted by a system or network failure. In fact, these two conditions can **cause downtime costs to skyrocket even further”**

Bad news...

A close-up photograph of Donald Trump, who is covering his face with both hands. He has a pained or distressed expression, with his eyes closed and mouth slightly open. He is wearing a dark suit, a white shirt, and a red tie. The background is dark and out of focus, with some microphones visible on the right side. A semi-transparent dark blue diagonal overlay covers the top right portion of the image.

You're not covered

Microservices-based systems
tend to look like...

“To be fully described, there are
many details, not few”

“The rate of change is high; the systems change before a full description (and therefore understanding) can be completed.”

“How components function is partly unknown, as they resonate with each other across varying conditions.”

“Processes are heterogeneous
and possibly irregular.”

Reactions?

Ugly Risk Avoidance!

The image features the silhouettes of a man and a woman against a light background. The man, on the left, is wearing a suit and pointing his right index finger towards the woman. The woman, on the right, is wearing a dress with a beaded shoulder detail and pointing her left index finger back at the man. The word "Blame." is centered in the middle of the image, overlaid on the space between their pointing hands.

Blame.

A better reaction?

*Being wrong is a
key software skill*

Get Better At Being Wrong™

Make it Safe(r) to be wrong.

Technical Robustness

Zero Blame

Go *Beyond Blame*

Remember “Dark Debt”

Deliberately Practice

Being Wrong

“prepare for undesirable
circumstances” - John Allspaw

Deliberately Practice
Being Wrong

=

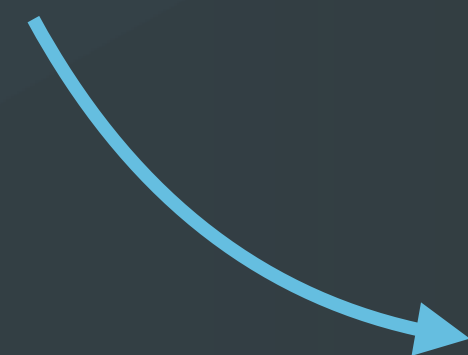
Chaos Engineering

Invest in **Resilience**

Resilience is a
Learning Loop

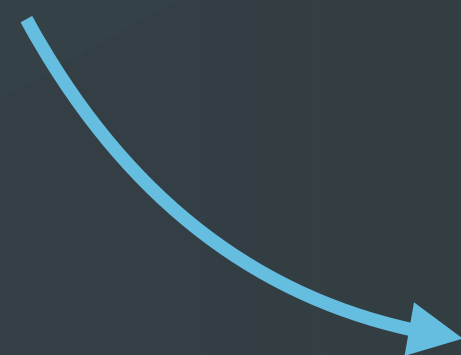
“Normal”

“Normal”



Outage

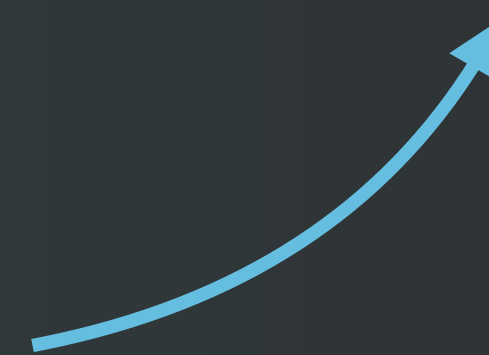
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Outage

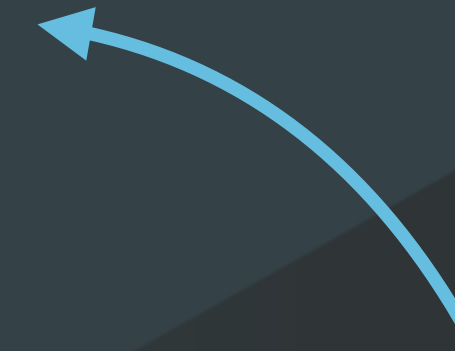


Fix
Diagnosis
Detection





Learning

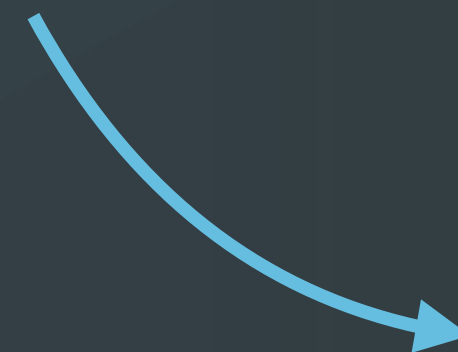


Fix

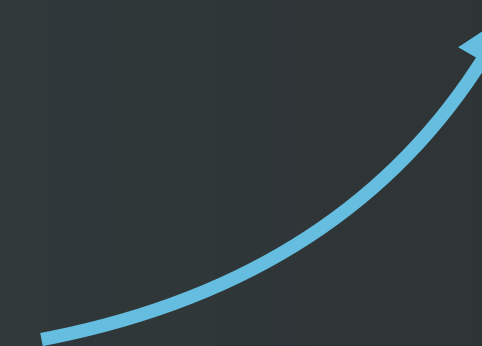
Diagnosis

Detection

“Normal”



Outage





Learning

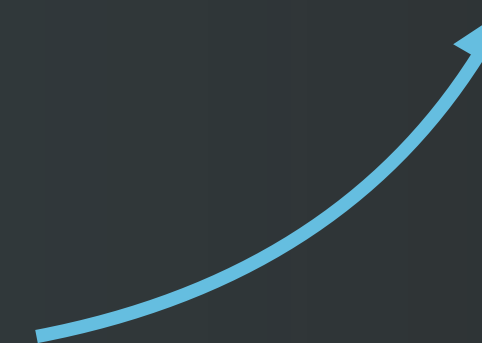
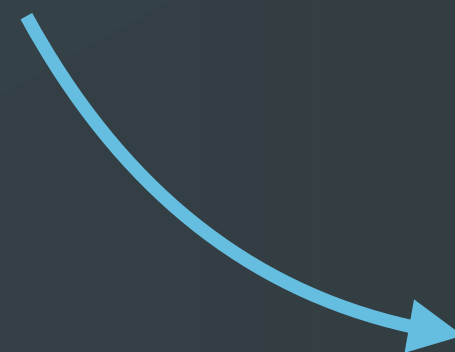
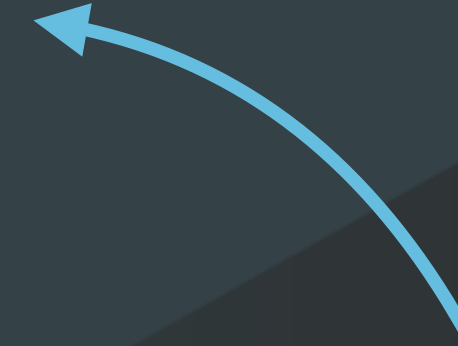
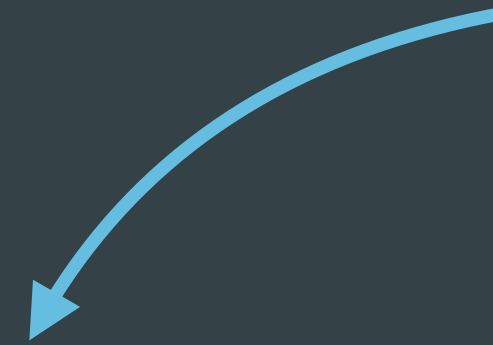
Improvement
(Robustness)

“Normal”



Outage

Fix
Diagnosis
Detection



“Never Let an Outage Go To Waste” - Casey Rosenthal

Post-mortem Learning is Good

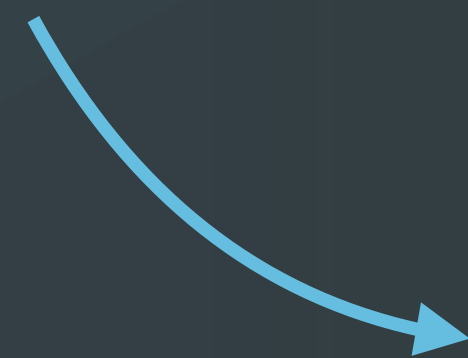
Pre-mortem Learning
is Better!

“Chaos Engineering is the discipline of
experimenting on a ***system***
in order to build ***confidence*** in the system’s
capability to ***withstand turbulent conditions***
in production.”

- principlesofchaos.org

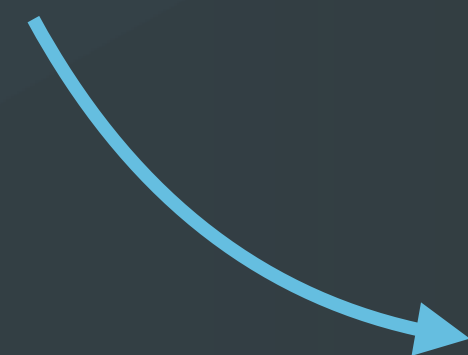
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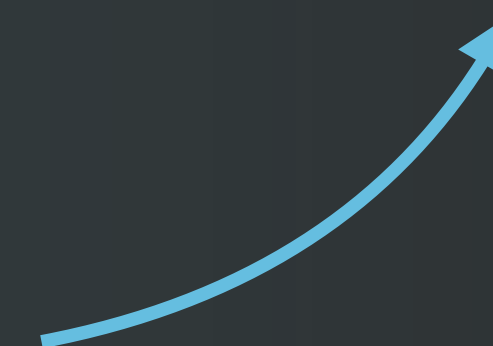


Game Day /
Automated Chaos Experiment

“Normal”



Game Day /
Automated Chaos Experiment



Fix
Diagnosis
Detection



Learning

Improvement
(Robustness)

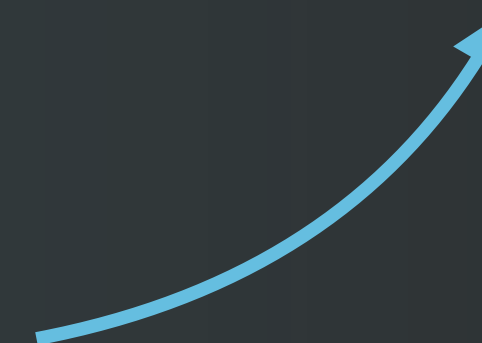
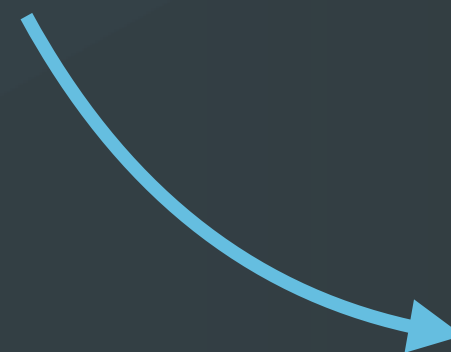
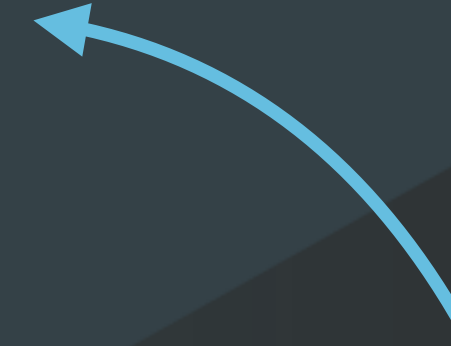
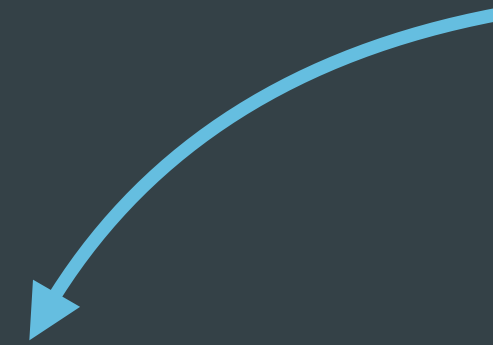
Fix
Diagnosis

“Normal”

Detection



Game Day /
Automated Chaos Experiment



Chaos

```
graph LR; Chaos[Chaos] -- "Game Days" --> P3[People, Practices & Process]; Chaos -- "Automated Experiments" --> Apps[Applications]; Chaos -- "Automated Experiments" --> Platform[Platform]; Chaos -- "Automated Experiments" --> Infra[Infrastructure];
```

Game Days

People, Practices & Process

**Automated
Experiments**

Applications

**Automated
Experiments**

Platform

**Automated
Experiments**

Infrastructure

We can ***learn after*** outages...

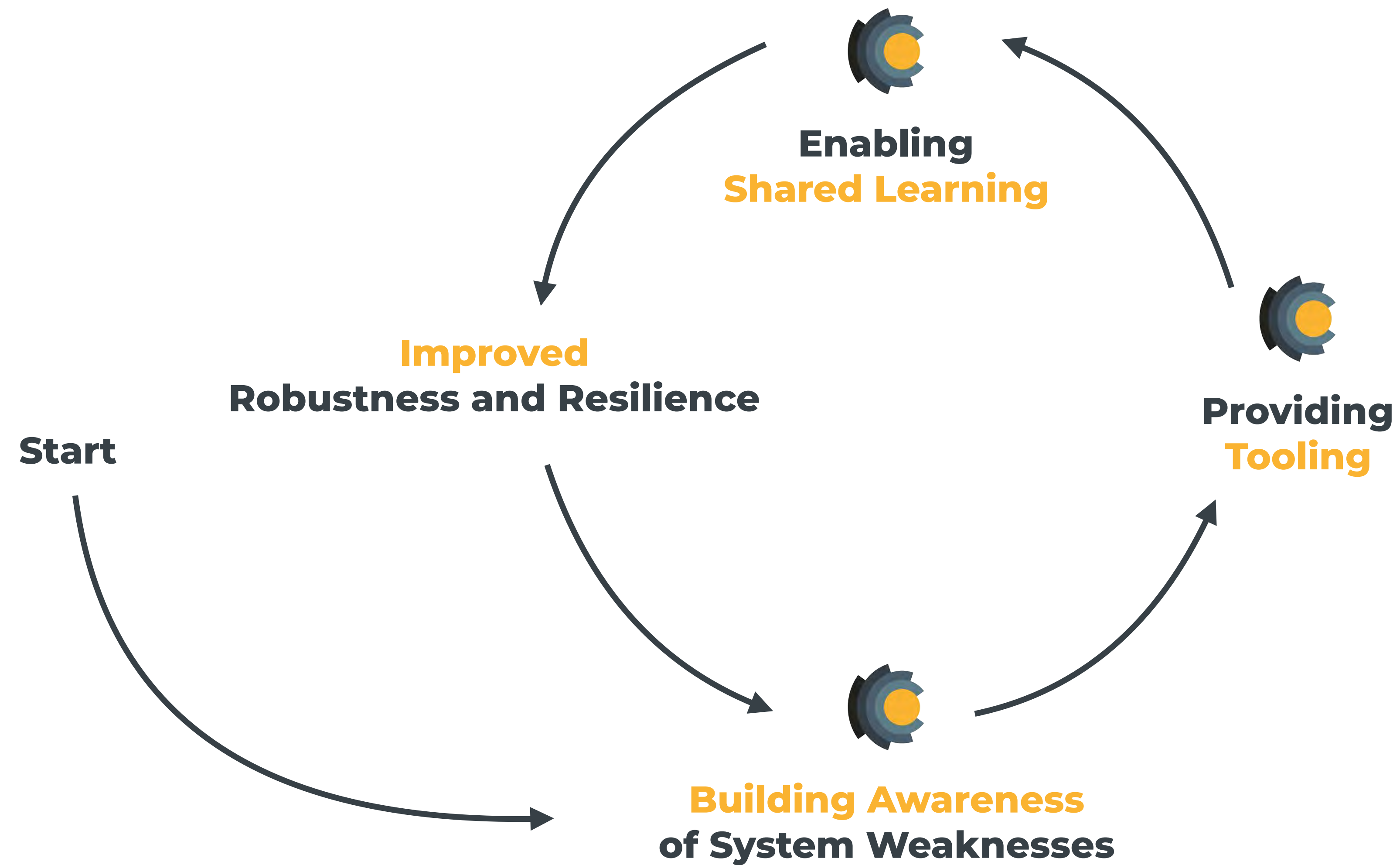
but it's even better to
learn from weaknesses ***before*** an outage.

Being Wrong can be a super
power, if it leads to ***learning***

Establish a Platform for
Pre-mortem, Deliberate Practice
@ ***“Being Wrong”***

Establish your own Platform for
Pre-mortem, Deliberate Practice
“Chaos Engineering”

Successful Chaos Engineers enable an investment in resiliency and reliability by:



Chaos Toolkit: chaostoolkit.org
join.chaostoolkit.org
and...

ChaosIQ ready for Early Access!

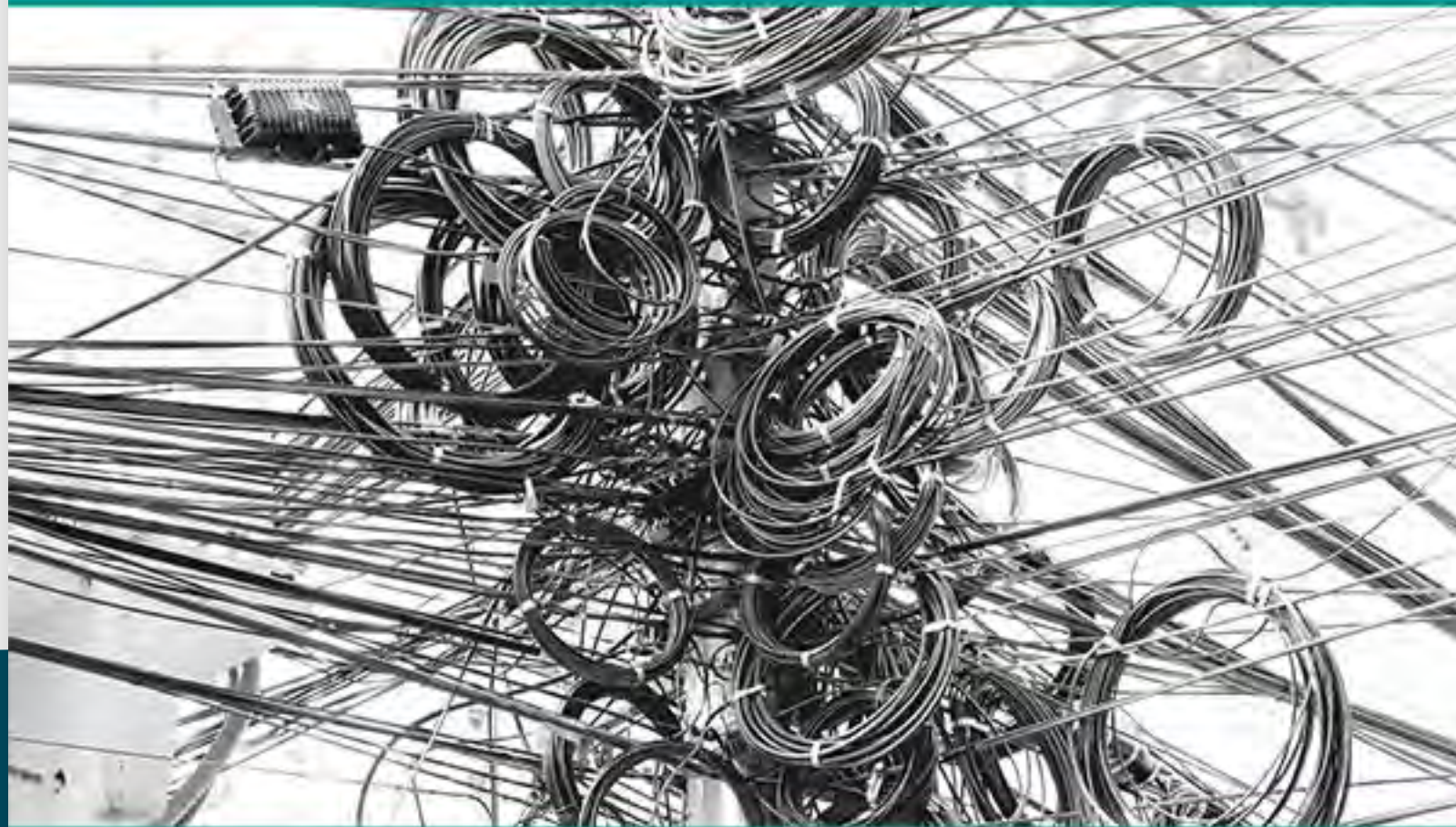
Lastly ... Futures...

O'REILLY®

Compliments of
Humio

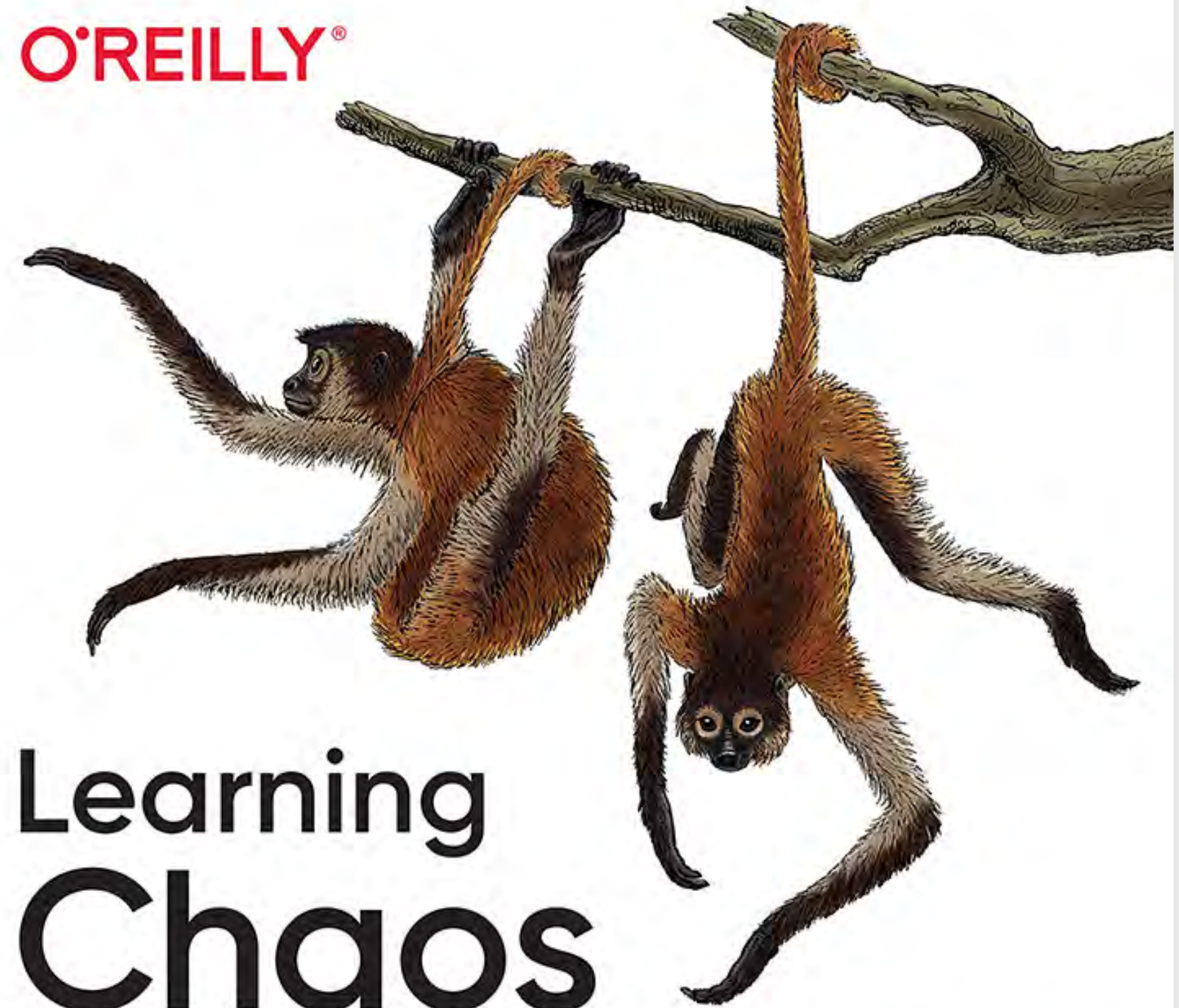
Chaos Engineering Observability

Bringing Chaos Experiments into
System Observability



Russ Miles

O'REILLY®



Learning Chaos Engineering

Discovering and Overcoming System
Weaknesses through Experimentation

Russ Miles

Thanks for Attending

Russ Miles | @russmiles | <https://www.linkedin.com/in/russmiles/>

