

Future of DevOps

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Ergonautic



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Dev
Ops
Product
Sales
Consulting





The Past

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1990s:

Getting a new
server up:
3+ months



Backup





William Herold
@willigula

...

Replying to [@DivineOps](#)

I don't know, but I have misguided nostalgia for getting a page & driving to our data center to physically restart a server in the middle of the night.



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Date	Release name
1990	SQL Server 1.1 (16-bit)
1992	SQL Server 4.2A
1993	SQL Server 4.21a
1995	SQL Server 6.0
1996	SQL Server 6.5
1998	SQL Server 7.0
2000	SQL Server 2000
2003	SQL Server 2000 64-bit
2005	SQL Server 2005
2008	SQL Server 2008
2010	Azure SQL database

Software release
cadence:
2-3-year cycle

Merge hell

Merging the development branches and completing the test procedures could take months



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GIT MERGE

A wide-angle photograph of a vast, flat landscape, likely a coastal or marsh area. The foreground is covered in low-lying, yellowish-green vegetation. In the middle ground, there's a flat expanse of the same vegetation extending to the horizon. The sky above is a clear, pale blue with no visible clouds.



Every company ran its own email





Software as a Service

- Hotmail 1996
- Google Search 1998
- Salesforce 1999

Revenue share in 1999

- Application Service Providers \$933M
- Software Applications \$74B

Source: <https://www.inc.com/magazine/20000401/18093.html>

Deployment Checklists

Deployment Plan Template: Blue Theme

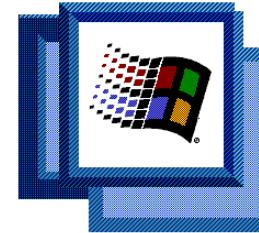
The screenshot shows a Microsoft Word document titled "Deployment Plan Template - Blue Theme - Coverage Sheet - Word". The document is structured into several sections:

- Table of Contents:** A hierarchical list of sections and their page numbers.
- Introduction:** A brief overview of the deployment plan.
- Site Information:** Details about the site, including address, contact information, and key personnel.
- Objectives:** Specific goals for the deployment.
- Deployment Phases:** Detailed steps for planning, installing, training, and transitioning to operations.
- Training:** Instructions for user training.
- Installation Considerations:** Factors to consider during installation.
- Installation Process:** A step-by-step guide for the installation process.
- Transfer to Operations:** Activities required to transition to operations.
- Appendix:** Additional resources and appendices.

Each section includes a table for tracking issues and their impact. The document is highly detailed, providing specific instructions and checklists for each phase of the deployment process.



2000



Microsoft
Windows 2000
Server Family

27% of server market

- File-based OS
- Maintains configuration in files
- Every device is a file

41% of server market

- Executable-based OS
- Maintains configuration in registry
- Every device has a different driver mechanism

1990s:
Maintenance
windows



How many 9s is two weekends like that?



< 99%

3.65 days /
year

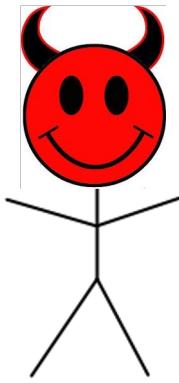
Unavailable systems were estimated to have cost American businesses \$4.54B in 1996.



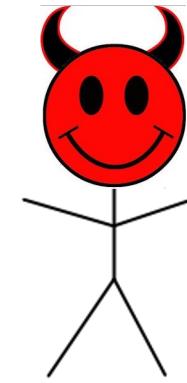
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Traditional IT



dev



ops

wall of confusion



Dev

Ops

Speed

Reliability



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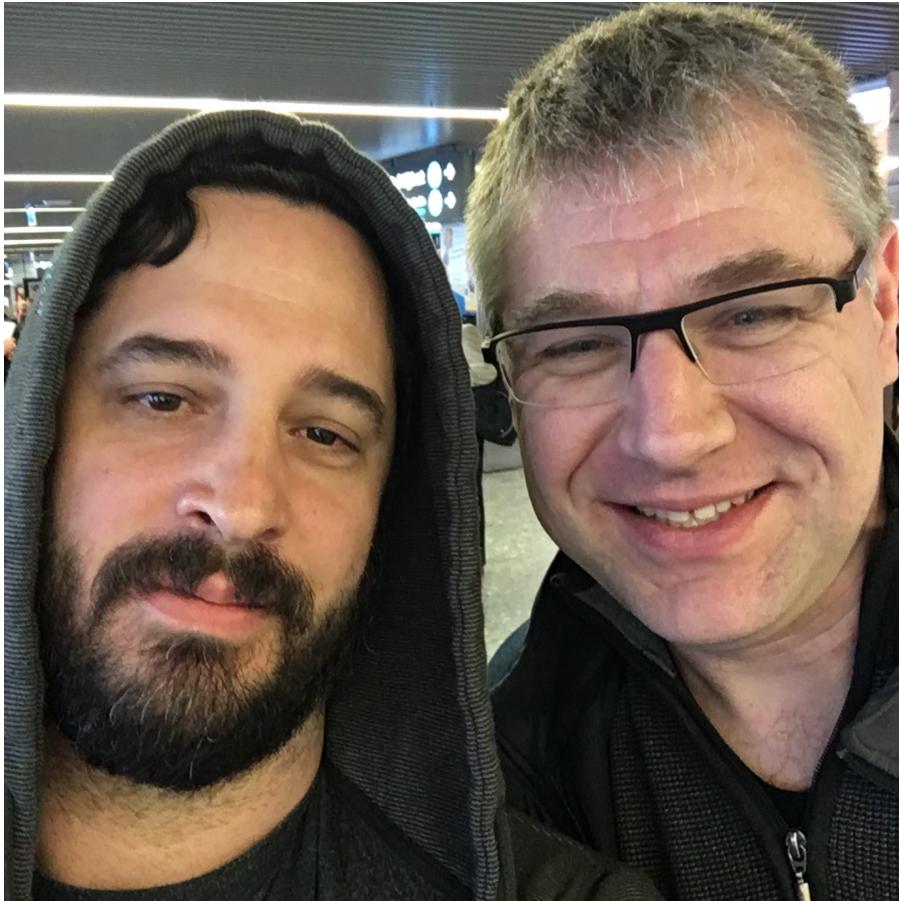
"I knew this organization was full of silos.
I just didn't think they'd be so heavily defended!"



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Darmok and Jalad at Tanagra

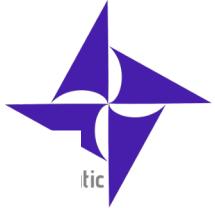


Patrick and Andrew
at Agile TO 2008

10 deploys per day:
Dev and Ops collaboration at
Flickr



Velocity 09: John Allspaw and Paul Hammond



Andrew Clay Shafer 雷启理

@littleidea

Don't just say 'no', you aren't respecting
other people's problems... #velocityconf
#devops #workingtogether



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DevOpsDays Ghent 2009: Patrick Debois

devopsdays events

80

60

40

20

0



1

4

6

5

18

19

22

42

51

71

73

2009

2010

2011

2012

2013

2014

2015

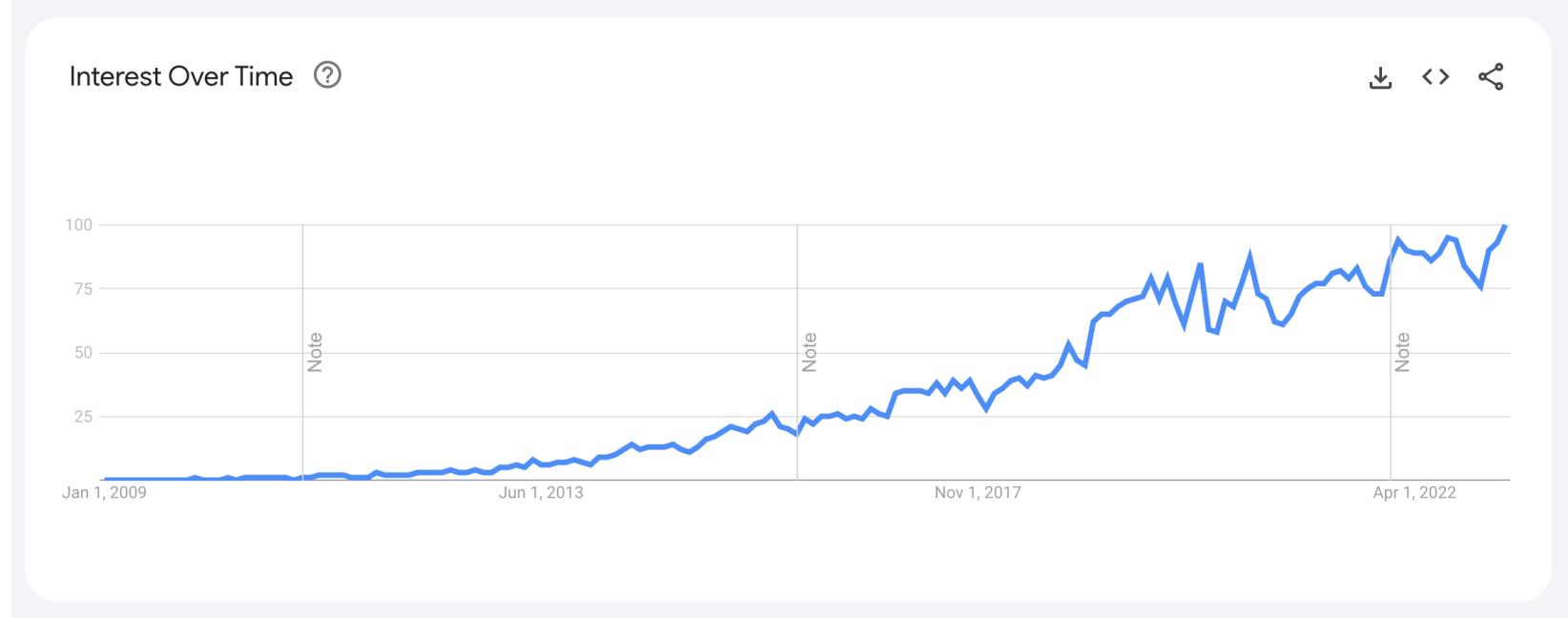
2016

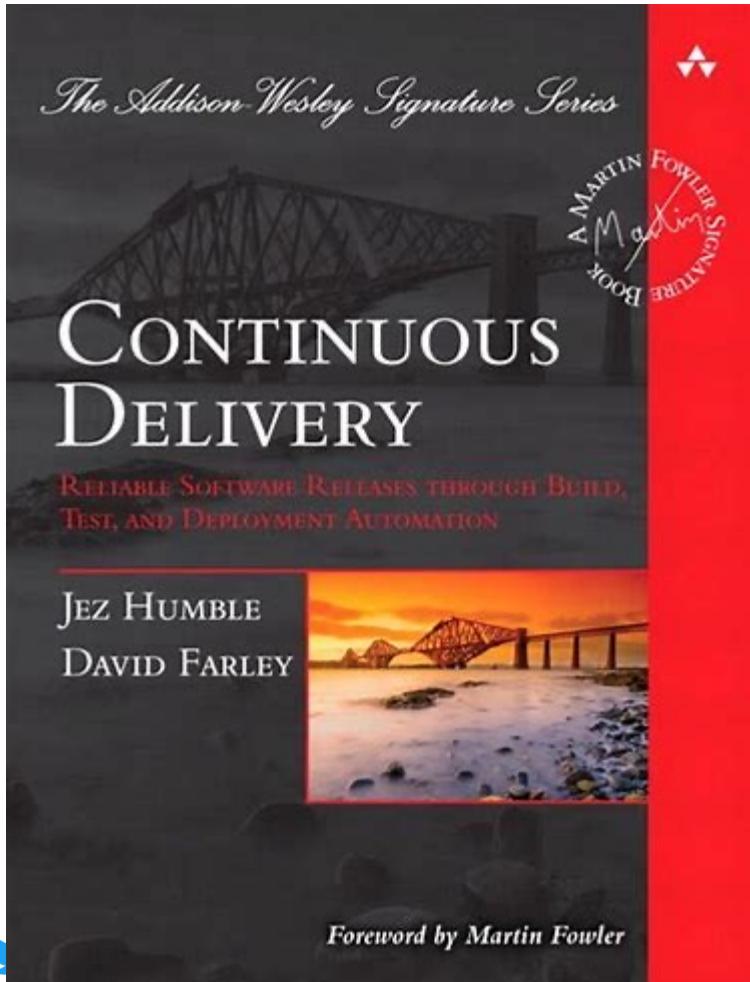
2017

2018

2019

“DevOps” Google Search Trend 2009-Present





Continuous Integration (CI)



The practice of merging code into the main branch several times a day; and automating the build and testing on every commit.

Continuous Delivery (CD)



The approach in which teams produce software in short cycles, ensuring that the software can be reliably released at any time.

ELITE PERFORMERS

Comparing the elite group against the low performers, we find that elite performers have...



208
TIMES MORE

frequent code deployments



106
TIMES FASTER

lead time from
commit to deploy



2,604
TIMES FASTER

time to recover from incidents



7
TIMES LOWER

change failure rate
(changes are $\frac{1}{7}$ as likely to fail)

Throughput Stability



Nicole Forsgren. State of DevOps Report 2019

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Software delivery is like a muscle.

The more you use it, the stronger it gets.



The Present

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Effective automation requires consistent APIs

OS-level APIs

PowerShell

(Windows) configuration
management framework and
scripting language



Jeffrey Snover, 2006

Infrastructure-level APIs

Amazon Web Services: 2002

Amazon Cloud Computing: 2006

Azure Cloud Services: 2008

Infrastructure as code

2005



2009



2012





Every wave of
automation

Enables the next
wave of automation



Today



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We have a lot more automation



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We have a lot more automation tools



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We have much higher availability



We have better on-call



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We have better incident response

We deploy a lot more frequently



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BUT



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Many of us are bad at monitoring

Many of us are bad at CI

Continuous Integration (CI)



The practice of merging code into the main branch several times a day; and automating the build and testing on every commit.

You cannot CI/CD Without Testing



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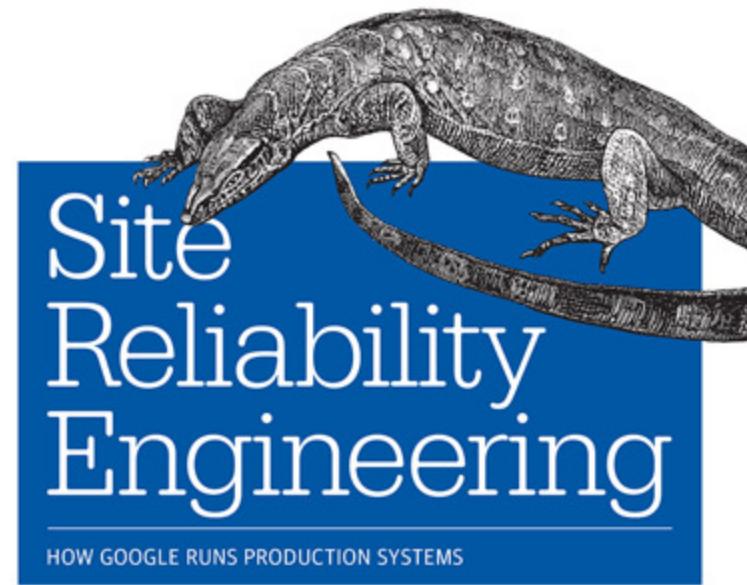


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We have convinced people that
deploying faster is good

We forgot to mention that increasing
the Operational Burden is bad



SRE \simeq Google's implementation DevOps

Why did SRE develop?



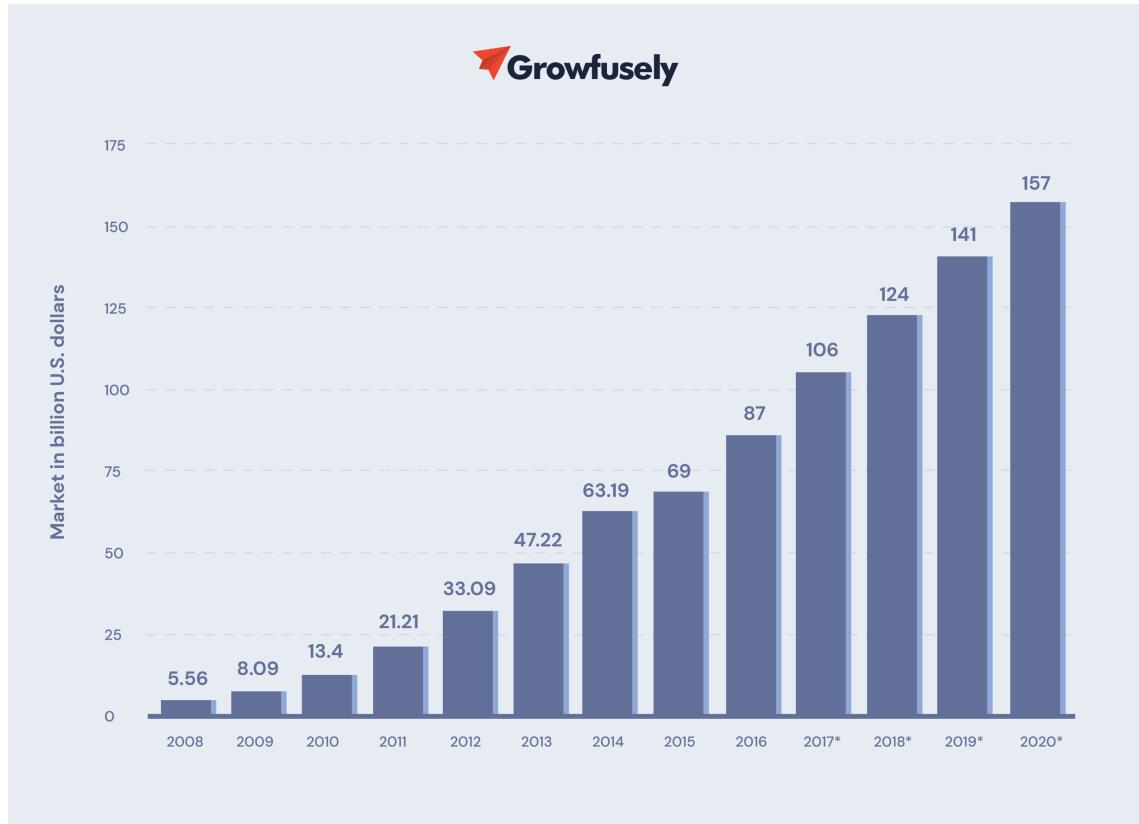
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SaaS Market

2008-2020



What is the most important thing about the SRE discipline?



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SRE is about explicit agreements
that align incentives

SLA, SLI, SLO



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SLA

=

Financially-backed availability

Monthly Uptime Percentage**Service Credit Percentage**

Less than 99.95% but equal to or greater than 99.0% 10%

Less than 99.0% but equal to or greater than 95.0% 25%

Less than 95.0% 100%

Monthly downtime > 15 days means 100% refund

SLAs are about
aligning incentives
between Vendor & Customer

SLO

=

Targeted reliability

While SLA is a single metric,
SLOs are a system of metrics

SLO

=

Business-approved reliability

SLOs are about
explicitly aligning incentives
between Business &
Engineering



Error Budgets

Acceptable level of **unreliability**

Error budget = $1 - \text{SLO}$

$$\text{EB} = 1 - 99.99\% = 0.01\% \simeq 13 \text{ mins /quarter}$$

Error budgets are about
aligning incentives
between Dev & Ops

If developers are measured on the same SLO,
then when the error budget is drained
developers shift focus from delivering new
features to improving Reliability

SLI

=

Actual reliability

Monitoring



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Without monitoring, you have no way to
tell whether your service even works!

Good Monitoring



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Without good monitoring, you don't
know that the service does what users
expect it to do!



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The Future



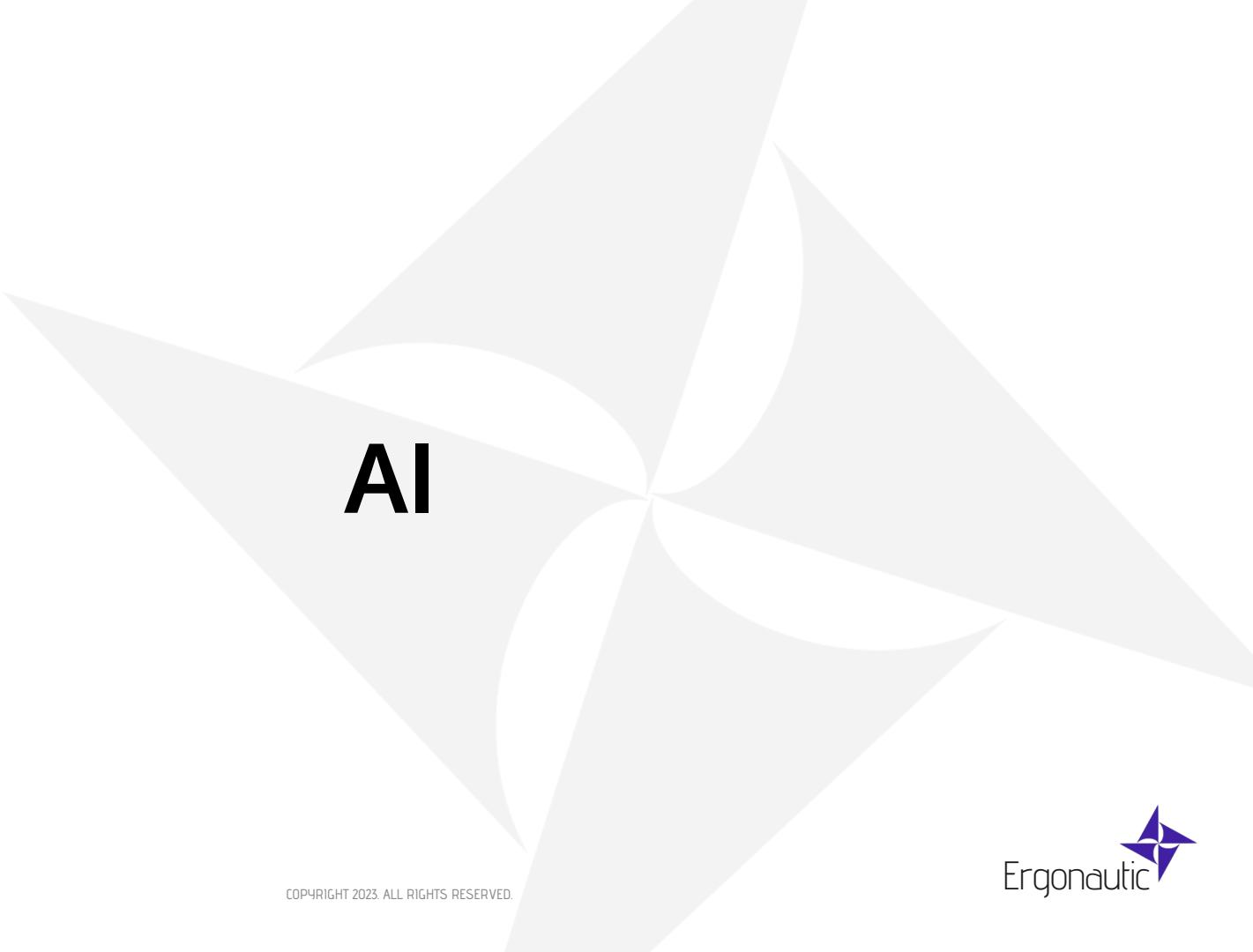
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Something we have to talk about



AI



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AI will not [yet] take your job



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AI will change jobs



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Ethics



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Like a Library

Current AI aggregates and
synthesizes the results of
decades of human work



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Written works, code, art



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Unlike a Library



Current AI charges its users for
the content

But it DOES NOT pay royalties or
give attribution to the creators



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Fairness usually loses to profit



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Are people going to stop sharing?

Something else we have to talk about



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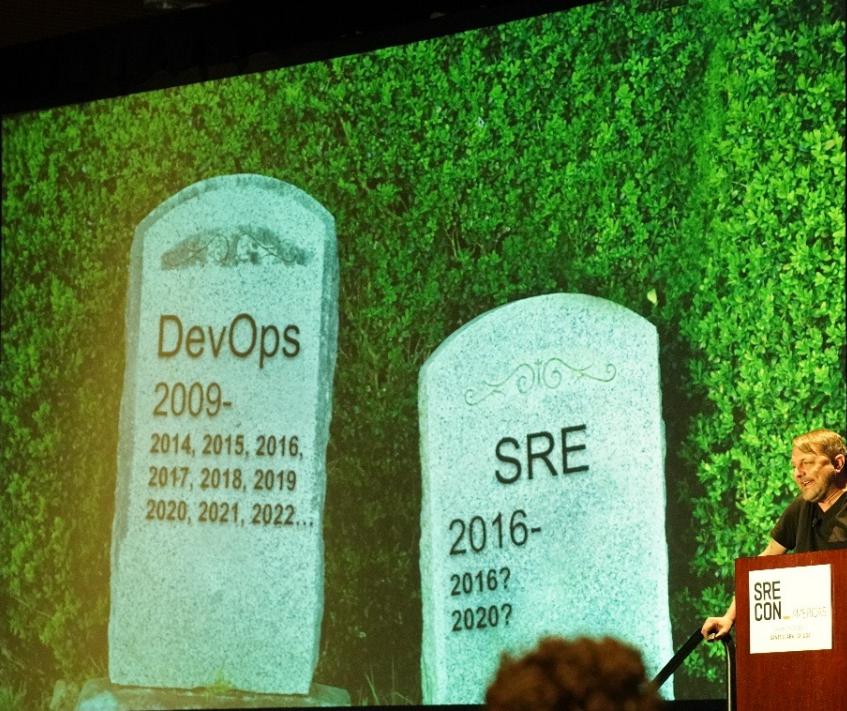
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DevOps is Dead

Is it though?



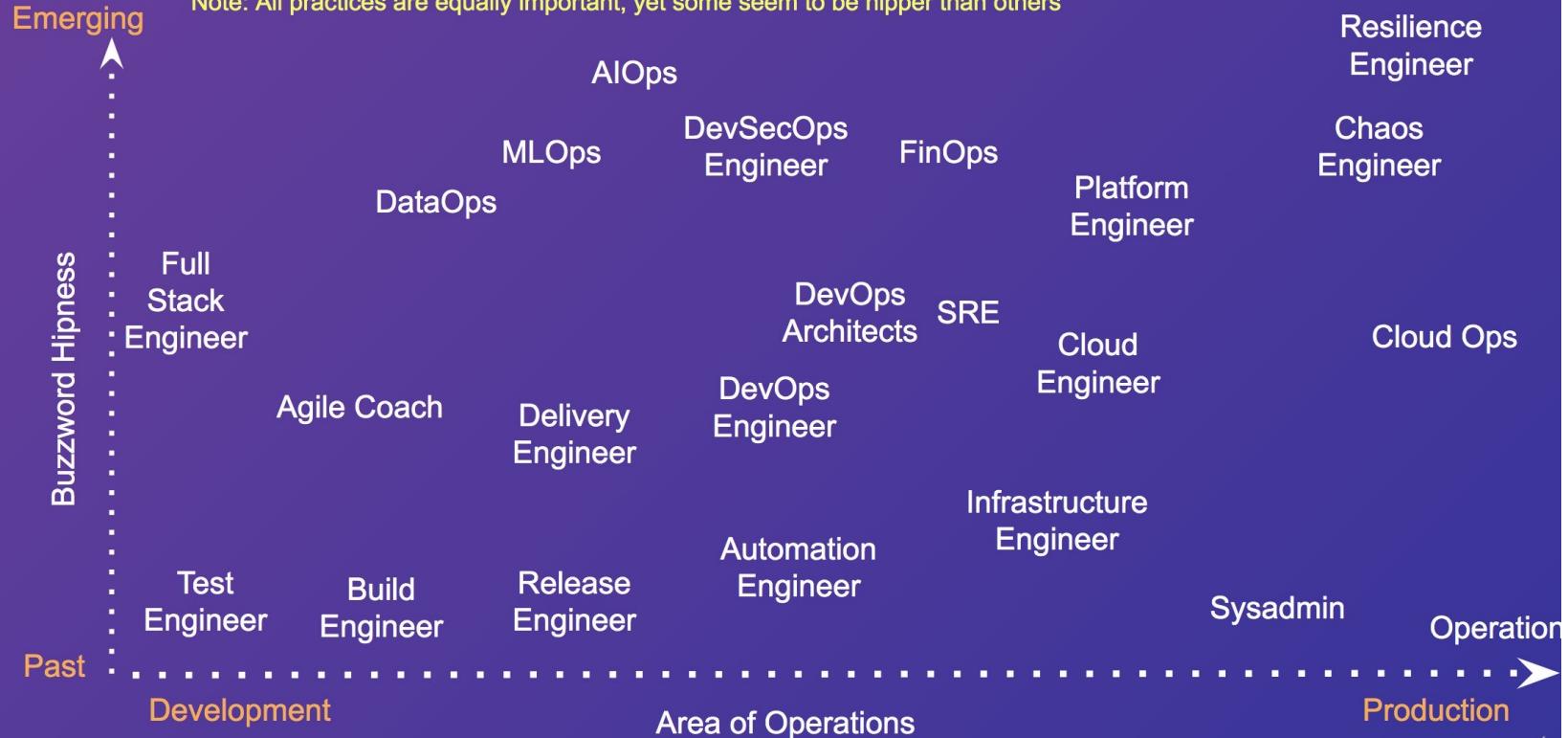


A man stands behind a wooden podium on a stage, speaking into a microphone. The podium has a sign that reads "SRE CON AMERICA".

A second man stands to the right of the speaker, looking towards the audience.

Shades of DevOps Industry Terms

Note: All practices are equally important, yet some seem to be hipper than others



Patrick Debois, 2021

Someone in your org is keeping
your systems alive

And their life might be hell

The future is already here.

It's just not evenly distributed

~ William Gibson

Renaming Teams



Support → Sys Admin → Ops → DevOps → SRE → Platform Eng (?)



dev

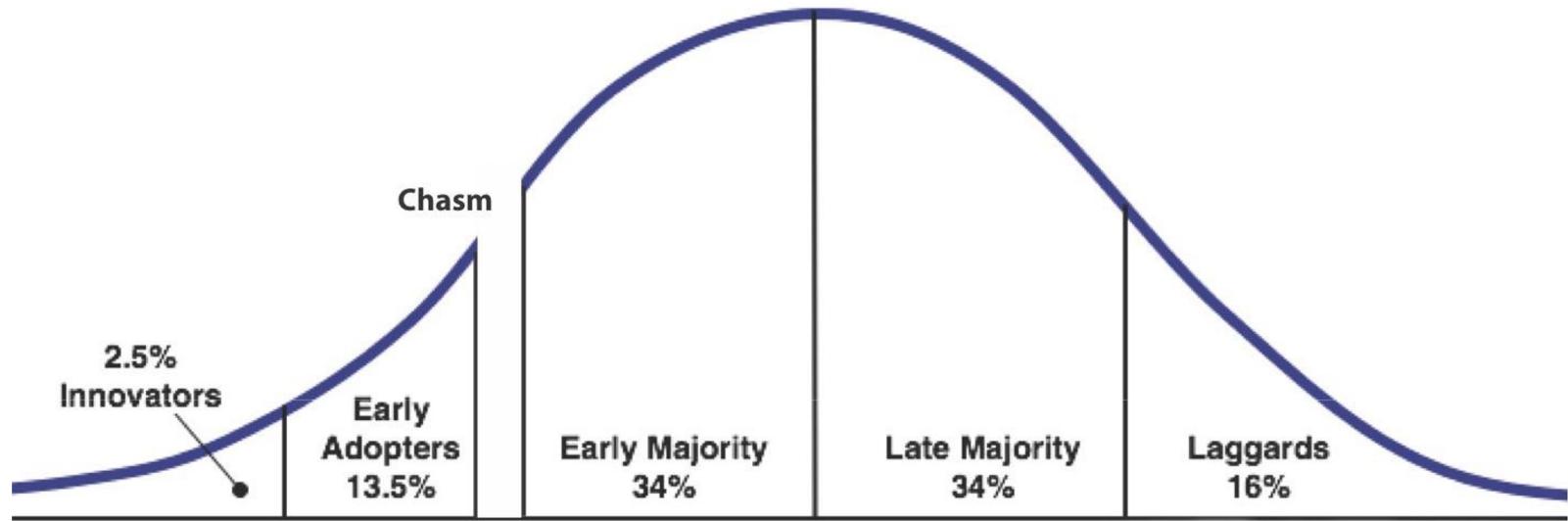


wall of confusion



ops

Technology Adoption Life Cycle



seeking advantage

seeking legitimacy

words cross the chasm before
understanding and practice

Most organizations I encounter,
even those running SaaS,
have no SRE practice

Most Organizations today



- Don't merge code frequently
- Don't have quality testing during CI
- Don't have informative monitoring
- Don't enforce Error Budgets
- Don't have a platform

everyone wants DevOps

well actually...

what they really want

- reliability
- availability
- scalability
- operability
- usability
- observability
- all for free
- without changing anything

without
changing anything

without
changing anything

without
changing
anything

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Software



Everyone wants this

Platform



When they haven't solved this

Infrastructure



Or even this

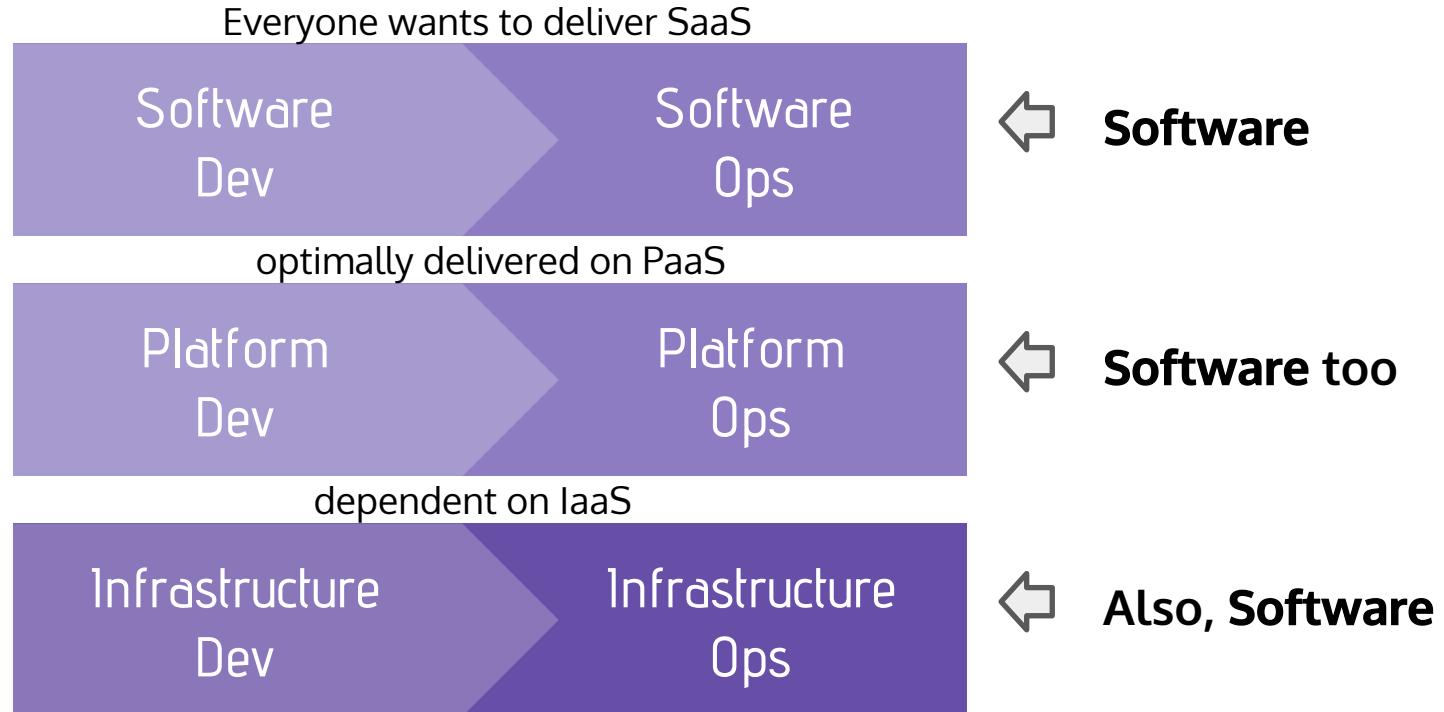


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Operating Model



Let's bring the future to everyone

We don't need new words

We need to implement what we
already know to work well

Let's start small

Not this



This



The future is already here.

It's just not evenly distributed

~ William Gibson

Thank you!



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