



David N. Blank-Edelman



@otterbook

Lessons Learned from a Parallel Universe



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SRE for DevOps



WHAT'S SRE?

I DON'T KNOW!

Apache Tomcat/7.0.26 – Error report

192.168.33.10:8080

HTTP Status 500 -

type Exception report

message

description The server encountered an internal error () that prevented it from fulfilling this request.

exception

```
javax.servlet.ServletException
    ralo.runtime.engine.CFMLEngineImpl.getConfigDirectory(CFMLEngineImpl.java:244)
    ralo.runtime.engine.CFMLEngineImpl.loadJSPFactory(CFMLEngineImpl.java:198)
    ralo.runtime.engine.CFMLEngineImpl.addServletConfig(CFMLEngineImpl.java:159)
    ralo.loader.engine.CFMLEngineFactory.getInstance(CFMLEngineFactory.java:141)
    ralo.loader.servlet.CFMLServlet.init(CFMLServlet.java:23)
    org.apache.catalina.valves.ErrorReportValve.invoke(ErrorReportValve.java:98)
    org.apache.catalina.valves.AccessLogValve.invoke(AccessLogValve.java:927)
    org.apache.catalina.connector.CoyoteAdapter.service(CoyoteAdapter.java:407)
    org.apache.coyote.http11.AbstractHttp11Processor.process(AbstractHttp11Processor.java:929)
    org.apache.coyote.AbstractProtocol$AbstractConnectionHandler.process(AbstractProtocol.java:657)
    org.apache.tomcat.util.net.JIoEndpoint$SocketProcessor.run(JIoEndpoint.java:307)
    java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1146)
    java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:615)
    java.lang.Thread.run(Thread.java:701)
```

note The full stack trace of the root cause is available in the Apache Tomcat/7.0.26 logs.

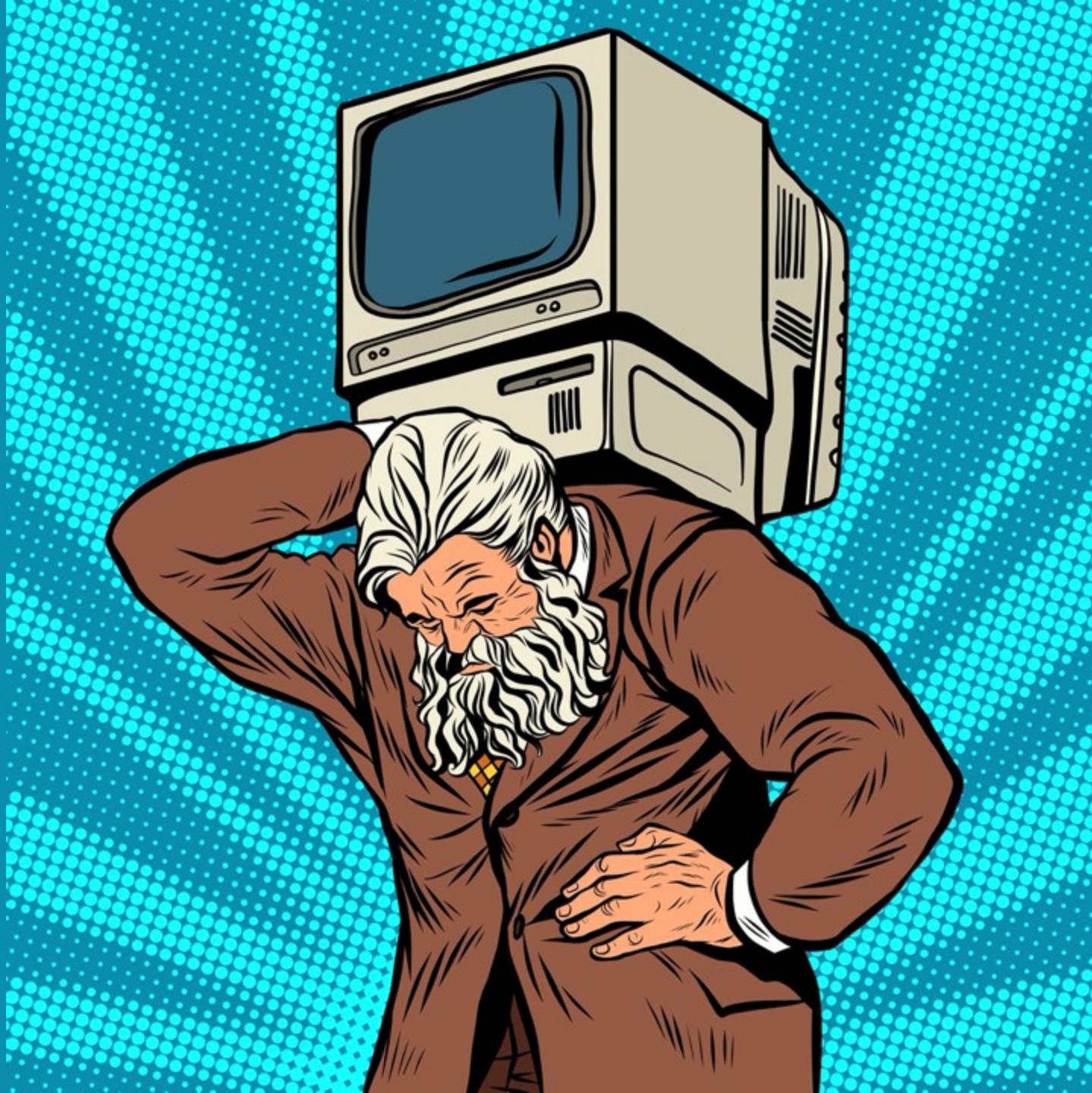
Apache Tomcat/7.0.26



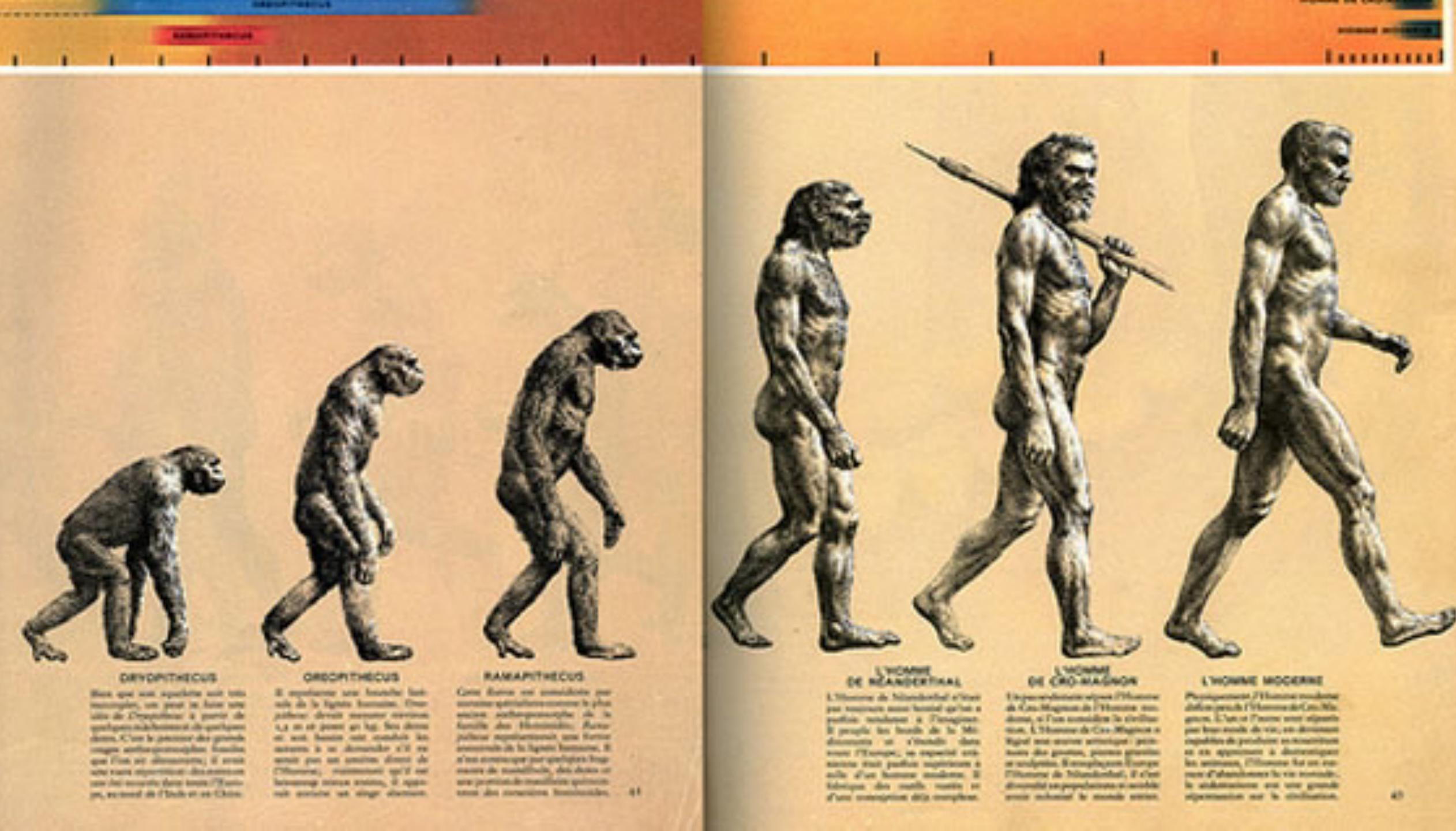


BUT IT WORKED
ON MY
MACHINE...









DRYOPITHECUS

Il existe peu d'espèces avec une morphologie, un pas ou faire une sorte de l'« hominidé ». Le point de départ des précurseurs évolue au cours des périodes. C'est le point de départ des grands singes anthropomorphes (tous qui l'ont fait est descendre) il sera très tardivement démontré que ces derniers sont aussi bons que l'homme, mais que l'homme est également très bon.

OROPITHECUS

Il possède une longue taille de la ligne humaine. Ces précurseurs devraient appartenir à la famille des hominidés. Ils possèdent également une taille moyenne de la ligne humaine. Il n'est pas nécessaire pour quelques singes être de marche, mais alors ce sera probablement nécessaire pour certains des premiers hominidés.

RAMAPITHECUS

Cette élite est considérée comme l'ancêtre du plus ancien précurseur de la famille des hominidés. Aussi possède-t-il également une taille moyenne de la ligne humaine. Il n'est pas nécessaire pour quelques singes être de marche, mais alors ce sera probablement nécessaire pour certains des premiers hominidés.

41

L'HOMME DE NEANDERTHAL

L'homme de Néandertal n'est pas nécessaire aussi bon que l'homme préhistorique à l'origine. Il possède les traits de la modernité et l'homme dans tout l'Europe, se répandent vers l'ouest, vers l'Asie, vers l'Afrique et l'Amérique. Il possède une grande taille et une grande force physique, mais aussi une grande intelligence et une grande capacité à survivre.

L'HOMME DE CRO-MAGNON

L'homme de Néandertal n'est pas nécessaire aussi bon que l'homme préhistorique à l'origine. L'homme de Cro-Magnon a également une grande taille et une grande force physique, mais aussi une grande intelligence et une grande capacité à survivre.

L'HOMME MODERNE

L'homme de Néandertal n'est pas nécessaire aussi bon que l'homme préhistorique à l'origine. L'homme de Cro-Magnon a également une grande taille et une grande force physique, mais aussi une grande intelligence et une grande capacité à survivre.

42



LET'S GO!

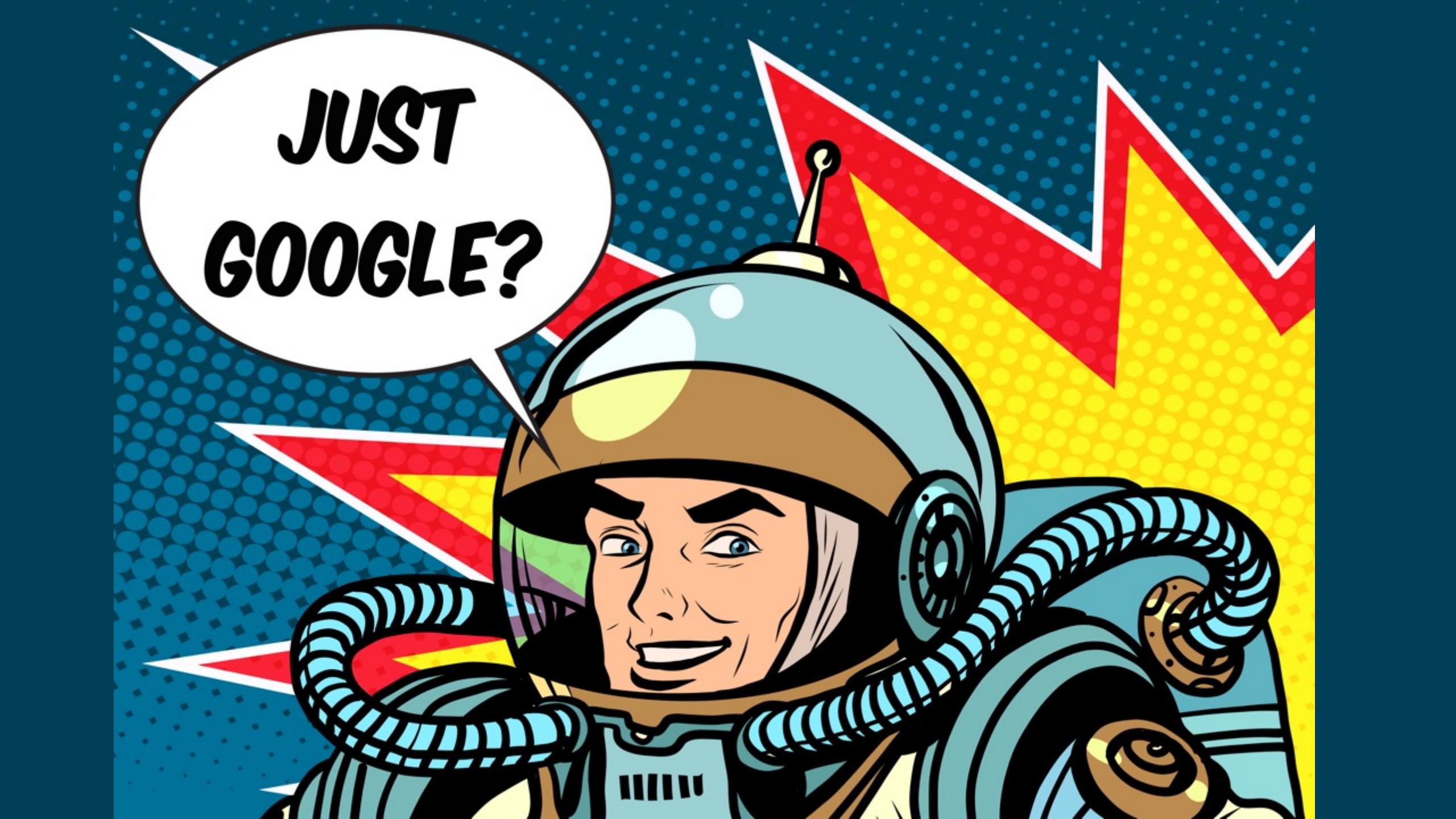
O'REILLY®



Site Reliability Engineering

HOW GOOGLE RUNS PRODUCTION SYSTEMS

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



**JUST
GOOGLE?**

SREcon14

05.30.14 | SANTA CLARA, CA



SOLD OUT!

Keys to SRE

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Ben Treynor

CONNECT WITH US



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Abstract:

Ben Treynor joined Google as Site Reliability Tsar in 2003. He is the founder of Google's Site Reliability team and grew it organically from an original core of 7 "production" engineers to its current ranks of >1200 software engineers. SRE is responsible for everything from Google's internal software infrastructure, to user services like Search, Gmail, Ads, and to the burgeoning Cloud Platform. Additionally, Ben is responsible for Google's worldwide internal and external network (since 2004), its data centers and hardware operations (since 2009), and is part of the Google Cloud Platform management team (since late 2013).

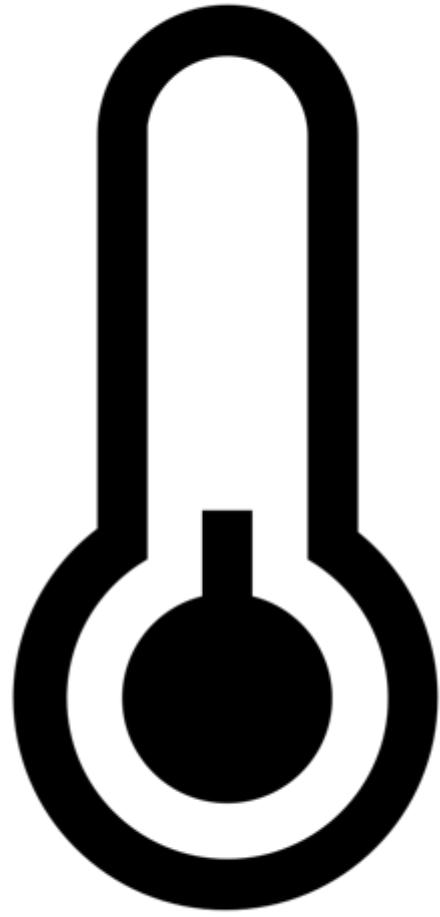


What Makes SRE, SRE (dramatic recreation)

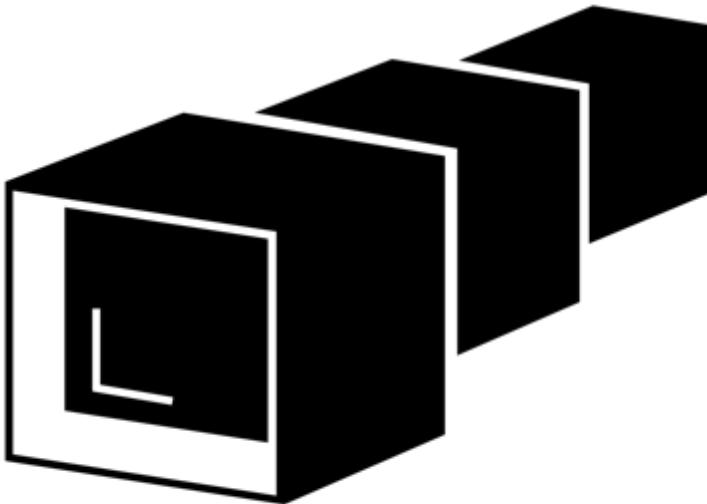
- hire only coders
- have an SLA for your service
- measure and report performance against SLA
- Use Error Budgets and gate launches on them
- Common staffing pool for SRE and DEV
- Excess Ops work overflows to DEV team
- Cap SRE operational load at 50%
- Share 5% of ops work with DEV team
- Oncall teams at least 8 people, or 6x2
- Maximum of 2 events per oncall shift
- Post mortem for every event
- Post mortems are blameless and focus on process and technology, not people

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SLO



monitor



decide

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Observation #1:

Create virtuous and reinforcing
feedback loops



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Observation #2:

You can't fire your way to reliable.

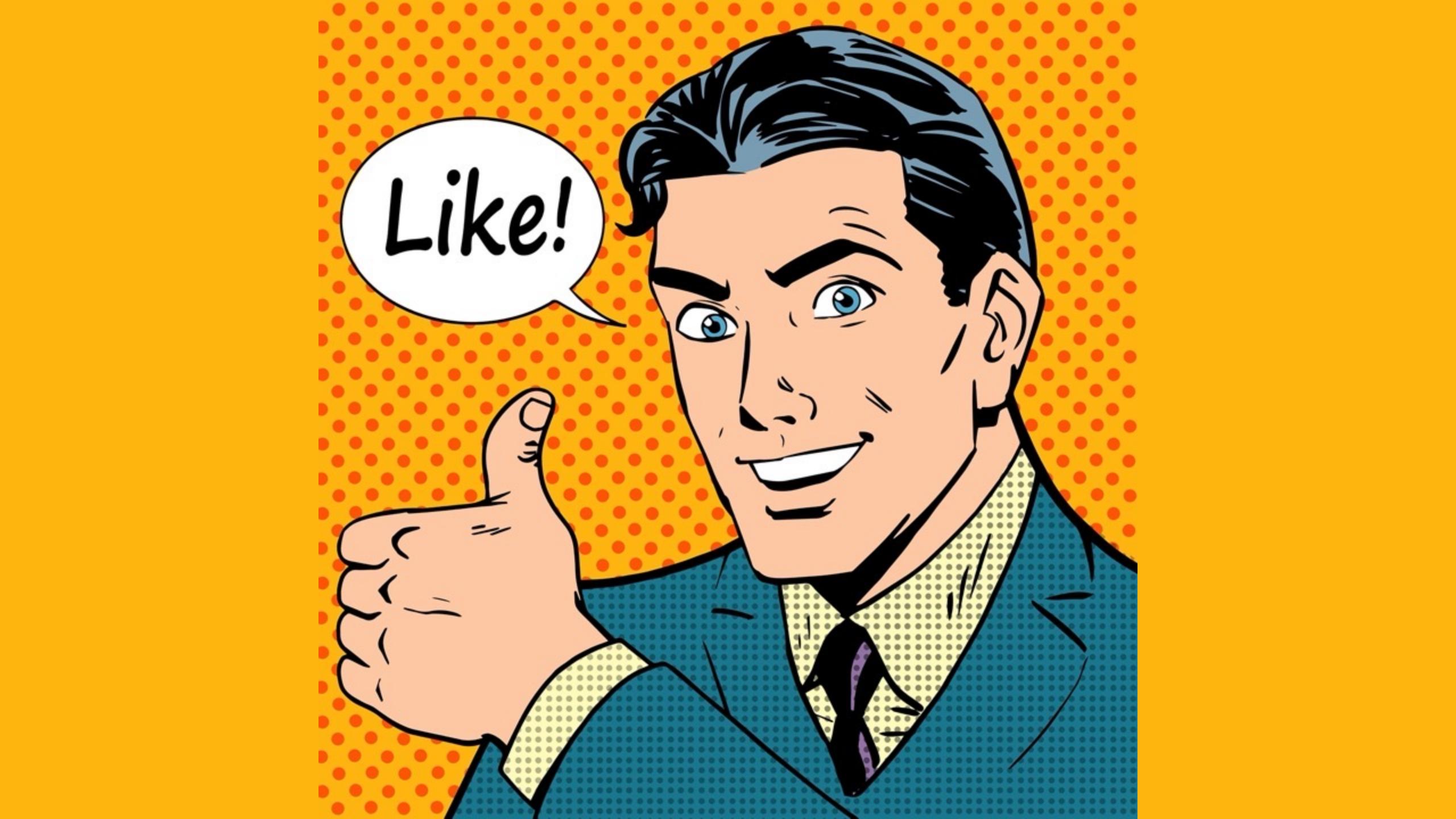


A stylized illustration in a comic book art style. A person with dark hair, seen from the back, looks towards a vibrant, sunburst-like background. The background features radiating yellow lines, orange dots, and a central cluster of yellow circles and red squares. A white speech bubble with a black outline is positioned in the lower-left foreground, containing the text.

**BUT WHAT ABOUT THE
REST OF THE SRE UNIVERSE?**

- Airbnb
- Amazon
- Apple
- Baidu
- Dropbox
- Etsy
- Facebook
- GitHub
- LinkedIn
- Microsoft
- Netflix
- Pinterest
- Spotify
- Stack Exchange
- Twitter
- Uber
- Yahoo!
- Yelp

- Airbnb
- Amazon
- Apple
- Baidu
- Dropbox
- Etsy
- Facebook
- GitHub
- LinkedIn
- Microsoft
- Netflix
- Pinterest
- Spotify
- Stack Exchange
- Twitter
- Uber
- Yahoo!
- Yelp

A stylized illustration of a man in a suit giving a thumbs up and saying "Like!". The man has dark blue hair, blue eyes, and a wide smile. He is wearing a blue suit jacket over a yellow shirt and a purple tie. A white speech bubble with the word "Like!" in black text is positioned above his head. He is pointing his right thumb upwards. The background features a yellow field with a pattern of red dots.

Like!

Facebook has Production Engineers

SREcon15

03.16.15-03.17.15 | SANTA CLARA, CA



Overview

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HELP PROMOTE



SREcon15 took place on March 16–17, 2015, in Santa Clara, CA. The [program](#) included:

- Keynote address from Pedro Canahuati, *Director, Production Engineering, Facebook*, on "Notes from Production Engineering"
- Invited talks, panels, and training on incident management, large-scale data management, and release and deployment processes
- Closing address from Caitie McCaffrey, *Twitter*, on "Architecting and Launching the Halo 4 Services"

Program Co-Chairs

Sabrina Farmer, *Google*
Andrew Fong, *Dropbox*
Fernanda Weiden, *Facebook*

Keynote Speaker

Pedro Canahuati is director of the production engineering team at Facebook, leading the teams that scale Facebook's infrastructure and making sure Facebook's products are available 24x7. Prior to this, Pedro was director of operations at SpinMedia and Qloud. He previously leveraged his network and systems knowledge to build data centers and scale web operations at companies like



Facebook has Production Engineers

“Production Engineers at Facebook are hybrid software/systems engineers who ensure that Facebook's services run smoothly and have the capacity for future growth. They are embedded in every one of Facebook's product and infrastructure teams, and are core participants in every significant engineering effort underway in the company.”

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Observation #3:

There is no one right way to build an SRE team. But there are wrong ways.



Facebook has Production Engineers

- ~1-10 ratio
- 18, 24, 36 months with a service
(not a S.W.A.T. team or ops monkeys)
- Also do Bootcamp
- Lead reports to Facebook head of engineering
(same person responsible for Ops and Eng)

Observation #4:

SRE requires management support
at the highest levels.



Production Engineering Maturity Model

- maturity of SW/PE team's work
- maturity of level of service
- relationship status of PE/SWE teams
- stages:
 - bootstrap/build out
 - scale/initial deployment
 - awesomize



Get in Touch!



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