The SRE I aspire to be

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Google Cloud
#SREcon Dublin 2019
Who is this guy

- **Google SRE since 2013**
  Most recently *GCP's Quantitative Reliability Lead*

- **Jack of all trades**
  Equal parts SRE, dev, and /pro(duct|ject) manager/

- **Opinions my own**
  But I owe a lot here to others
Who is this guy

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*NB: what does "SRE" really mean?*
Wikipedia says Engineering is "using scientific principles to design and build $THINGS"

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Imagine $THINGS="Reliability"... how do we apply science to that?
“When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, your knowledge is of a meagre and unsatisfactory kind.”

William Thomson (Lord Kelvin)
President of the Royal Society
*Lecture on "Electrical Units of Measurement”*
Published in "Popular Lectures", Vol. 1, 1883
(abridged to fit slide)
Measurably optimise reliability vs cost
On ops, user harm, and tradeoffs

Your product is here.
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A single HDD has an annualized failure rate (AFR) of ~1.5%

How can we build a more reliable logical disk?
Engineering reliability

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How can we build a more reliable logical disk?

RAID-1 (mirror) should theoretically offer $1.5\%^2 \approx 0.02\%$ AFR

Assuming immediate disk replacement + replication after failure, completely independent disk failures, and no RAID related bugs. None of which is even remotely true, of course.
The (modest) reliability engineer toolbox

Redundant resource
Trade cost

Degraded results
Trade quality

Retry transient failures
Trade latency
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Any of these
Adds complexity
Compound/advanced reliability patterns

Waterfall

Jitter

Breaker

Infra as Code

Partitioning

Sidecar

Fail Static

Self-healing
Innovation
(engineering, proactive, change)

Reliability
(support, reactive, preserve)
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(support, reactive, preserve)

Reliability

(engineering, proactive, change)

Innovation
Reliability

The Error Budget

Innovation

(engineering, proactive, change)
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MTBF/MTTR

Challenge: fungible definition of "failure"

"9s" (e.g. "99.95% uptime")

Challenge: aggregating individual events into business credible 9s
You need "better quality" 9s!

Misaligned
"Whatever I happened to measure"

Aligned
"I spent time ensuring 9s correlate with customer pain"

99.999%
"I spent time making my metrics hit certain thresholds"

99%
"Whatever I happened to ship"
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First move right, then move up

99.999%
"I spent time making my metrics hit certain thresholds"

Wasted Effort

Happy Customers

Misaligned
"Whatever I happened to measure"

Aligned
"I spent time ensuring 9s correlate with customer pain"

Unknown Problem

Known Problem

Unknown Problem

99%
"Whatever I happened to ship"
Measurably optimise reliability vs cost

Your product is here.
Why is this hard?

- Scope
- Difficulty
- Cost++
- Misconceptions
Why is this hard? And why is it good?

- Scope
- Difficulty
- Cost++
- Misconceptions

- Leverage
- Cost--
- Precision
SRE team: a recipe

Fundamental

- Monitoring
- Alerting
- Capacity planning
- CI/CD & Rollouts
- Load Balancing
SRE team: a recipe

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**Advanced**
- System Architecture
- Distributed Algorithms
- Networking
- Operating Systems
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**Pioneering**
- Product Management
- Data Science
- Business Acumen
- UX Research
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- Have a measurement of reliability
- The measurement is tied to project priorities
- Your ops work is tied to the measurement
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* Please remember this is my aspiration... tell me yours?
Thank you!

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