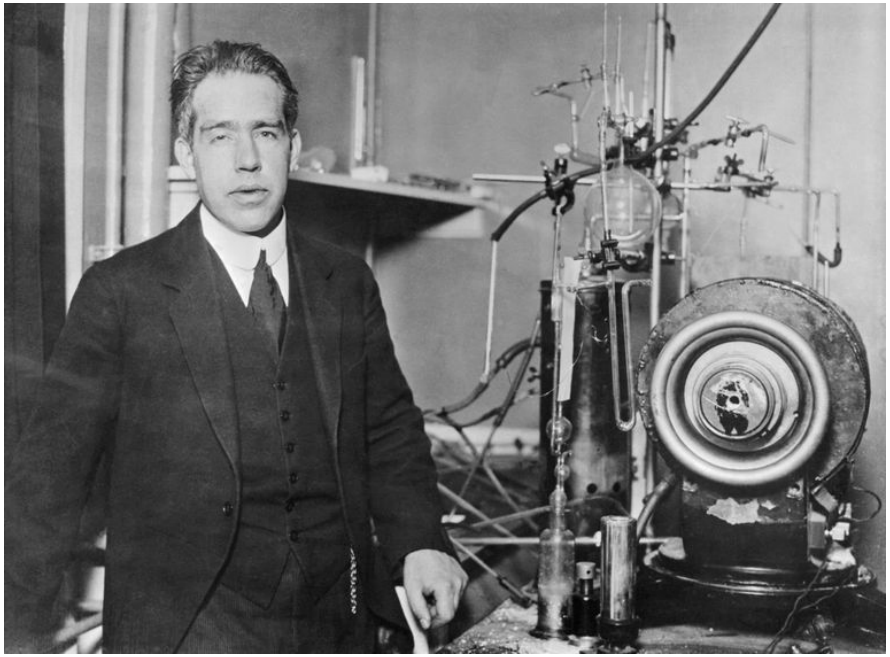
8ms/99th write percentile latency - is it fast?

Understanding the importance of "SRE implements devops"

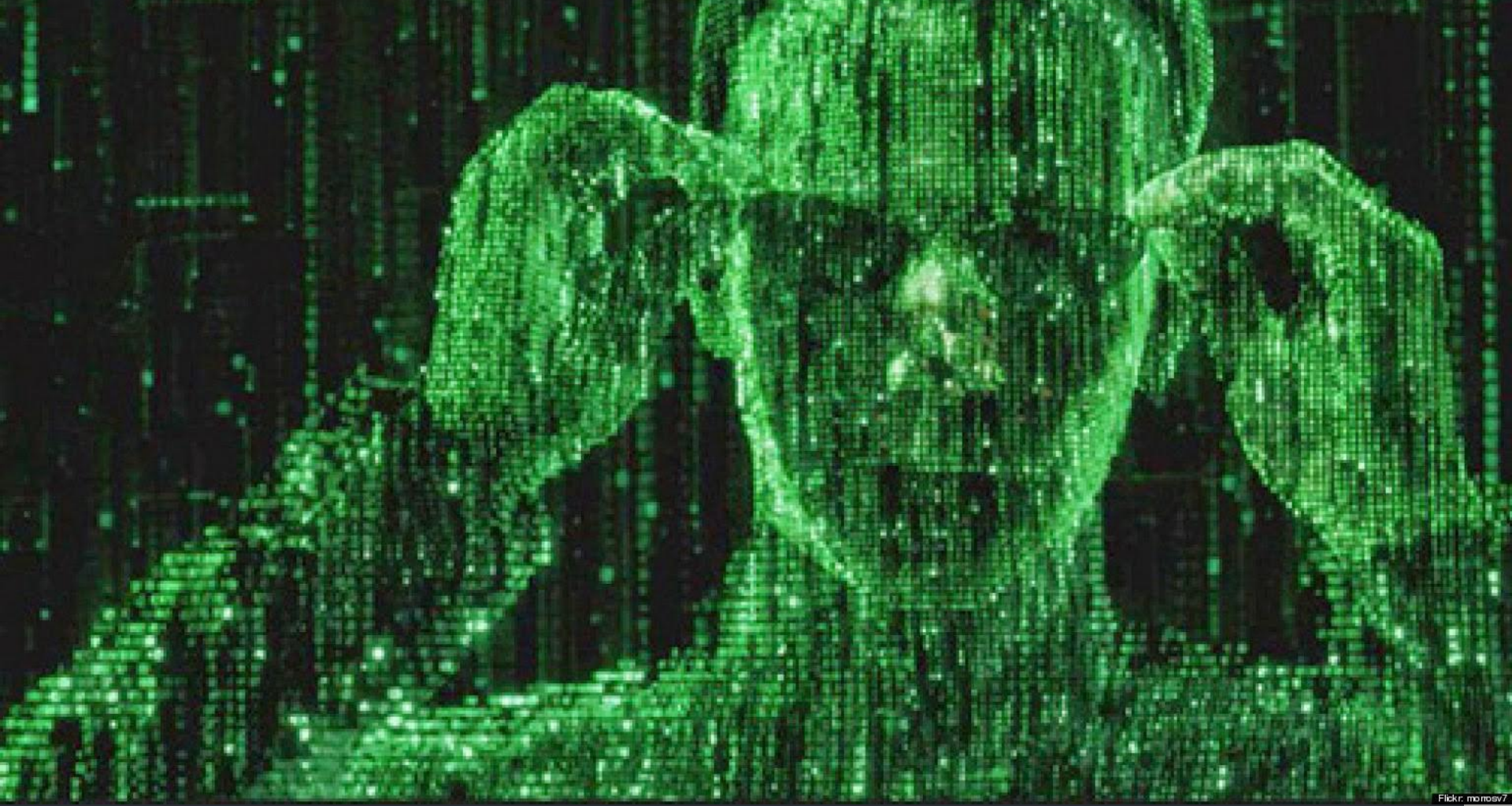
Maciej Lasyk,
Devopsdays Poznań
Kraków 2019-05-20



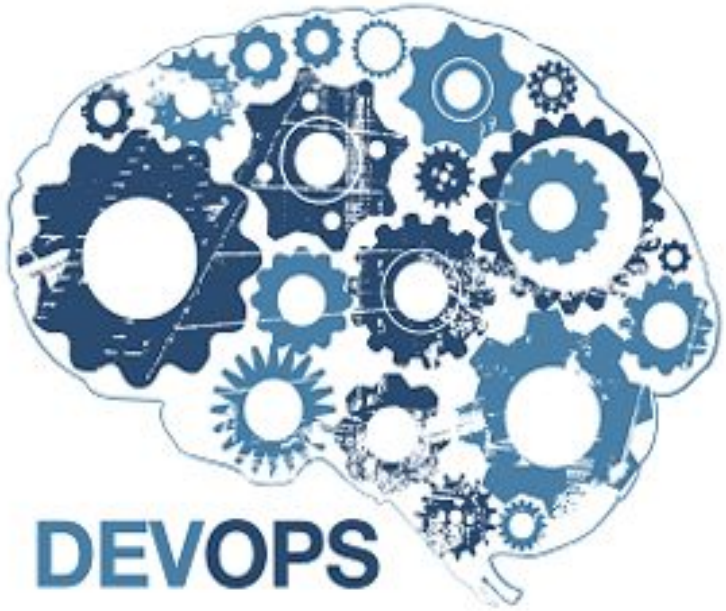
An expert is a person who has made all the mistakes that can be made in a very narrow field

Niels Bohr
(Nobel Prize, quantum physics)

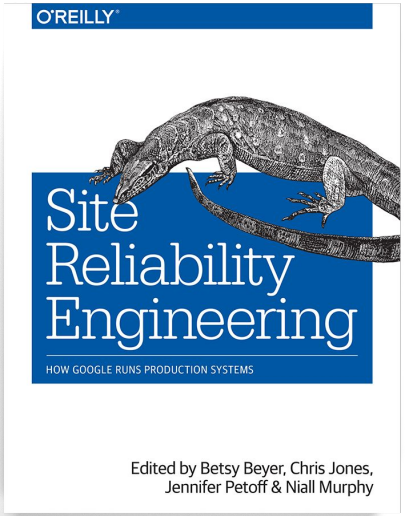
- PUCHACZ -
SP-3366

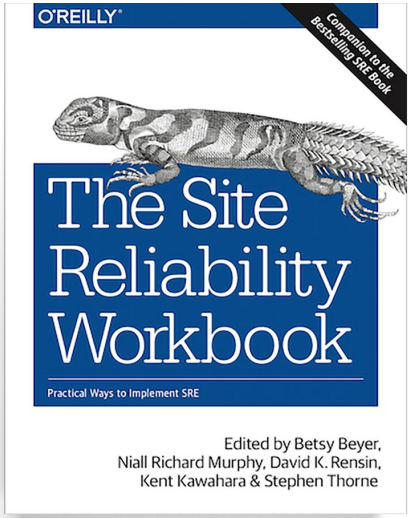

Flickr: morosv7

/Theory/In/Practice
Web Operations
Keeping the Data on Time
O'REILLY®
John Allspaw
& Jesse Robbins


DEVOPS

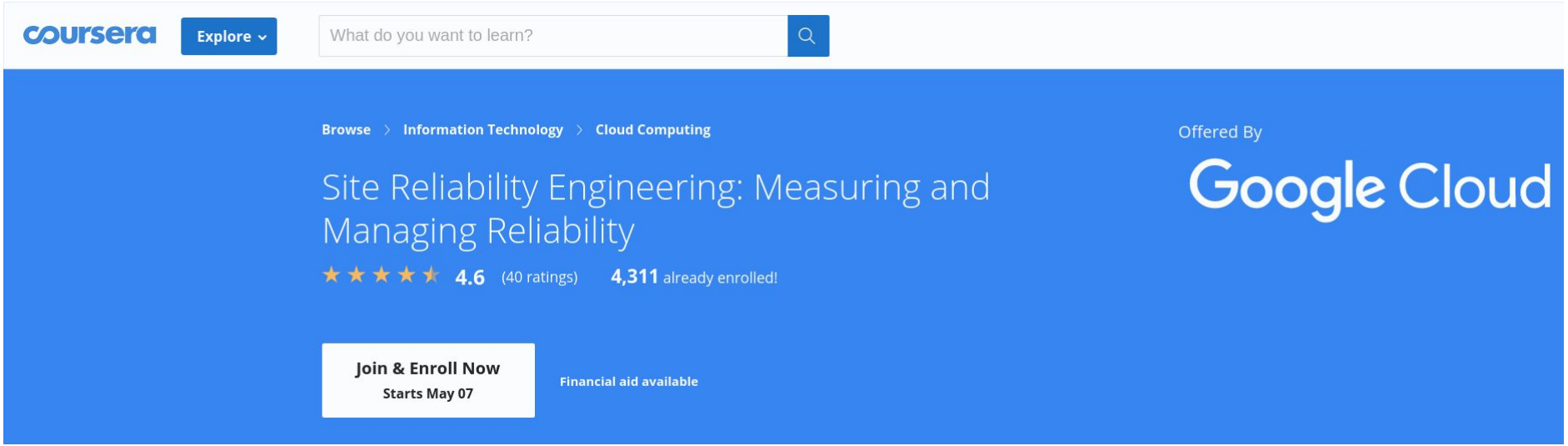
The Google approach



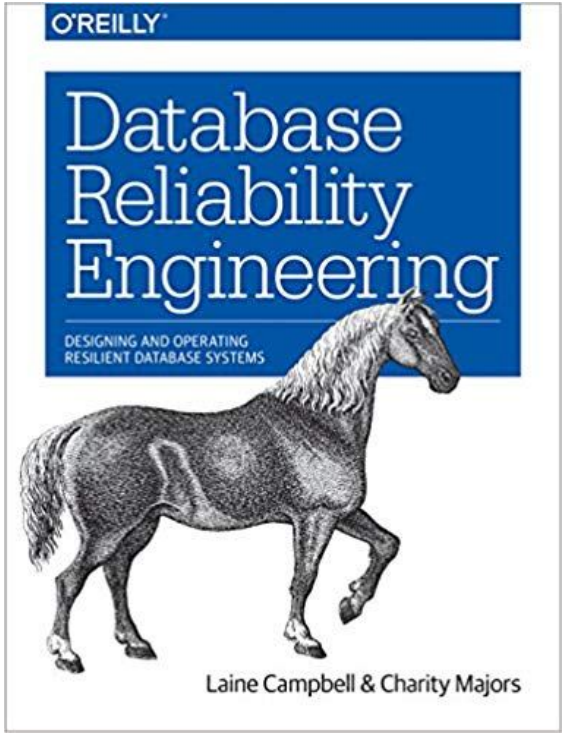


https://landing.google.com/sre/books/

The Google approach



https://www.coursera.org/learn/site-reliability-engineering-slos



https://charity.wtf

What is SRE about?

Are our products working reliable so users are happy?

How much reliability - related work is required?

How to maximize effort on feature development?

Tell me more about SRE

SREs take care of products reliability

Tell me more about SRE

SREs take care of products reliability

At Codewise developers are oncall

So.. developers are SREs!

The CRE principles

- **reliability is the most important feature**
- **users, not monitoring, decide reliability**
- **in order to increase availability there is a need for well engineered:**
  - **software: 99.9% (40min / 28 days)**
  - **operations: 99.99% (4min / 28 days)**
  - **business: 99.999% (24 sec / 28 days)**
  - **above time is the error budget**

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SLA

- Service Level Agreement: a commitment between a service provider (e.g. Codewise) and a customer
- agreement on unreliability of the service in the reliability model
- e.g. Voluum can be down for 1 hour per month and that's fine (only 99.86% availability!)

SLO

- Service Level Objectives, a key element of SLA
- SLO is a measurement characteristic (availability, throughput, response time, quality)
- SLO = successful events / valid events [%]

SLI

- Service Level Indicator
- low level metrics and monitoring checks
- SLI provide data for SLOs
- it’s a measurement of user’s expectations

Error Budget

- How much of downtime is acceptable?
- availability = successful requests / total requests
- 100% - target SLO = error budget

Error Budget

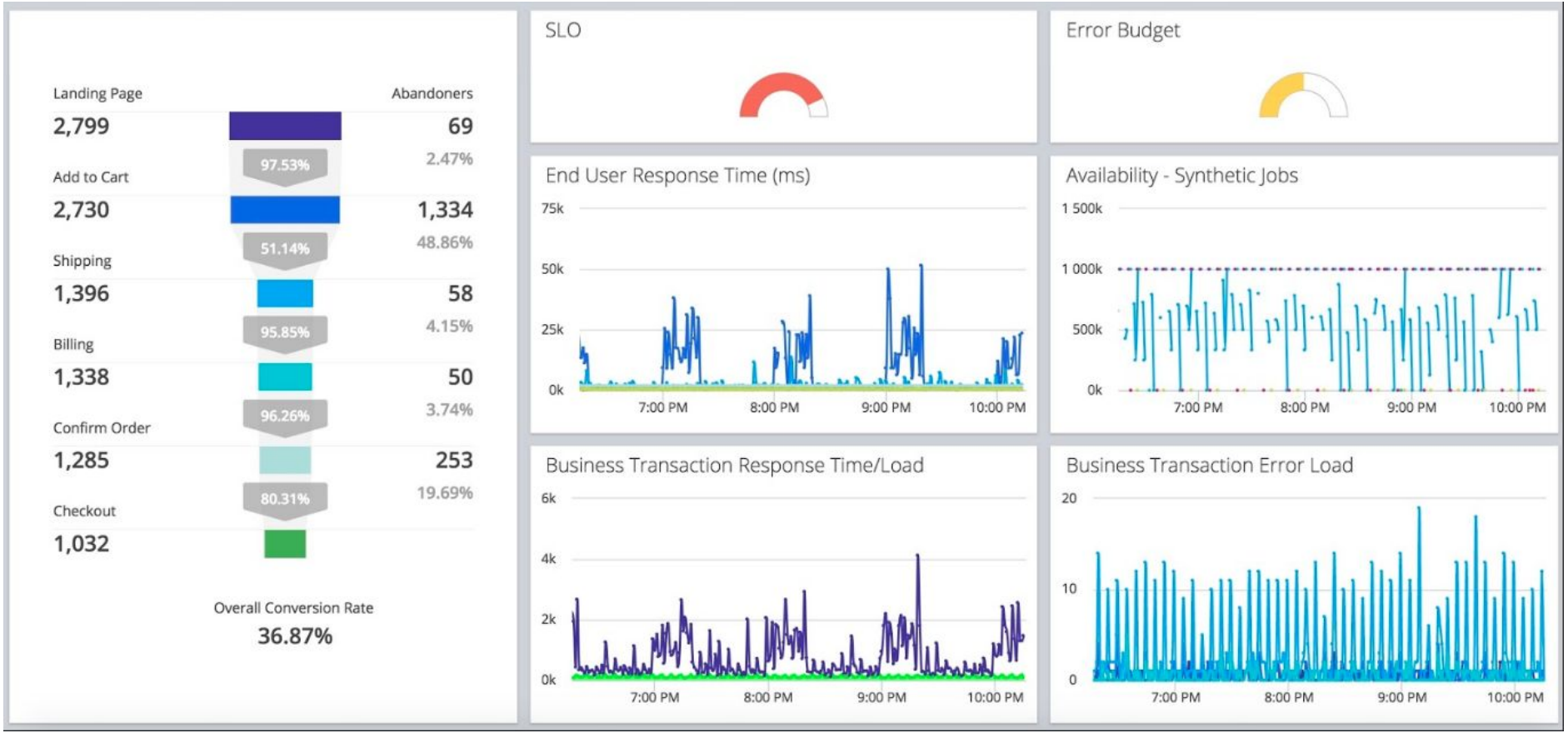
SLO = 95% of responses return within < 1s

Error Budget = 5% responses >= 1s

Error Budget

Target SLO	Allowable Downtime (per 30 days)	Likely Requires
99.999% (5 nines)	0.43 minutes	Automated Failover
99.99% (4 nines)	4.32 minutes	Automated Rollback
99.95% (3.5 nines)	21.6 minutes	
99.9% (3 nines)	43.2 minutes	Comprehensive monitoring and on-call system in place
99.5% (2.5 nines)	216 minutes (~3.5 hours)	
99% (2 nines)	432 minutes (~7 hours)	

Visualizing reliability



Toil

- manual and repetitive work that could be automated
- nontactical / reactive work (e.g. flapping monitoring)
- resolving performance issues with no value for the future
- SRE defines Toil as a waste
- Toils should be removed - perfectly by automation!

Setting up the reliability

Setting up the reliability: the culture debt

SRE roadmap

Created by Maciej Lasyk
Aug 17, 2018

During one of our meetings we've discussed a list of subjects we'd like to take care of in this SRE chapter.

Following is a picture of that discussion followed by a list of those topics and results of our vote for importance:

1. self - healing (7 votes)
2. improve monitoring, metrics, alerting (6)
3. high availability (3)
4. rest
    a. planning for failure (1)
    b. logging (1)
    c. chaos monkey (1)
    d. disaster recovery (1)
    e. capacity planning
    f. operational knowledge

Setting up the reliability: the culture debt

SRE group meets regularly. Here you'll find meeting notes as well as any other informations related to it:

- SRE meeting #1: Hello world!
- SRE meeting #2: Where to?
- SRE meeting #3: The Roadmap
- SRE meeting #4: Self - healing (part 1)
- SRE meeting #5: Self - healing (part 2)
- SRE meeting #6: Self - healing (part 3)
- SRE meeting #7: reactivation
- SRE meeting #8: Infra as a Code (part 1)
- SRE meeting #9: Infra as a Code (part 2)
- SRE meeting #10: SRE follow - up: SLA/SLO/SLI
- SRE meeting #11: SRE follow - up: SLA/SLO/SLI (part 2)

Setting up the reliability: postmortems

SRE group will discuss how this page should look like, what the postmortem template should consist of and any other details.

- Post-mortem 2018-07-06: Cassandra upgrade 2.2->3.11
- Post-mortem: Cassandra, you naughty! 2018-03-02
- Post-mortem: Config-server unstable/down - TEST - 15.06.2018
- Post-mortem: h2o down - GitHub API increased error rates - TEST - 9.08.2018
- Post-mortem: Removed AMI used in production - 10.11.2017
- Post-mortem: Zeropark, 2018-06-29
- Post-mortem: Zeropark, 2018-07-04

Old VoluumDB Post-Mortens / System-Owner's log: https://docs.google.com/document/d/1viuWr6Gs6r3Ex-kOtMWCSFv_-mmWl3sw9yAtUZ978N8

"attack the problem, not the people"

Setting up the reliability: service catalog

Team	Service name	Severity of service (1-3, where 3 is critical and 1 is TV dashboard)	infra provisioning tools	infra provisioning repos	Monitoring tool (Sentinel, Cloudwatch, Datadog etc)	Alerting (Pagerduty, Pingdom etc)	Self - healing (yes / no / partial)	Self - healing (yes / no / partial) - put here anything, we
infrastructure	Cassandra	3	TF & Ansible	click	Sentinel, Datadog, Tornimo	Pagerduty, Tornimo	no	we're working on self - healing (Datadog triggering Rundec
infrastructure	Cassandra-Reaper	2	TF & Ansible	click	Datadog, Tornimo	Pagerduty, Tornimo	no	we're working on IT; ASG + S3
infrastructure	Rundeck	3	TF & Ansible	click	Datadog, Tornimo	Pagerduty, Tornimo	no	we're working on IT; ASG + S3 & RDS
infrastructure	etcd	3	Ansible	click	Sentinel, Datadog	Pagerduty	no	etcd is going down in the nearest future
infrastructure	etcd-browser	2	-	-			no	to be decomissioned after DSP migration to config-server

Introducing SRE between product and devs

Event Details | Find a Time

Googlers shared publically how they work with their customers in terms of applications reliability and they want everyone to learn from their mistakes.

One of my favourite quotes from the training I did on this whole subject is: “targeting specific level of reliability is a key to establish balance between need to maintain system reliability and providing new features to drive user acquisition and revenue growth”.

So - this talk is an introduction to Site and Customer Reliability Engineering (SRE/CRE) where you will learn about:

- Making applications reliability a feature so it can be prioritized
- What level of reliability is enough?
- Measuring the reliability and acknowledging some degree of unreliability
- Defining SLAs (Service Level Agreements) and introducing the “happiness test”
- Setting reliability targets, defining and understanding SLOs (Service Level Objectives)
- Working on key metrics / figuring out SLIs (Service Levels Indicators)

A couple of months ago we created SRE chapter here @Codewise. However, this is an engineering group and **we need our business to take part in this**. Customer Reliability Engineering happens between technology, product and the client. **Thus this invitation for you guys <3**

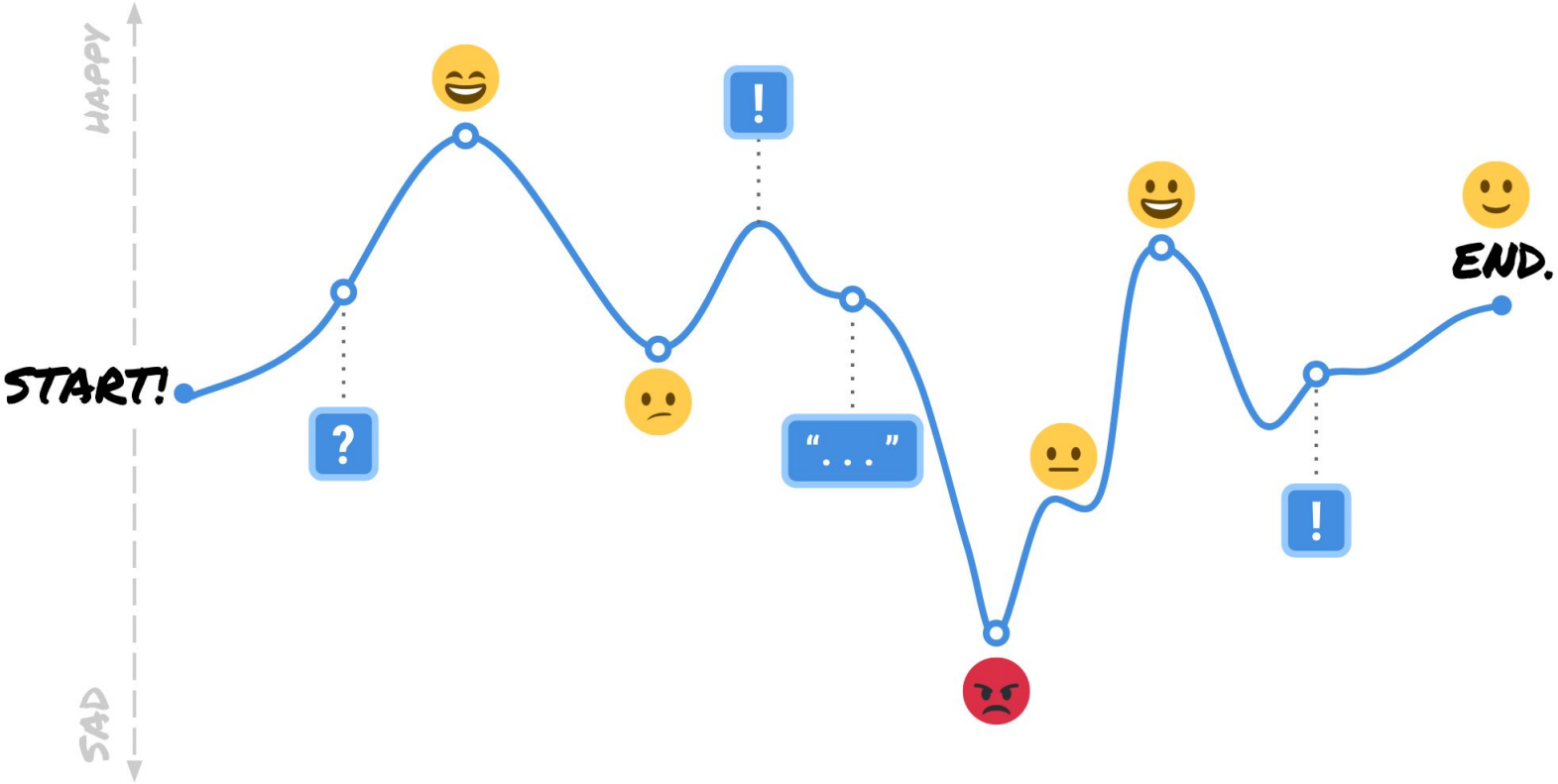
Possible business buyins for reliability

- when everything is stable - focusing 100% on features
- business will know before customers about problems
- lower chance for unhappy customers
- status pages for customers
- dashboards with reliability information
- business may decide to override sometimes

Introducing SRE between product and devs

- Get 3 perspectives:
  - developers’
  - TLs’
  - business’

User journeys and happiness (SLOs!)



https://blog.fullstory.com/customer-journey-maps-session-replay-and-the-power-of-empathy/

Consistency is the key!

Observability & monitoring

TORNIMO

Application monitoring for developers & teams that move fast

Self - healing kit

1. Bring all procedures into one place
2. Automate procedures
3. Test, use manually, build trust
4. Build more trust
5. Attach automation jobs to monitoring
6. Profit

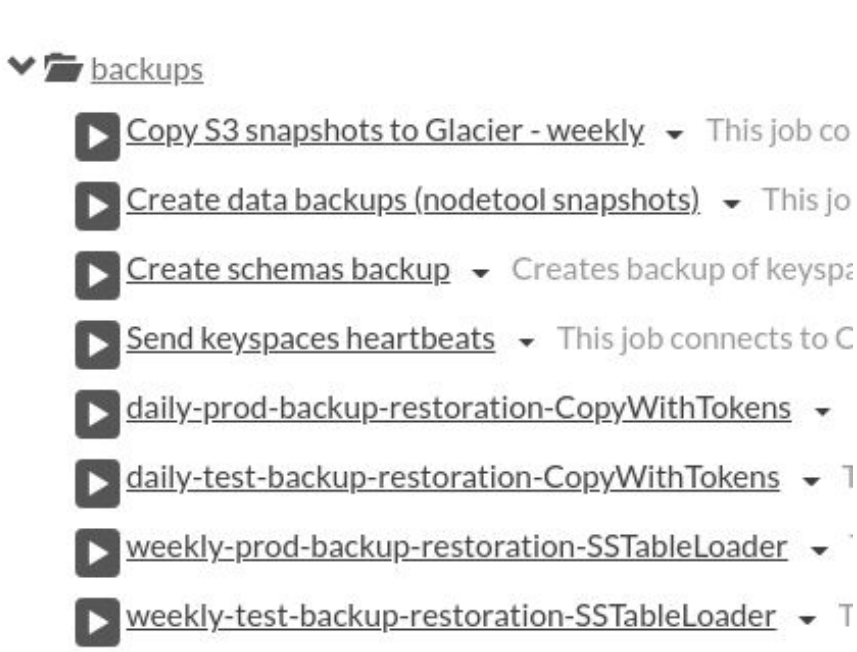
Our generic operational flow

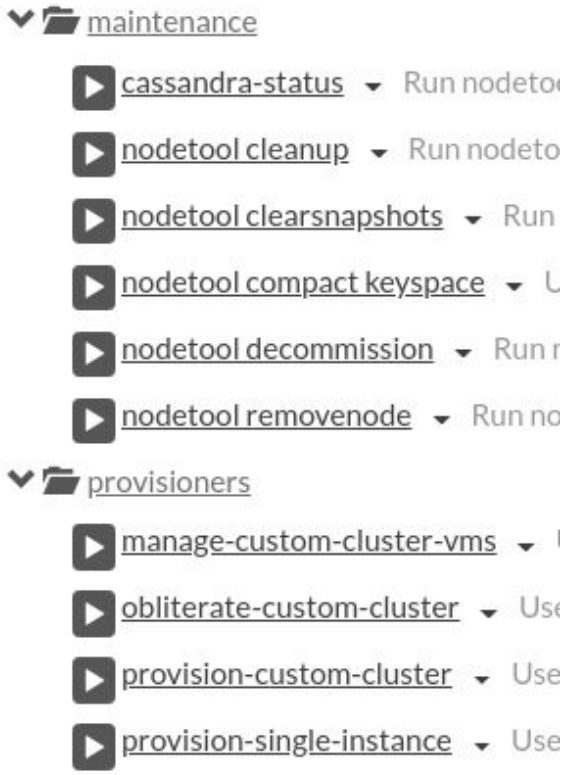
- get all procedures in one place
- put into repo
- use one scheduler (Rundeck)
- Cassandra as a service
- KISS: no k8s & Docker; VMS+ASG+LB=<3
- Just do perf tuning per instance type

Our operational flow for Cassandra

- Using Ansible Playbooks
  - via Vagrant box (suggested way)
  - directly from own laptop (more complicated)
  - Running a playbook
- Cassandra management
  - Accessing and managing container logs
  - Replacing live node without bootstrapping (only on TEST for now)
  - Dead node replacement
  - Cluster restore
  - Resizing Cassandra data filesystem
- Cassandra-Reaper
  - Provisioning Cassandra Reaper
  - Reaper logs
- Etcd
  - Adding new node to cluster
  - Removing node from cluster
  - Upgrading to new etcd version

C* operational tasks and automation





Prepare for the inevitable failure

- 3 nodes down (1 full AZ and one in different AZ) cassandra mst-c-recovery-scenarios
  #71
- 3 nodes down scenario (1 in each AZ) cassandra mst-c-recovery-scenarios
  #70
- 2 AZs down scenario cassandra mst-c-recovery-scenarios
  #69
- 1 AZ down scenario cassandra mst-c-recovery-scenarios
  #68
- Whole cluster fail scenario cassandra mst-c-recovery-scenarios
  #67
- EU failure scenario cassandra mst-c-recovery-scenarios
  #66
- US failure scenario cassandra mst-c-recovery-scenarios
  #63

Drills?

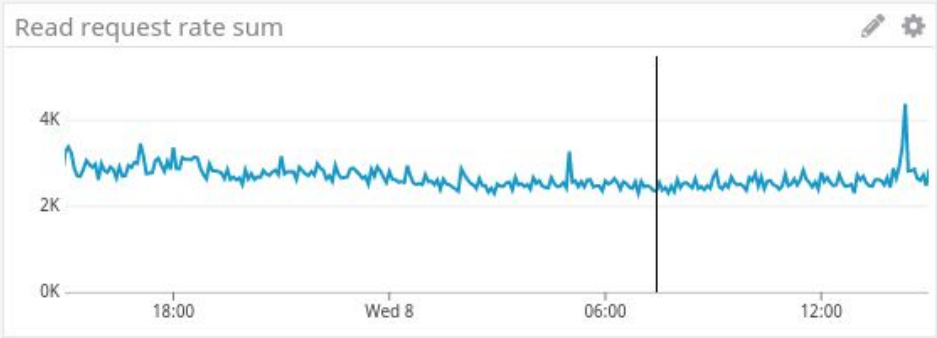
Workshops! And RPG

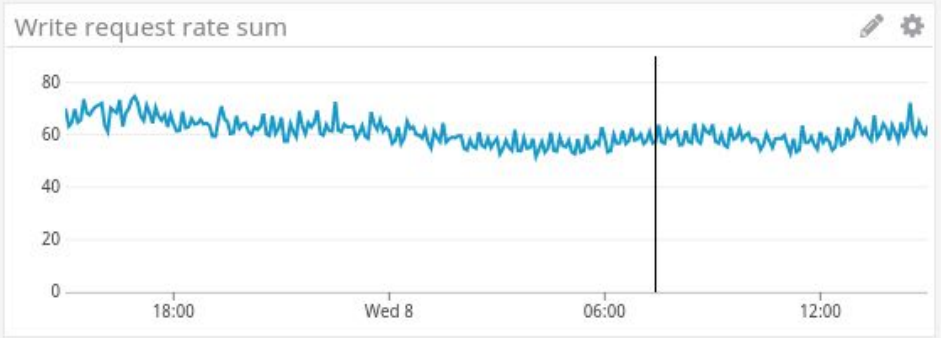
Review regularly performance and logs!

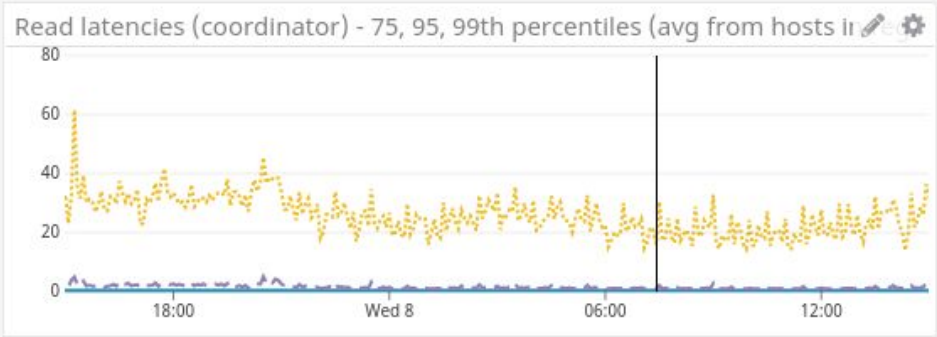
So what exactly means "reliable enough" now?

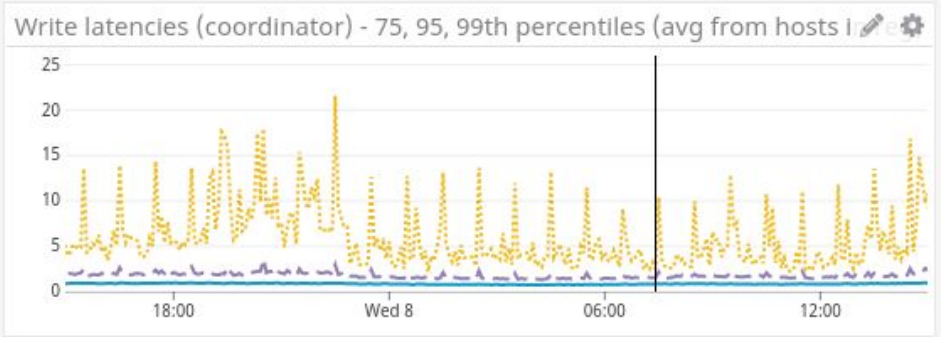
1. on-calls doesn’t really receive C* - related calls
2. But it they did they’d manage
3. Latencies are stable (we’re working on C* SLOs)
4. Latencies are not too low (we are at 50% of possible VM size)
5. neither too high (developers are happy, customers are happy)

So what exactly means "reliable enough" now?









Whatever as a service

1. All 3rd party services might be managed this way
2. Developers on-call
3. High level of automation
4. Think Redis, MongoDB, Zookeeper, Kafka etc
5. The most important thing: developers have to understand technology (e.g. Cassandra)

URLs

1. https://github.com/dastergon/awesome-sre
2. https://landing.google.com/sre/books/
3. https://www.coursera.org/learn/site-reliability-engineering-slos
4. https://github.com/dastergon/awesome-sre
5. https://shermandigital.com/blog/designing-a-cassandra-data-model/
6. https://www.datastax.com/dev/blog/basic-rules-of-cassandra-data-modeling
7. https://docs.datastax.com/en/cassandra/3.0/cassandra/dml/dmlAboutDataConsistency.html
8. https://www.slideshare.net/DataStax/replication-and-consistency-in-cassandra-what-does-it-all-mean-christopher-bradford-datastax-c-summit-2016
9. https://blog.fullstory.com/customer-journey-maps-session-replay-and-the-power-of-empathy/

Thank you, questions?

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