SWEN438 - DevOps

Lecture 13 - Reliability

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Karakia Timatanga

Whakataka te hau ki te uru.
Whakataka te hau ki te tonga.
Kia mākinakina ki uta,
Kia mātaratara ki tai.
Kia hī ake ana te atakura,
he tio, he huka, he hauhū
Tihei mauri ora!

Cease the winds from the west
Cease the winds from the south
Let the breeze blow over the land.
Let the breeze blow over the ocean.
Let the red-tipped dawn come with a sharpened air,
a touch of frost, a promise of a glorious day.
the breath of life

“Imagine getting a flat tire. Even if you have a spare tire in your trunk, do you know if it is inflated? Do you have the tools to change it? And, most importantly, do you remember how to do it right?”

– Netflix on philosophy behind **Chaos Monkey**

Reliable?

Cyber attack: ANZ online access down for third day

10 Sep, 2021 07:27 AM

3 minutes to read

ANZ online banking services down for a third day

John Anthony · 14:56, Sep 10 2021

Kiwibank warns internet banking outages could persist throughout Sunday

Tom Pullar-Strecker · 16:26, Sep 12 2021

The Third Way

"Focuses on creating a culture of **continual learning** *and* **experimentation**. *In the technology value stream, our goal is to create a high-trust culture, reinforcing that we are all lifelong learners who must take risks in our daily work ... we learn from our successes and failures, identifying which ideas don't work and reinforcing those that do."*

– The DevOps Handbook

Continual Learning and Experimentation

- **Enabling learning and a safety culture**. Establishes a generative culture by striving to create a safe system of work. *Removes blame and fear, enabling honesty and prevention.*

- **Improvement of daily work**. Reserves time to pay down technical debt, fix defects, in problematic areas of code and environments. *Makes system of work safer, problems can be fixed from ever weaker failure signals.*

- **Local discoveries to global improvements**. Mechanisms to enable local learnings to be shared. *Helps convert individual expertise into artifacts that the rest of the organization can use.*

Continual Learning and Experimentation (Cont'd)

- **Inject resilience patterns**. Introducing tension to elevate performance, and experimentation to continually increase capacity and resilience. *Ensures capability to implement services that are more reliable.*

- **Leaders reinforce a learning culture**. Create the conditions so teams can discover greatness in their daily work. *The scientific approach improves processes and ensures products that help clients achieve their goals are built.*

Whakataukī

Ākuanei a kino tō ai me he rā

Soon evil disappears like the setting sun

(A community can overcome evil if it tries hard enough)

Techniques

- **Stop-the-line mentality**
  - » Any issue that consists of solution value means team members stop what they are doing.
  - » Then work on the issue together until resolved.
  - » Learnings are turned into permanent fixes to prevent issue from occuring.
- **Plan and rehearse for failures**
  - » In order to minimise impact of failures and improve resiliency of solutions.
  - » Develop recovery plans and practice them in PROD or PROD-like conditions.
- **Fast fix forward and roll back**
  - » Failures are inevitable, teams need to be able to ’fix forward’ or roll back’ quickly.
  - » Fixes must flow through the same process as features.
  - » CD pipeline must accommodate any type of change at any level of severity.

Case Study: Right Media

"In our business, ad inventory levels were extremely dynamic, so we needed to respond to market conditions within minutes. This meant that Development had to be able to quickly make code changes and get them into production as soon as possible, otherwise we would lose to faster competitors. We found that having a separate group for testing, and even deployment, was simply too slow. We had to integrate all these functions into one group, with shared responsibilities and goals. Believe it or not, our biggest challenge was getting developers to overcome their fear of deploying their own code!"

– Nick Galbreath VP of Engineering (2006)

Case Study: Right Media Cont'd

- **Reducing batch size and frequent feedback**. Created safety, then confidence.
- **Work together to resolve problems in PROD**. Quickly recover and encourage people.
- **Proactively getting more peer reviews**. Better automated tests to find issues before deployment.
- **Smoother deployments**. Better service stability, benefits everyone including security.

Case Study: Netflix

*"This was our philosophy when we built **Chaos Monkey**, a tool that randomly disables our production instances to make sure we can survive this common type of failure without any customer impact. ... By running Chaos Monkey in the middle of a business day, in a carefully monitored environment with engineers standing by to address any problems, we can still learn the lessons about the weaknesses of our system, and build automatic recovery mechanisms to deal with them. So next time an instance fails at 3 am on a Sunday, we won?t even notice."*

– Netflix on Chaos Monkey

Auto-Scaling and Auto-Recovery

- **Automated Scaling**
  - » Dynamic adjustment of infrastructure.
  - » Vertical and horizontal scaling.
  - » Helps adjust to change in demand.
- **Automated Recovery**
  - » When a failure occurs, how long does it take to recover and how difficult is it?
  - » Enables minimum effort and recovery time.

Next Lecture

- What is Fuzzing?
  - American Fuzzy Logic (AFL)

Karakia Whakamutunga

Unuhia, unuhia.
Unuhia ki te uru tapu nui
Kia wātea, kia māmā, te ngākau,
te tinana, te wairua i te ara takatā
Koia rā e Rongo, whakairia ake
ki runga
Kia hī ake ana te atakura,
Kia tina! Tina! Hui e! Tāiki e!

Draw on, draw on,
Draw on the supreme sacredness
To clear, to free the heart, the body
and the spirit of mankind
Rongo, suspended high above us
Draw together! Affirm!