

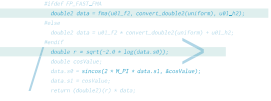
Dealing with Dark Debt

Lessons learnt at Goldman Sachs

Vanessa Yiu

Site Reliability Engineering, Goldman Sachs

SREcon EMEA 2018



Goldman Sachs

Agenda

- SRE@GS
- What is “Dark Debt”?
- How to combat Dark Debt
- Q&A



SRE@GS: Who are we?





Leading global financial services firm

- Investment banking
- Securities services
- Investment management services



Client base includes

- Corporations
- Financial institutions
- Governments
- Individuals



Founded in 1869 as a commercial paper provider



~38k
employees in over 30 countries

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SRE@GS: Who are we?





One in three

of our employees are engineers



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SRE@GS: Scale and impact

Why are we at SREcon?





1.5bn+
lines of code



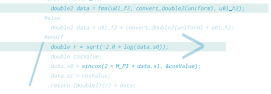
~7k
software products / applications



200k
compute nodes



50TB
data processed daily in our DataLake



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SRE@GS: Scale and impact

Why are we at SREcon?

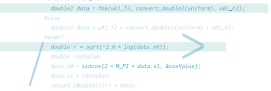


Managing system risks and

complexity at enterprise scale

is the core of what we do as

SREs at Goldman Sachs



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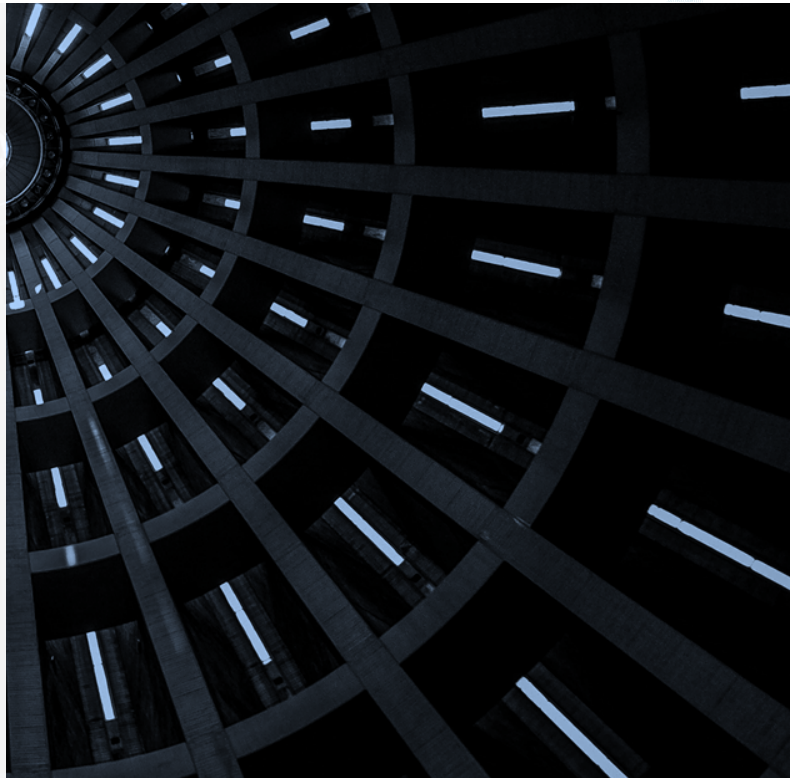
What is Dark Debt?



“Dark debt is found in complex systems and the anomalies it generates are complex system failures. Dark debt is not recognizable at the time of creation. … **It arises from the unforeseen interactions of hardware or software with other parts of the framework. …**”

STELLA Report from SNAFUcatchers

Workshop on Coping With Complexity (2017)



How to combat Dark Debt



1. PREVENTION
2. INSIGHT
3. DETECTION
4. DIAGNOSE
5. CULTURE

How to combat Dark Debt



1 **PREVENTION**

2 INSIGHT

3 DETECTION

4 DIAGNOSE

5 CULTURE

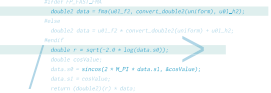
1

Build ***sustainable*** development ecosystems.

SecDb Ecosystem



- Central risk management platform for Goldman Sachs
- Object oriented database with dependency graph
- Has own language and integrated development environment
- **Invented 25 years ago *but only 2 weeks old!***



Goldman Sachs

SecDb Ecosystem



- Designed with transparency and collaboration from the outset
- Everyone can read code and see dependencies
- Everyone can ***write and execute*** code locally too!



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SecDb Ecosystem

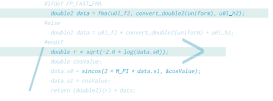


- Heavy investment in linting and beaconing

  Examples:

  - Instrumentation of complete runtime environment
  - Automated bots
  - “Fix Me!” comments

- Gamification to improve codebase



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How to combat Dark Debt



1 PREVENTION

2 INSIGHT

3 DETECTION

4 DIAGNOSE

5 CULTURE

2

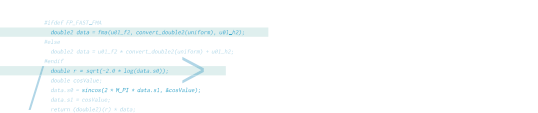
Decouple monitoring tools from application.

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Java Runtime Monitor (JRM)



- Agent embedded into JRE
- JMX metrics
- Beaconing / instrumentation
- Developers can expose app specific data
- All data ingested into centralised monitoring / alerting / data analytics framework
- Configuration **completely decoupled** from sourcecode



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How to combat Dark Debt



1 PREVENTION

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3

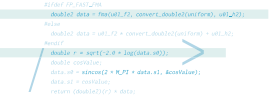
Controlled chaos is good for your systems.

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Chaos Engineering



- Controlled experiments to test for anomalies in system behaviour
- Flags issues with potential to cause outages
- Helps uncover systemic weaknesses, including dark debt, ***at point in time***
- **But systems are not static!**
- Recalibrate and run continuously across environment



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How to combat Dark Debt



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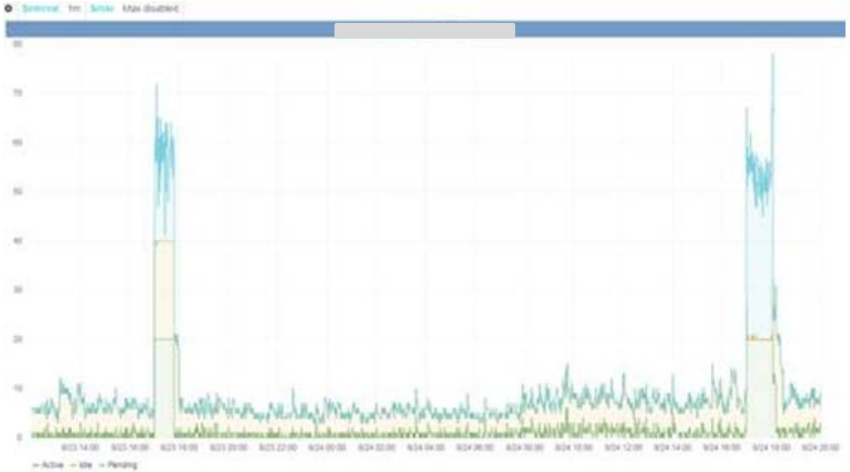
4

Visualise issues in your distributed systems.

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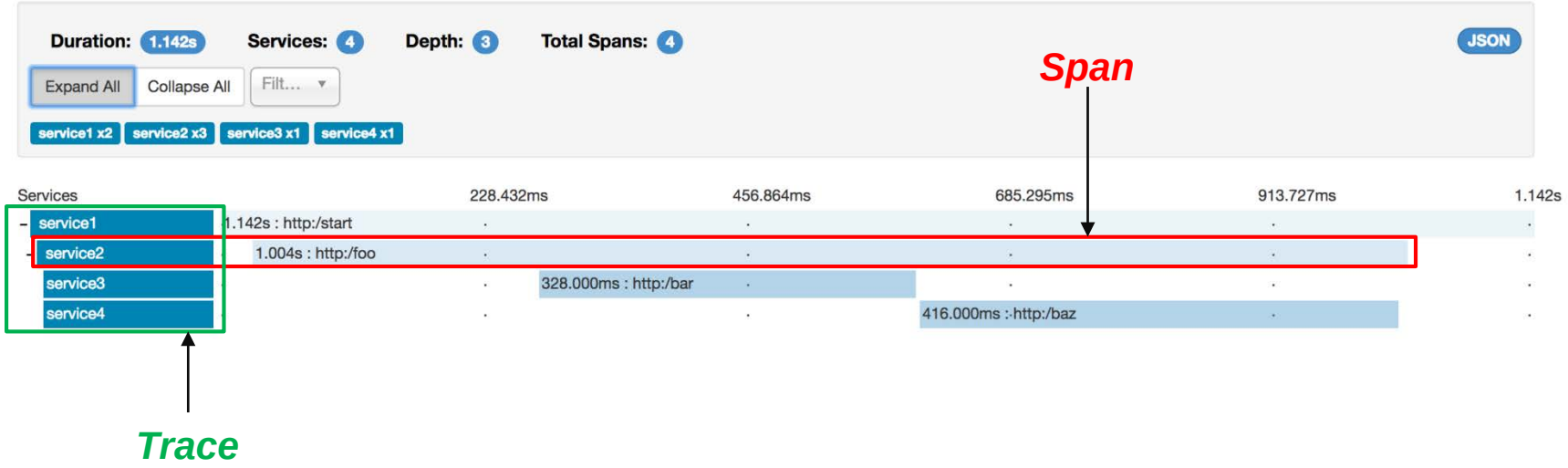
Distributed Tracing



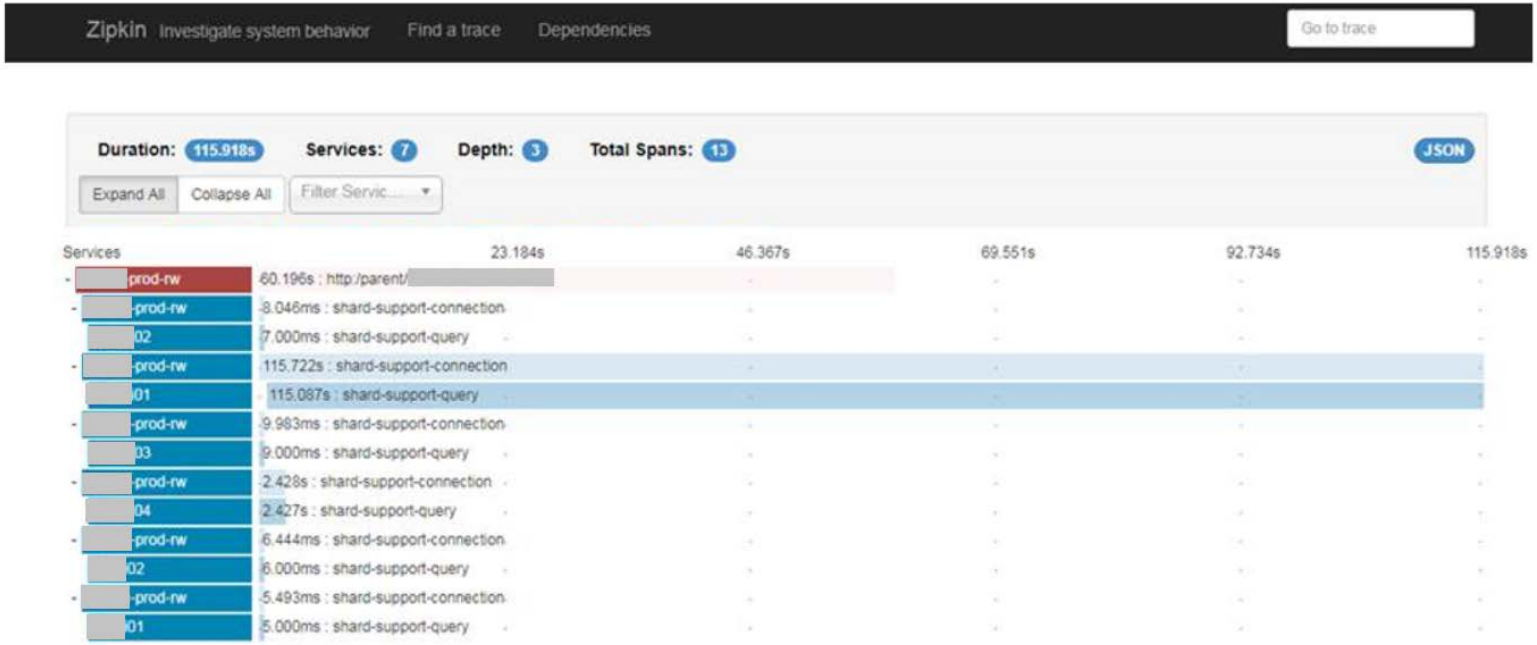




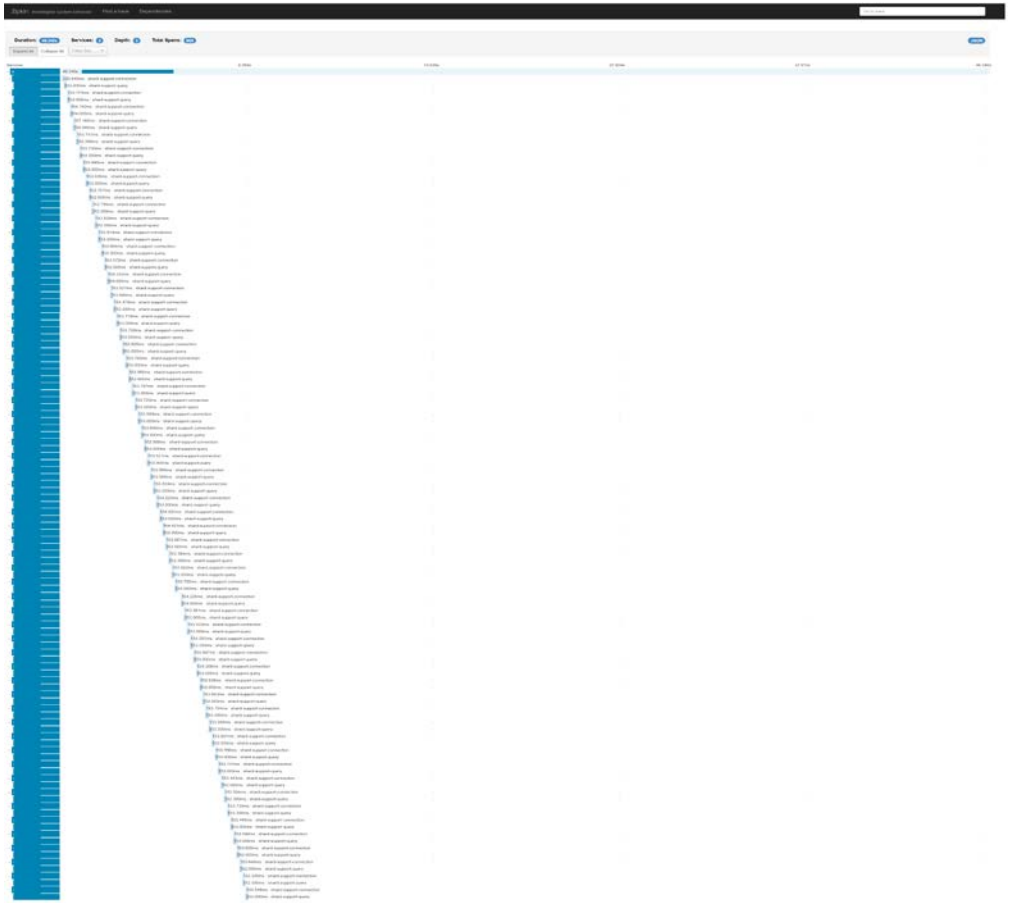
Distributed Tracing



Distributed Tracing



Distributed Tracing



How to combat Dark Debt



1 PREVENTION

2 INSIGHT

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5

Help ***foster right culture and practices***.

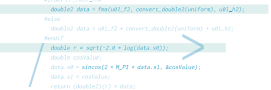
Dos and Don’ts



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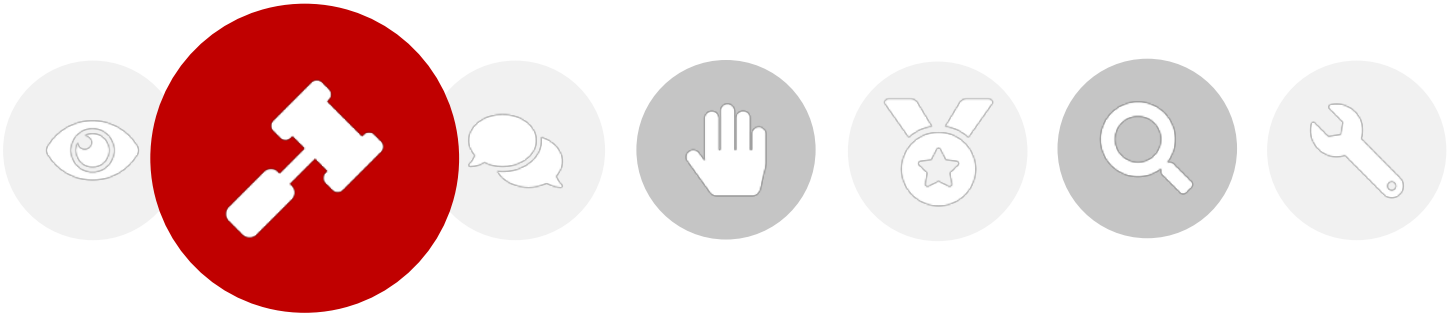
The Don’ts





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The Don’ts



Don’t play Whack-A-Mole!

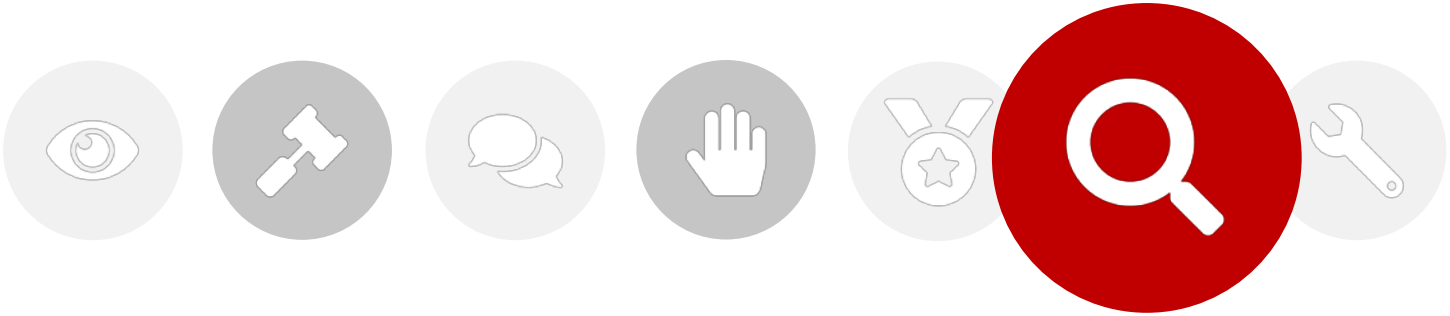
The Don’ts



Say no to “dark matter” developers

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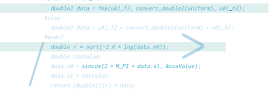
The Don’ts



Don’t ignore your technical debt

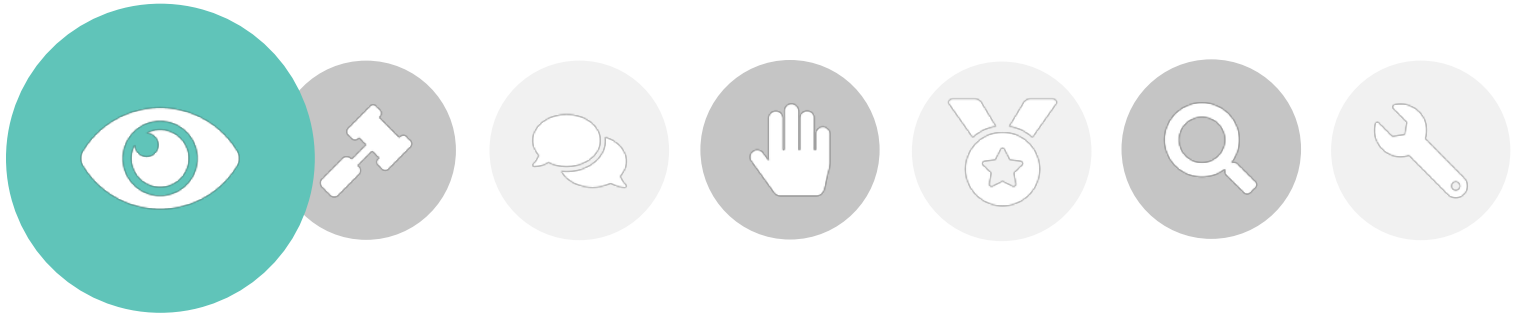
The Dos





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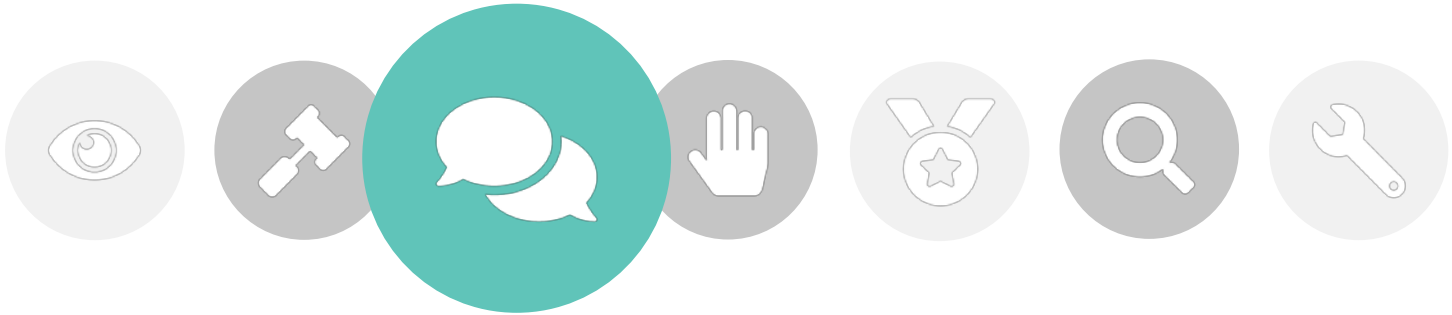
The Dos



Increase runtime transparency

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The Dos



Practice blameless post-mortems

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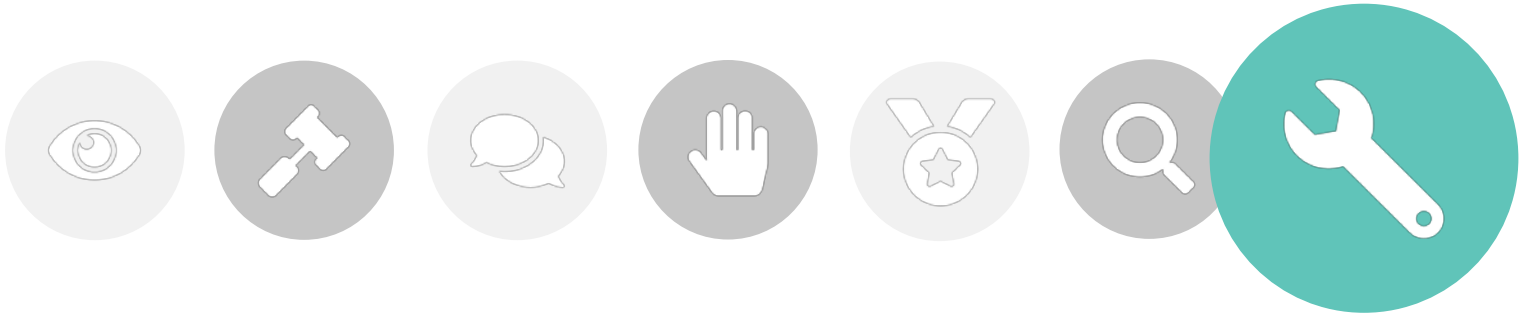
The Dos



Pair programming and peer code reviews

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The Dos



SRE hackathons / dedicated sprints for refactoring

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How to combat Dark Debt



1	**PREVENTION**	Build ***sustainable*** development ecosystems.
2	**INSIGHT**	***Decouple*** monitoring tools from application.
3	**DETECTION**	***Controlled chaos*** is good for your systems.
4	**DIAGNOSE**	***Visualise*** issues in your distributed systems.
5	**CULTURE**	Help ***foster right culture and practices***.

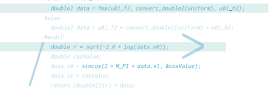
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