EXPLORE

The Platform Contract

Developing more robust applications.

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Meet Your Expert(s)

Job Role:

PaaS Product Owner, NatWest

Areas of Specialism:

• Product Owner

• Cloud

• Service Management

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Kieran Breen

Meet Your Expert(s)

Job Role:

Developer Advocate, Broadcom

Areas of Specialism:

• Programming, Java, Spring Framework

• Platform Engineering

• Cloud Native

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DaShaun Carter

Agenda

A little about our platform.

What we offer our consumers.

User experience / feedback.

Investigating issues found.

Learning and communicating our findings.

Revising our platform contract.

NatWest Banking Group

We are a UK-focused bank, serving over 19 million customers

Over 1 million new personal current accounts in 2023

~62k staff worldwide

1 in 4 UK payments processed in 2021

750 million financial transactions per month

NatWest Group

NatWest

Royal Bank of Scotland

HOLT'S MILITARY BANKING

RBS International

10.9 million active digital users

Over 1.5 million new savings accounts in 2023

Coutts

Lombard

Ulster Bank

94% of Retail Banking customers' needs now met digitally

MultiCloud!

Tanzu Platform for Cloud Foundry at NatWest

6,400+ Developers, 50,000+ containers over two sites, supporting all NatWest Franchises.

Platform Customers

6,400+ Developers
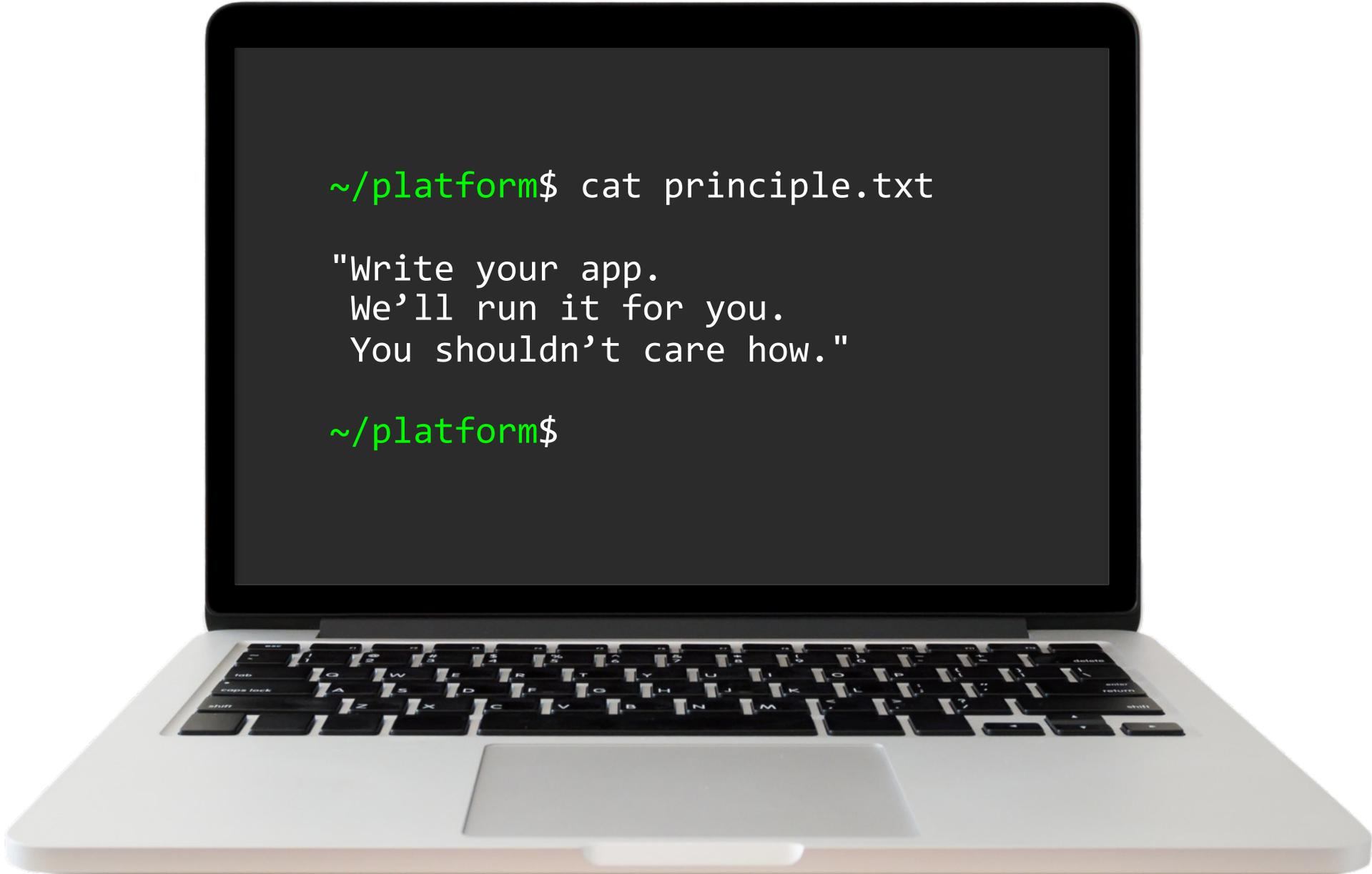
300+ Unique Applications

All NatWest Franchises

Platform Scale

50,000+ Containers

2 Sites

4 Foundations

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How we Engage with our Customers
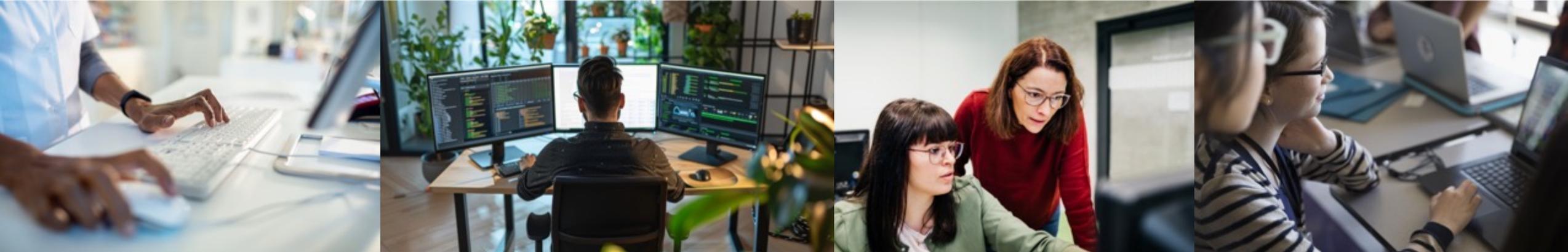
Developer Self-Service

Go live without platform team

Platform Engineering

Operational activities

Application Engineering

Developer support for platform

Enterprise Engineering

Developer experience and frameworks

Our Tanzu Platform for Cloud Foundry Developers Feedback

Feedback from our customers, the developers is positive.

Developers like

- Platform simplicity.

- Easiest platform to onboard.

- Easy to check app health in production.

- Focus on apps, not infrastructure.

Why Weren't Upgrades Transparent?
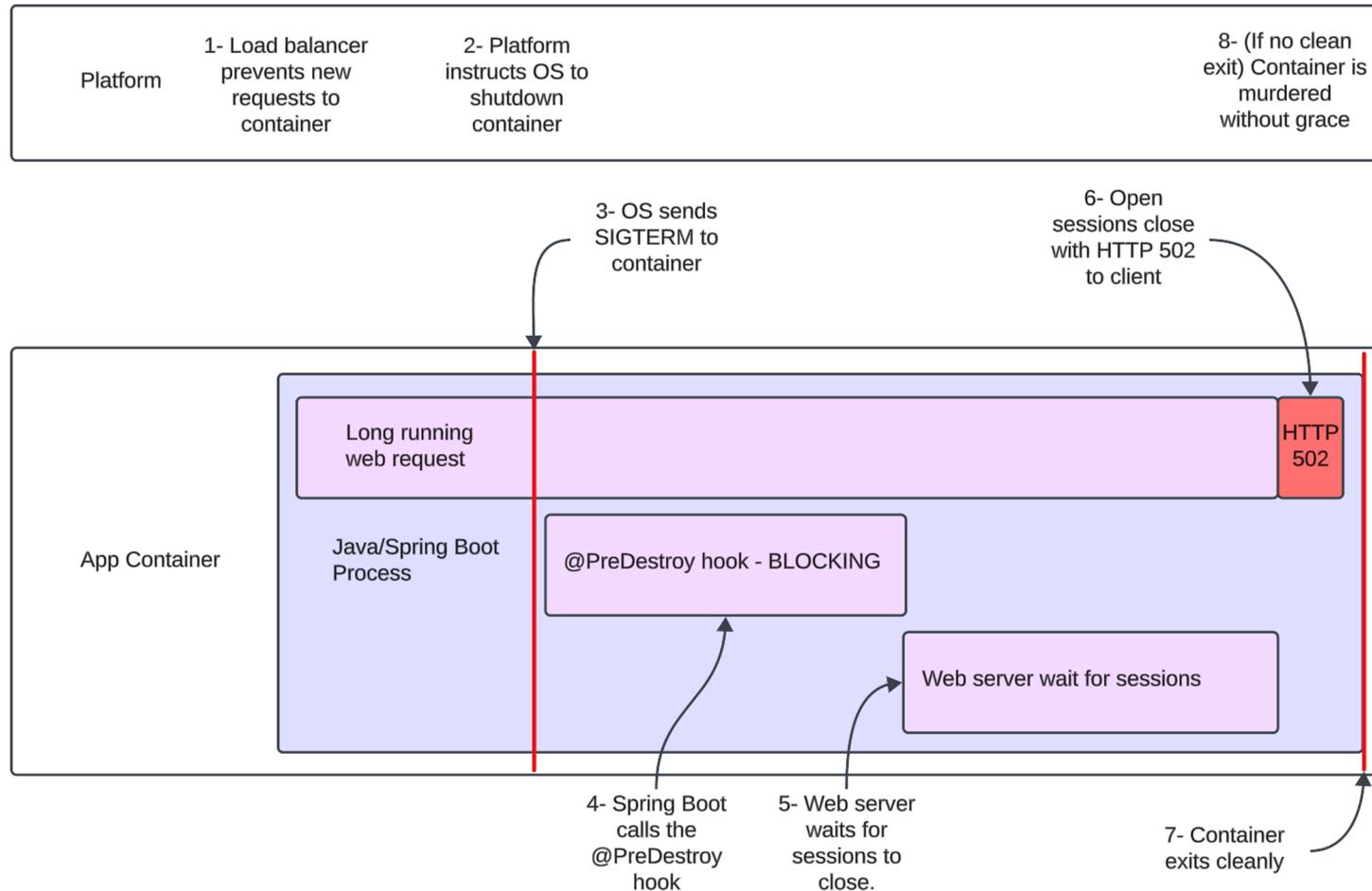
Unexpected response codes

```
[RTR/0] OUT app.bill.dev - [2024-08-16T10:39:42Z] "GET / HTTP/1.1" 502 0
```

Applications terminated whilst processing transactions

```
Exit status 137 (exceeded 10s graceful shutdown interval)
```

Explaining the Observed Behaviour?

Spring Boot shutdown with long running web requests

| Platform | 1- Load balancer prevents new requests to container | 2- Platform instructs OS to shutdown container | | 8- (If no clean exit) Container is murdered without grace |

3- OS sends SIGTERM to container

6- Open sessions close with HTTP 502 to client

App Container

Long running web request

HTTP 502

Java/Spring Boot Process

@PreDestroy hook - BLOCKING

Web server wait for sessions

4- Spring Boot calls the @PreDestroy hook

5- Web server waits for sessions to close.

7- Container exits cleanly

What Would Good Look Like

12 Factor App - Factor 9 Disposability

".. Implicit in this model is that HTTP requests are short (no more than a few seconds)"

"… or in the case of long polling, the client should seamlessly attempt to reconnect when the connection is lost."

The fix… architecture change.

Processes shut down gracefully when they receive a SIGTERM signal from the process manager.

The fix… PreDestroy hook.

The Technical Fix

In Spring Boot, use the @PreDestroy hook.

Teams should test how their application responds to SIGTERM to validate this behaviour.

```
public class MessageProcessor {

    @PreDestroy
    public void stopProcessor() {

        // stop handling new messages
        // ...
    }

}
```

Validating the Fixes

- App teams must test.

- App team can issue a rolling restart during a pre-prod load test.

- Tanzu team wrote a CF CLI plugin to check for bad behaviour.

- Platform team can search through load balancer (Gorouter) logs to check for relevant error codes.

```
→ cf sig-check java-sigterm-ignore
Rolling restarting app guid: 15d5d1a3-a2f3-4d80
New instances running for: 15d5d1a3-a2f3-4d80-a
Waiting 30 seconds for shutdowns to complete
HTTP endpint error due to requests outstanding!
HTTP endpint error due to requests outstanding!
HTTP endpint error due to requests outstanding!
HTTP endpint error due to requests outstanding!
Restart complete for app guid: 15d5d1a3-a2f3-4d
2 instaces restarted

!!!FAILED!!!
0 instances terminated using SIGKILL.
4 http endpoint error/s encountered
```

Front-load Efforts to Avoid Later Errors.

What "shift left" means in practice.

- Influence during app and service architecture planning.

- Consult with application teams as early as possible.

- Create templates showing what good looks like and giving starter code/projects.
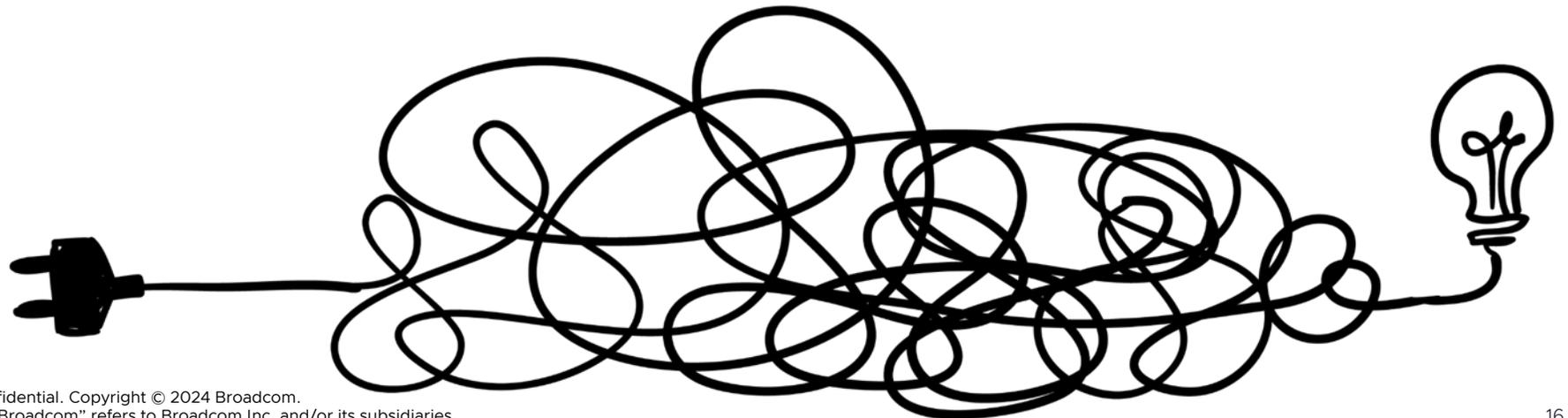
Changing Existing Customer Behaviour

- Provide tools and metrics that help check for issues.

- Provide relevant sample code.

- Write docs about point issues.

- Run education sessions.

- Build understanding of app/platform interaction.

```
~/platform$ cat CONTRACT_DEF.txt

"A platform contract is an agreed
 understanding between application
 developers and platform providers
 about how their respective systems
 will interact."
```

Next Steps

- Provide app teams with CI jobs that can check for bad behaving apps.

- Continue to iterate on the Platform Contract and education.

- Work with our Enterprise Engineering group on high level architecture patterns focusing on long running transactions.

- Work on platform level and/or app level dashboards that show app lifecycle issues.
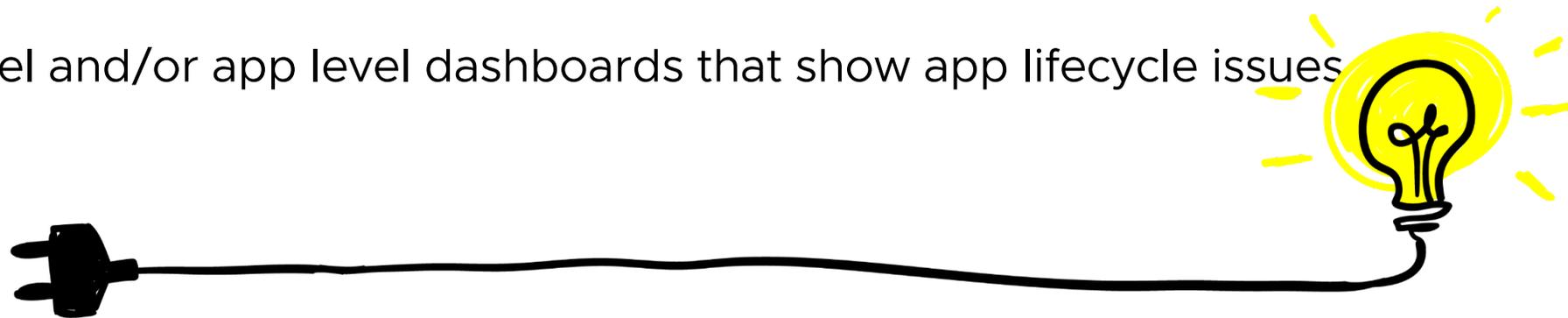
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Please take your survey.

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Thank You