

September , 2023

# Operational Excellence at Zendesk



John Viner  
Senior Director of Engineering

A Framework for running reliable software at scale



# Agenda

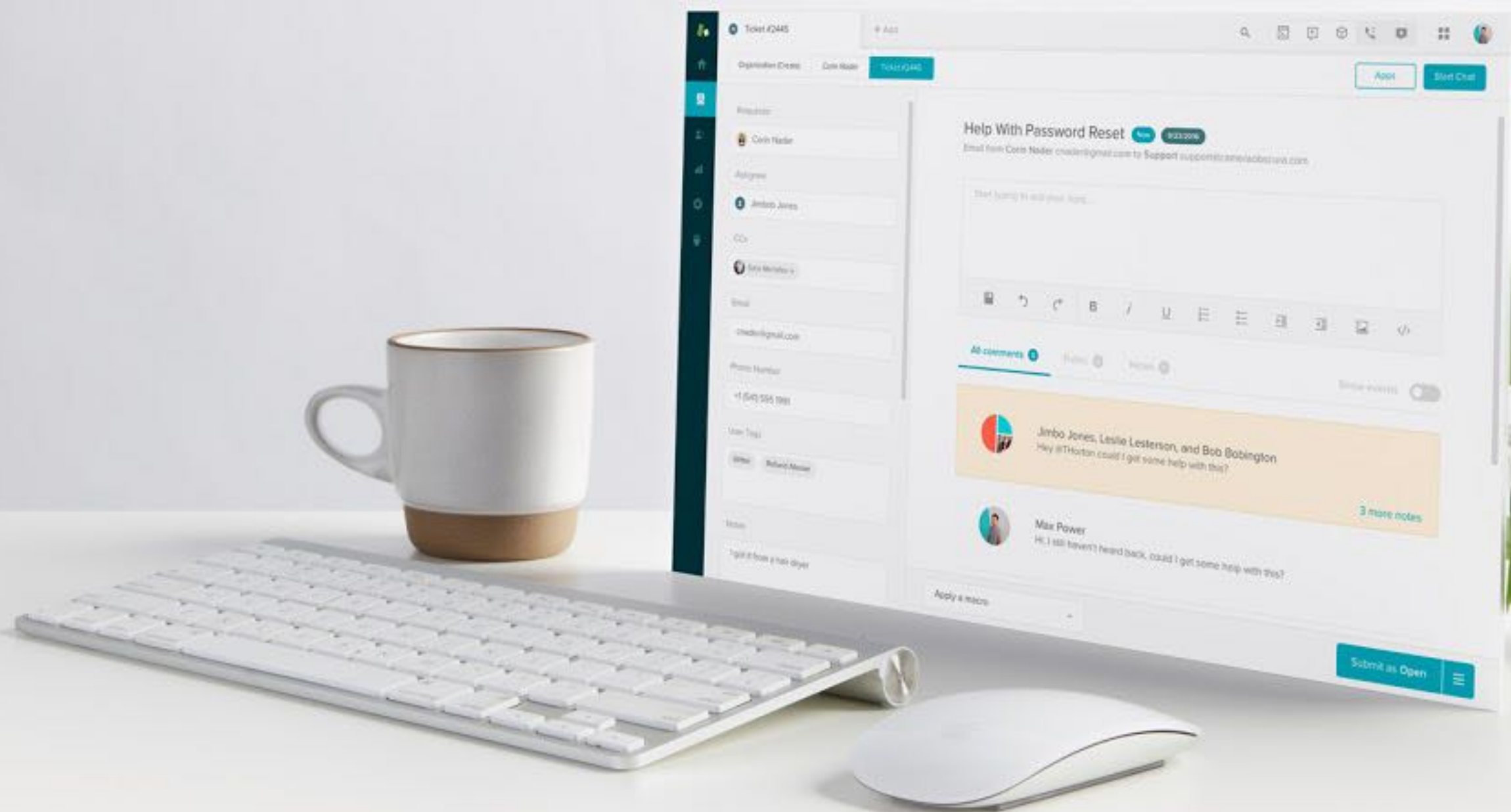
Recap - Error Budgets

Operational Metrics Review

Operational Excellence Dashboard

The Results

Recommendations



# Recap: 2019 Error Budgets



# ERROR BUDGETS RECAP - 2019

---



**SLI - Service Level Indicator**

HOME PAGE REQUEST SERVED IN  
< 100MS

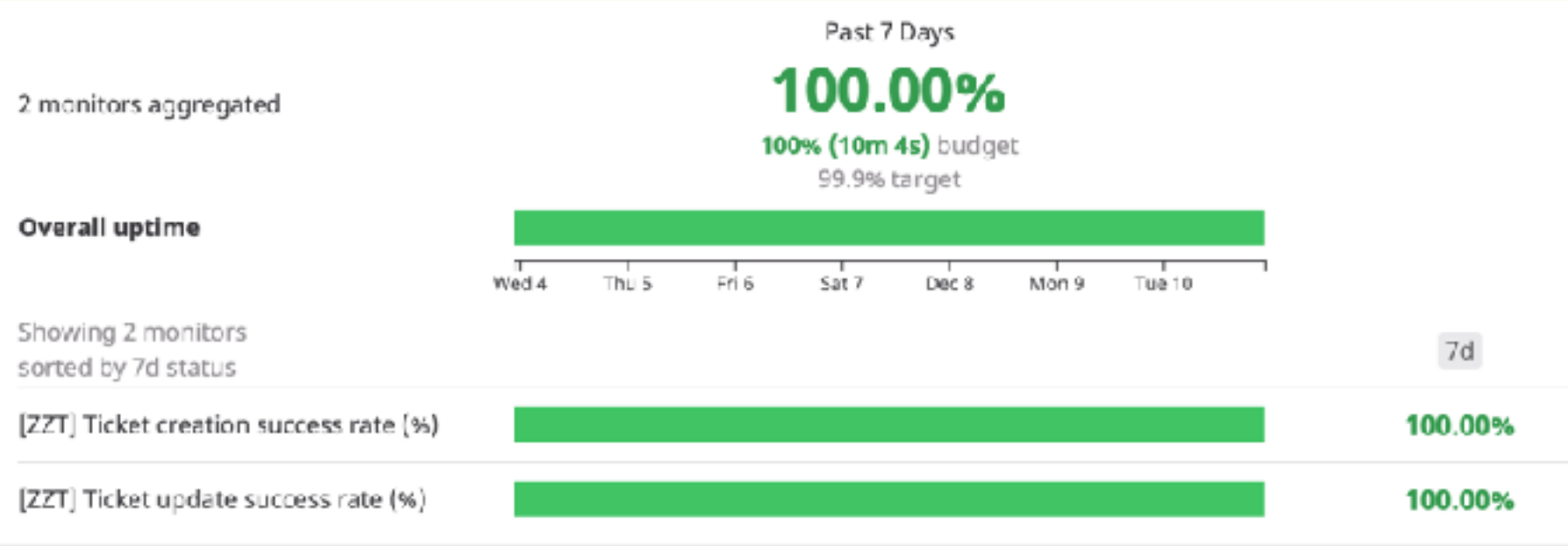
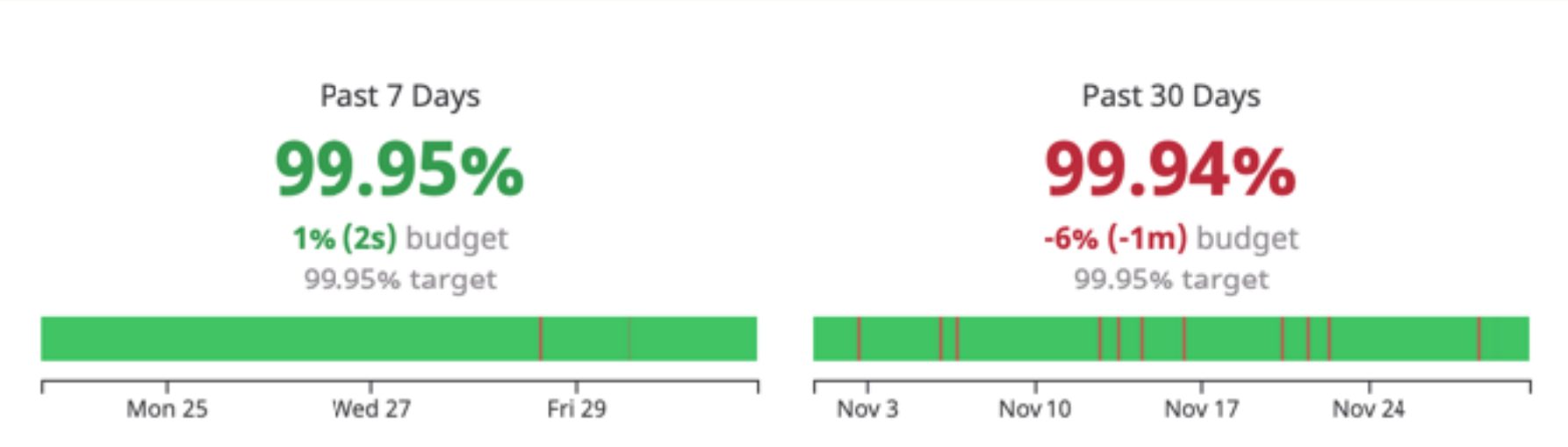
**SLO - Service Level Objective**

95% OF HOME PAGE REQUESTS SERVED  
IN < 100MS OVER LAST 24 HOURS

**Error Budget**

ALLOW 5% FAILURE OF HOME PAGE  
REQUESTS SERVED IN < 100MS  
OVER LAST 24 HOURS

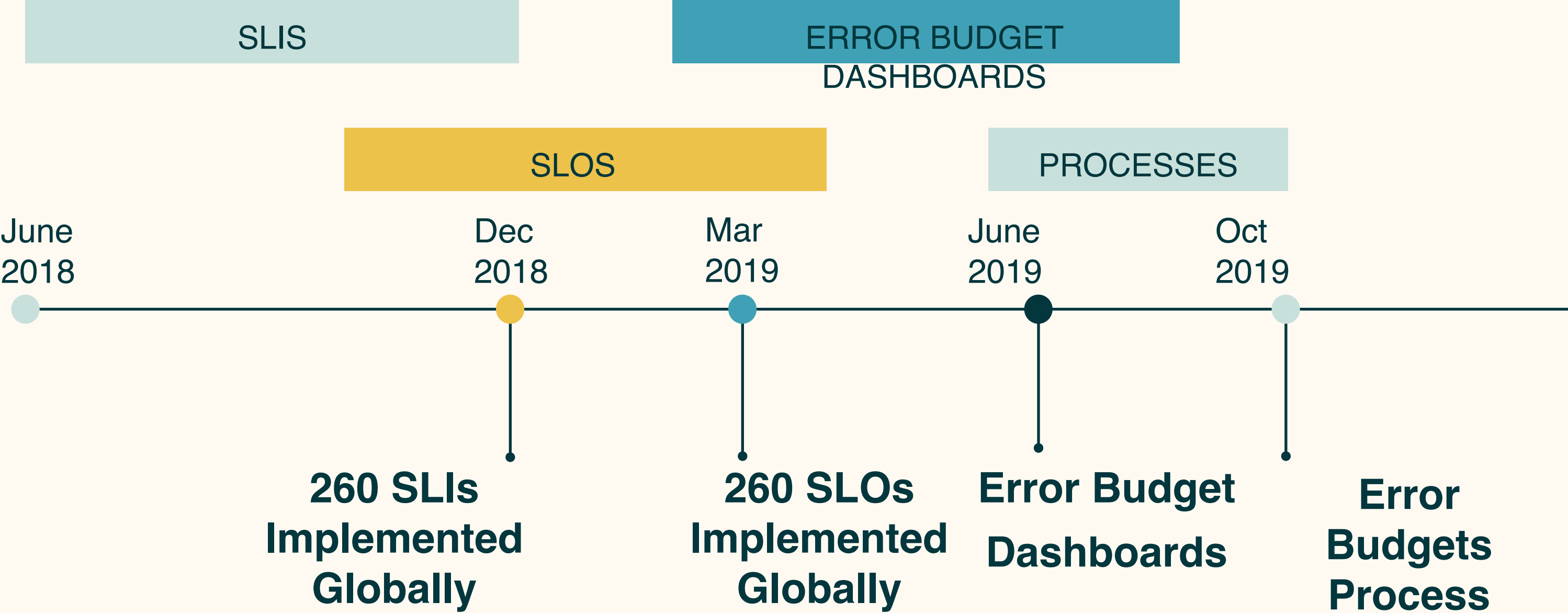
# ERROR BUDGETS RECAP



[le Controls](#) | Showing 1221-1240 of 2K results

TYPE	NAME ↑	TIME ↑	STATUS	ERROR BUDGET LEFT
🕒	Api::V2::WorkspacesController#update laten...	30d	🕒	—
🕒	Api::V2beta::Tickets::RelatedController#sho...	30d	100.00%	100% (14h 24m)
🕒	Api::V2beta::Tickets::RelatedController#sho...	30d	100.00%	7% budget left (1m 36s remaining)
🕒	Article Page "Up"	30d	99.95%	7% (1m 36s)
🕒	Articles API "Up"	30d	99.99%	91% (19m 35s)
🕒	AttachmentsController#token Duration (95p...	30d	100.00%	100% (14h 24m)
🕒	AttachmentsController#token Error Rate 🚫	30d	100.00%	100% (14h 24m)
🕒	AttachmentTokenController#show Duration ...	30d	99.08%	54% (7h 46m)
🕒	AttachmentTokenController#show Error Rat...	30d	100.00%	100% (14h 24m)

ERROR BUDGETS RECAP





# Freeze or thaw?





# We Needed to do More

**1**

Pre Deployment Testing

---

**2**

Deployment Standards

---

**3**

Production Smoke Tests

---

**4**

Alerting and Monitoring

---

**5**

Completing Remediation Items

---

**6**

SLI Coverage and Error Budget Status

---

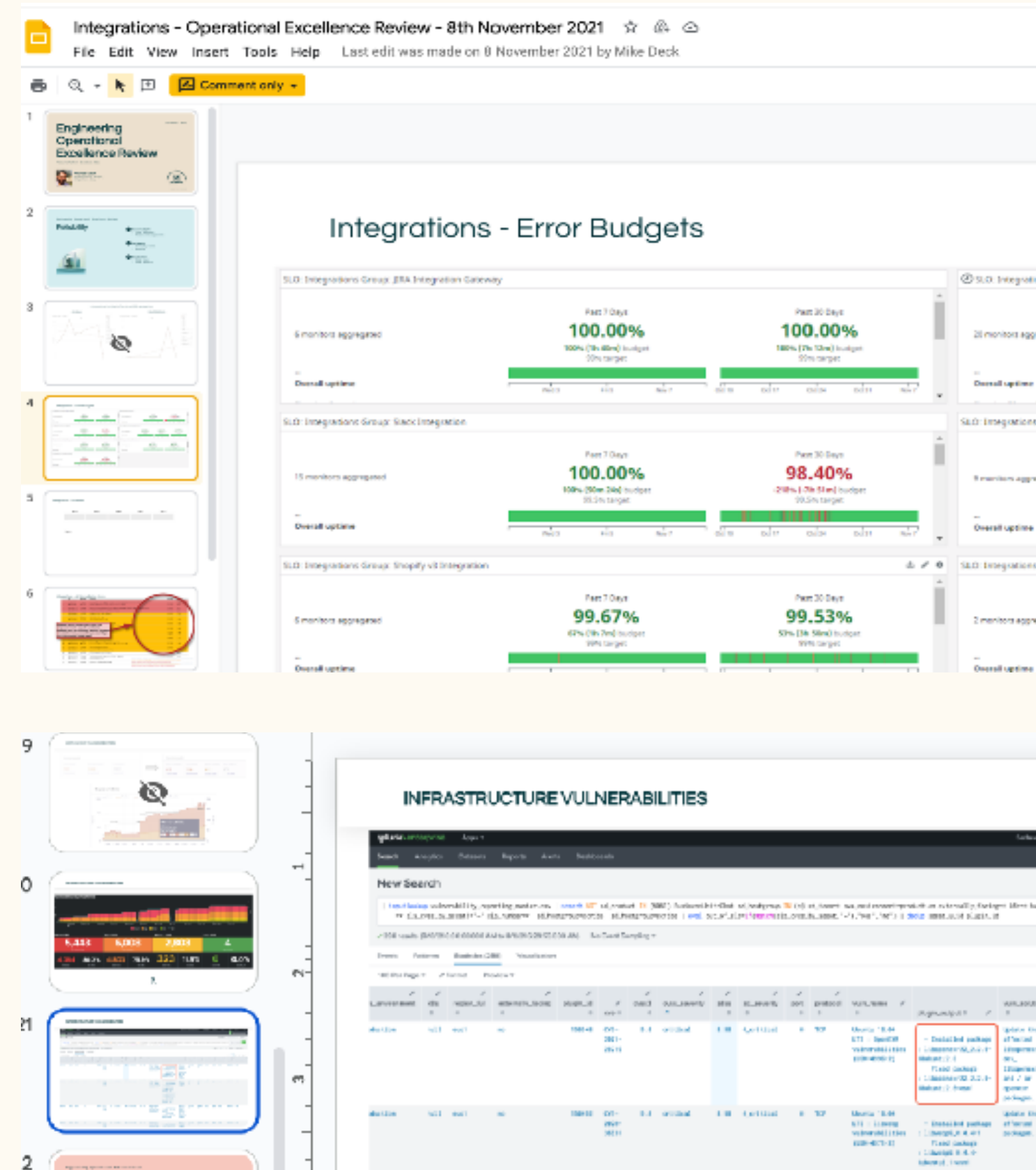
Across 1500 Engineers, 250+ teams and 7 worldwide locations

# V1: The Operational Metrics Review



# Bringing Our Operational Metrics Together in One Place

Metric / Indicator	Chat Reliability Review	Support Reliability Review	Dev Platform - Sunshine Customer Trust Review	Core Services Monthly Ops Metrics Review	Guide Reliability Review	Agent Workspace Ops Metrics Review
<b>Reliability</b>						
TFA (Current and last 3 months)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
# Incidents by Severity	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
# Incidents by Failure Mode	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Incident Details Sev 0/1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Incident Details Sev 2/3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Incident Details Sev 4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SLO / Error Budget Status - By Product/Feature	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SLO / Error Budget Status - By Team	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
# Remediation Items Open / Out of SLA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Remediation Item List	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Incidents in Staging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pro-Active Reliability Work	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Release Process Compliance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gameday/Chaos Testing Participation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Customer Support</b>						
Z1 Tickets - # by State	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Z1 Tickets - Out of SLA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Z1 Tickets by Cause	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Z1 Ticket Details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Security</b>						
Application Vulnerabilities - # Out of SLA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Application Vulnerabilities - Details	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Infrastructure Vulnerabilities - Out of SLA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Infrastructure Vulnerabilities - In # Out of SLA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Infrastructure Vulnerabilities Details - Out of SLA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pro-Active Security Work	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Security Product Reviews	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Security Threat Modeling Sessions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Quality</b>						
Integration Test Success Rate - Production	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Integration Test Success Rate - Staging	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Integration Test Failure Modes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Test Code Coverage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reliability Static Bug Detection (Senscube)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flaky tests on github	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flaky tests on Jenkins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fully built smoke tests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
KTL O Load	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technical Debt Issues (Debtify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Escaped Defects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smoke Tests Success Rates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Money</b>						
Cloud Spend Review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>



## **Learnings**

- Screenshot Busy Work for Engineering Managers
- Content Quickly Diverged from Template
- Reporting Dimensions Not Consistent
- Data Munging Effort Duplicated Throughout the Company

# V2: Operational Excellence Dashboard



# Standardising

**1**

Single Reporting System

---

**2**

Single Data Ingestion Pipeline

---

**3**

Standard Org Structure

---

**4**

Same Monthly Cadence

---

**5**

Single Notification and Recording

---

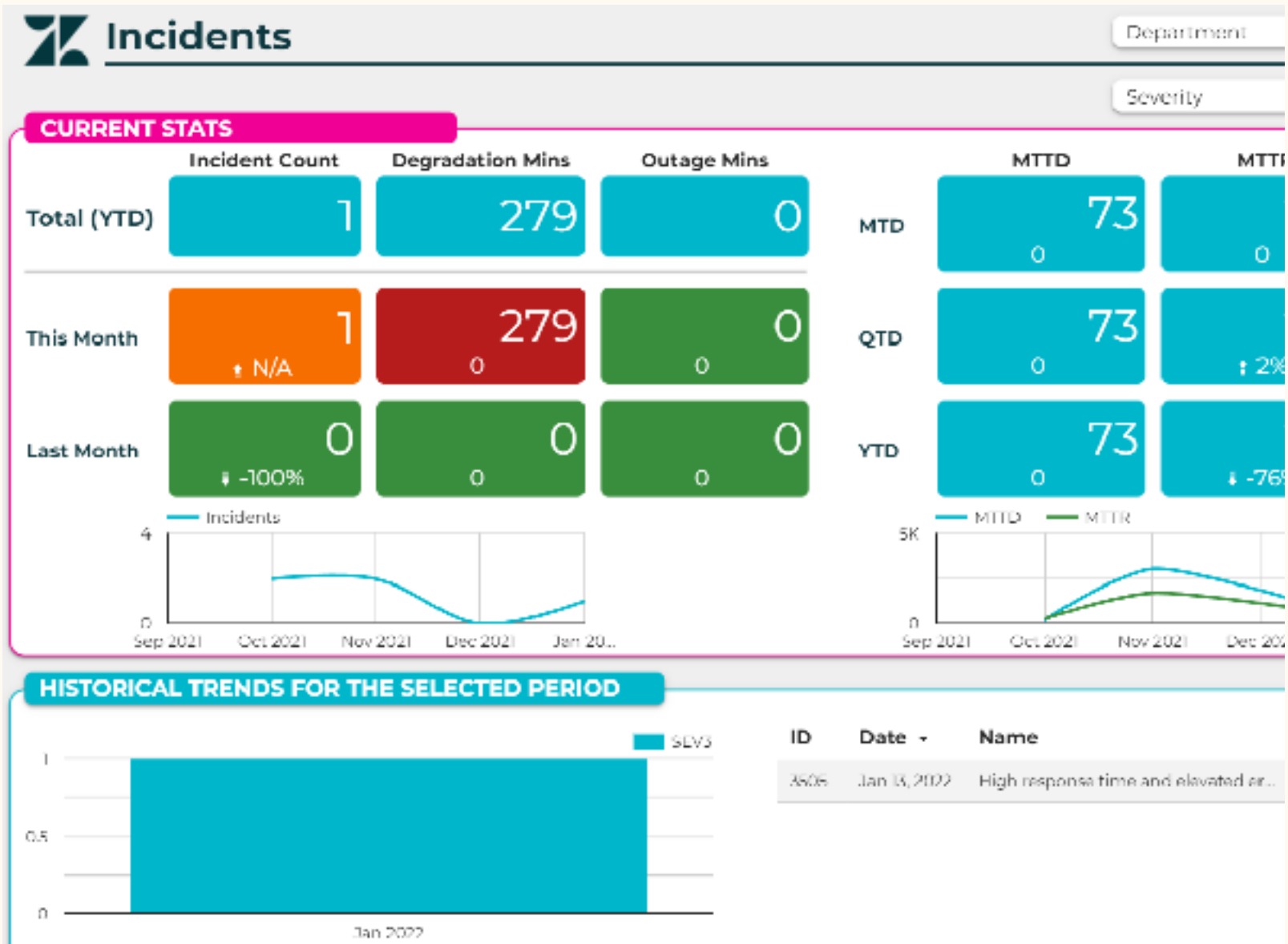
**6**

One Team to Own It

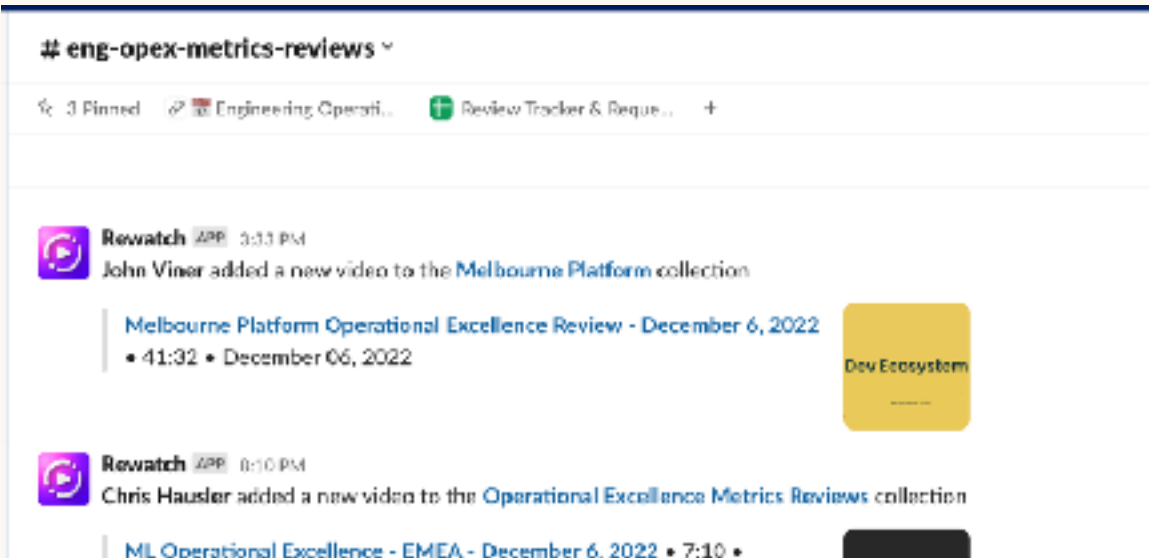
---



# Bringing it together



# And Sharing



## **Learnings**

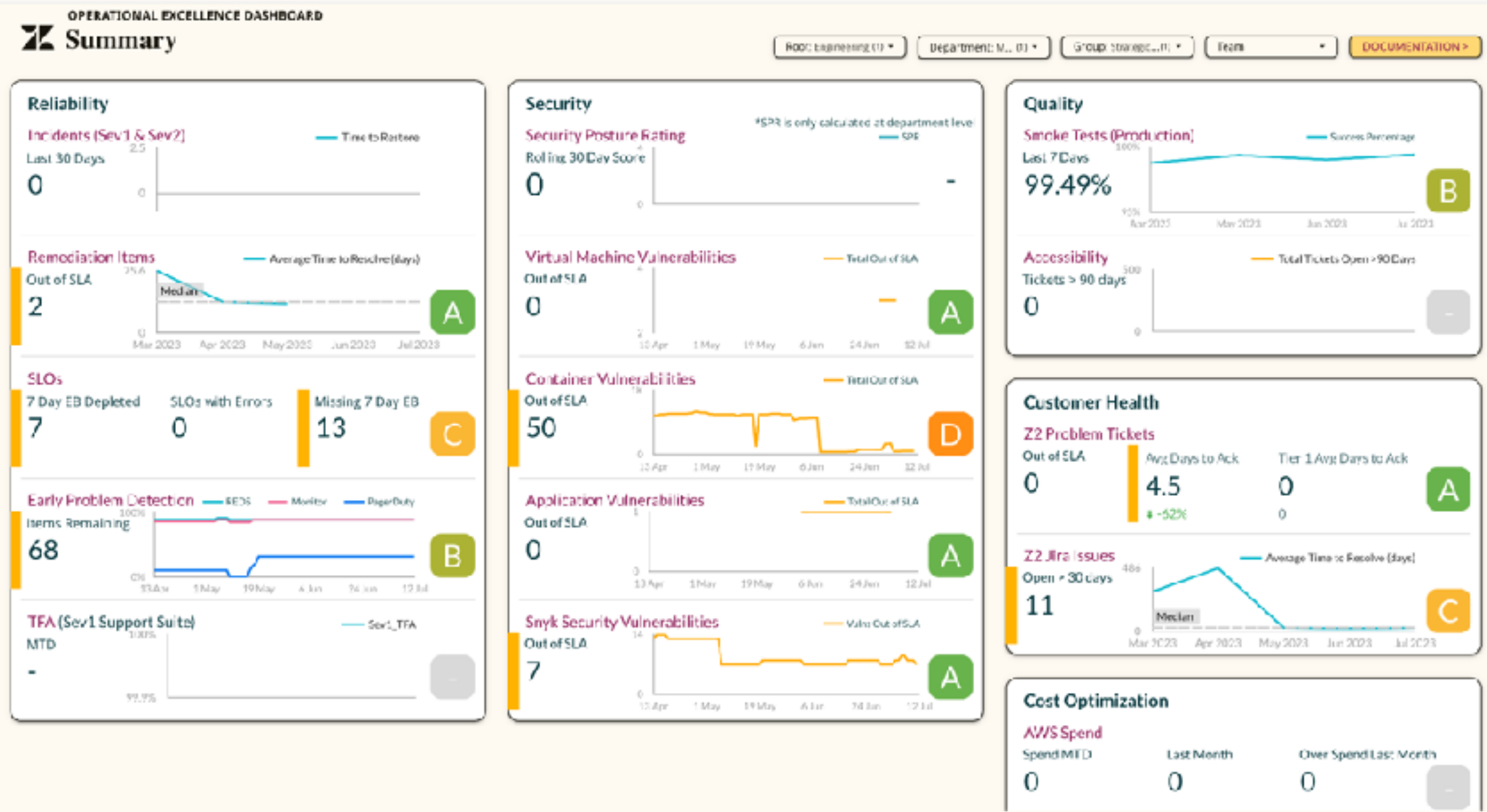
- Much More Efficient for Managers
- Proliferating Amount of Data and Visualisations
- Hard To Pinpoint Problem Areas

# V3: Back to School

(Introducing grades)



# Grading



## OpEx Dashboard

	Jira projects will be combined and added to your report.
Update Frequency	Data is automatically refreshed every 4 hours.
SLAs	<a href="https://docs.google.com/document/d/1pB4wGiwS0HnENaOSMmM-0fWn1eQ4wj5ACVCHmfqXU/edit">https://docs.google.com/document/d/1pB4wGiwS0HnENaOSMmM-0fWn1eQ4wj5ACVCHmfqXU/edit</a>
Data Owners	Incident Management team <a href="#">#ask-incident-management</a>
Help	If you see some discrepancies in the data on the dashboards you can go to <a href="#">#ask-opex-dashboard</a> .

### Remediation Health Score Criteria

Grade	Criteria
A	<10 Normal out of SLA and 0 Major, Critical & Blocker out of SLA
B	0 Critical out of SLA and under 3 Major out of SLA and under 15 Normal out of SLA
C	under 3 Critical out of SLA and under 7 Major out of SLA and under 20 Normal out of SLA
D	>=3 Critical out of SLA or >=7 Major out of SLA or >=20 Normal out of SLA or
F	>0 Blocker out of SLA

## **Learnings**

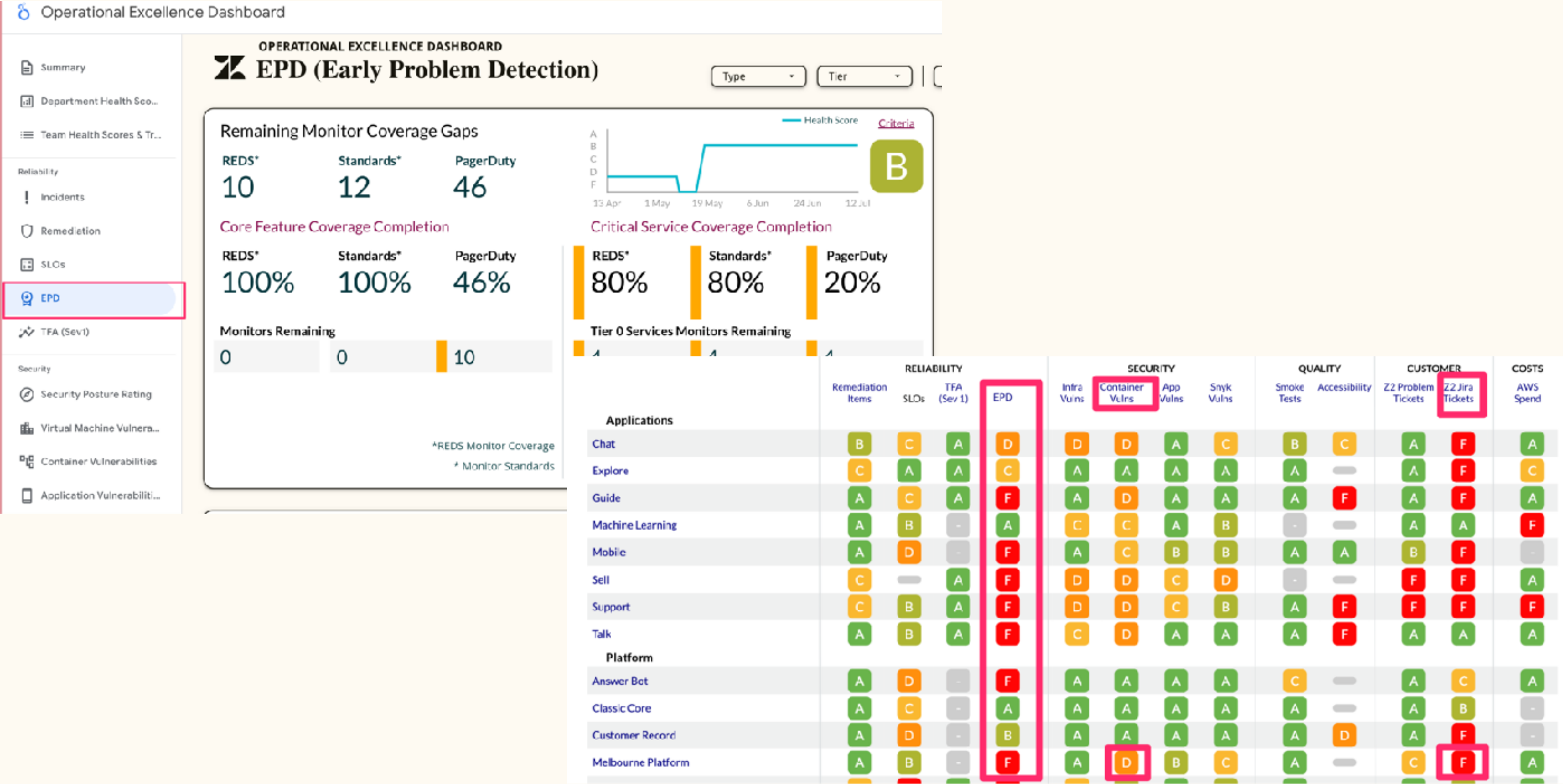
- Quickly Surfaced Problem Areas
- Reduced Time Spent Discussing “Good” Areas
- Opportunity to Layer on New Standards

# V4: Tip of the Spear







# Rolling out Early Problem Detection




# Rolling out “First Response Times” to our Customer Tickets

**Unreads**  All of Zendesk ▾ Sorted by recommended order ▾

▼ # eng-announcements

 **Kelvin Pham** 10:22 AM  
Post ▾

 **First Response Time (FRT) macro/metric for Z2 Customer Health**  
Post

**TL;DR:** On September 11th, we are launching a new process to measure the First Response Time metric for Product Development Z2 tickets. This will be a required step for all Z2 tickets moving forward and will allow us to measure how quickly we're reviewing and responding to customer tickets.

**What you need to do:**

- Head on over to the Confluence page and view the [training video](#)
  - In short, we're asking every team to run this new First Response Time (FRT) macro upon receipt of the ticket so we're able to track how quickly we're able to get eyes on a ticket once Advocacy has escalated it to Prod Dev.

When we go live on September 11, The OpEx dashboard will reflect the new FRT so we're able to see out of the TtA bucket, how quickly in that timeframe teams were able to look at tickets escalated by Advocacy.

## **Learnings**

- Powerful Extrinsic Motivation to Adopt a Standard
- Can be Demotivating to start with an “F” Grade ... ratchet grades.


# V5: Executive Zoom Out



# Head of Engineering getting a 10,000 ft View

OPERATIONAL EXCELLENCE DASHBOARD		Department Health Scores & Trends		
		RELIABILITY		
		Remediation Items	SLOs	EPD
APPLICATIONS	Chat	C ↘	C ↔	B ↔
	Explore	A ↔	B ↗	A ↔
	Guide	A ↔	C ↘	C ↔
	Machine Learning	A ↔	B ↗	A ↔
	Mobile	D ↔	D ↔	C ↔
	Sell	B ↘		C ↗
	Support	B ↔	B ↔	C ↔
	Talk	A ↔	C ↘	A ↔
GLOBALIZATION	Internationalization	A ↔	A ↗	A ↔
	Localization	A ↔		A ↔
GROWTH AND MONETIZATION	Growth And Monetization Dept	D ↔	D ↘	B ↔
PLATFORM	Answer Bot	A ↔	A ↗	A ↔
	Classic Core	A ↔	B ↔	A ↔
	Customer Record	B ↘	B ↔	A ↔
	Melbourne Platform	D ↘	C ↘	A ↗
	Sunshine Conversations	B ↔	B ↗	A ↔
	Support Platform	B ↔	B ↔	C ↔
	Web Widget	A ↔	A ↔	A ↔
ZENDESK OS	Core Services	A ↔	B ↗	A ↔
	Engineering Productivity	B ↔	B ↔	D ↘
	Foundation	A ↗	C ↘	A ↔
	Resilience and Reliability Engineering	A ↔	A ↔	A ↔

# Department Head gets a 1,000 ft View



OPERATIONAL EXCELLENCE DASHBOARD

Team Health Scores & Trends

Root: Engineering (1)

Department: A... (2)

Group

Team

	RELIABILITY				SECURITY					QUALITY		CUSTOMER		COSTS
	Remediation Items	SLOs	EPD	TFA (Sev 1)	SPR	VM Vulns	Container Vulns	App Vulns	Snyk Vulns	Smoke Tests	A11y	Z2 Problem Tickets	Z2 Jira Tickets	AWS Spend
APPS & EXTENSIBILITY	A ↔	B ↔	A ↔	n/a	D ↔	A ↑	A ↔	B ↘	A ↔	B ↔	n/a	B ↔	A ↔	n/a
APPS & EXTENSIBILITY TEAMS														
Customer DevX (Vegemite)	A ↔	A ↔	A ↗	n/a	n/a	A ↔	A ↔	A ↔	A ↔	B ↘	n/a	B ↘	A ↔	n/a
Dugong	A ↔		A ↔	n/a	n/a	A ↔	A ↔	A ↔	A ↔		n/a	A ↔	A ↔	n/a
Tardigrade	A ↔		A ↔	n/a	n/a	A ↔	A ↔	A ↔	A ↔		n/a	A ↔	A ↔	n/a
Wattle	A ↔	B ↔	A ↔	n/a	n/a	A ↔	A ↔	B ↘	A ↔	A ↗	n/a	A ↗	A ↔	n/a
Yowie	A ↔	A ↗	B ↔	n/a	n/a	A ↑	A ↔	A ↔	A ↔	C ↘	n/a	A ↗	A ↔	n/a
STRATEGIC INTEGRATIONS	A ↔	A ↔	A ↗	n/a	A ↔	A ↔	C ↔	A ↔	A ↔	A ↗	n/a	B ↘	B ↗	n/a
STRATEGIC INTEGRATIONS TEAMS														
Ocean	A ↔	A ↔	F ↔	n/a	n/a	A ↔	A ↔	A ↔	A ↔	A ↔	n/a	A ↔	A ↔	n/a
Pegasus	A ↔	A ↔	A ↔	n/a	n/a	A ↔	C ↔	A ↔	A ↔	B ↗	n/a	B ↘	A ↗	n/a



## **Learnings**

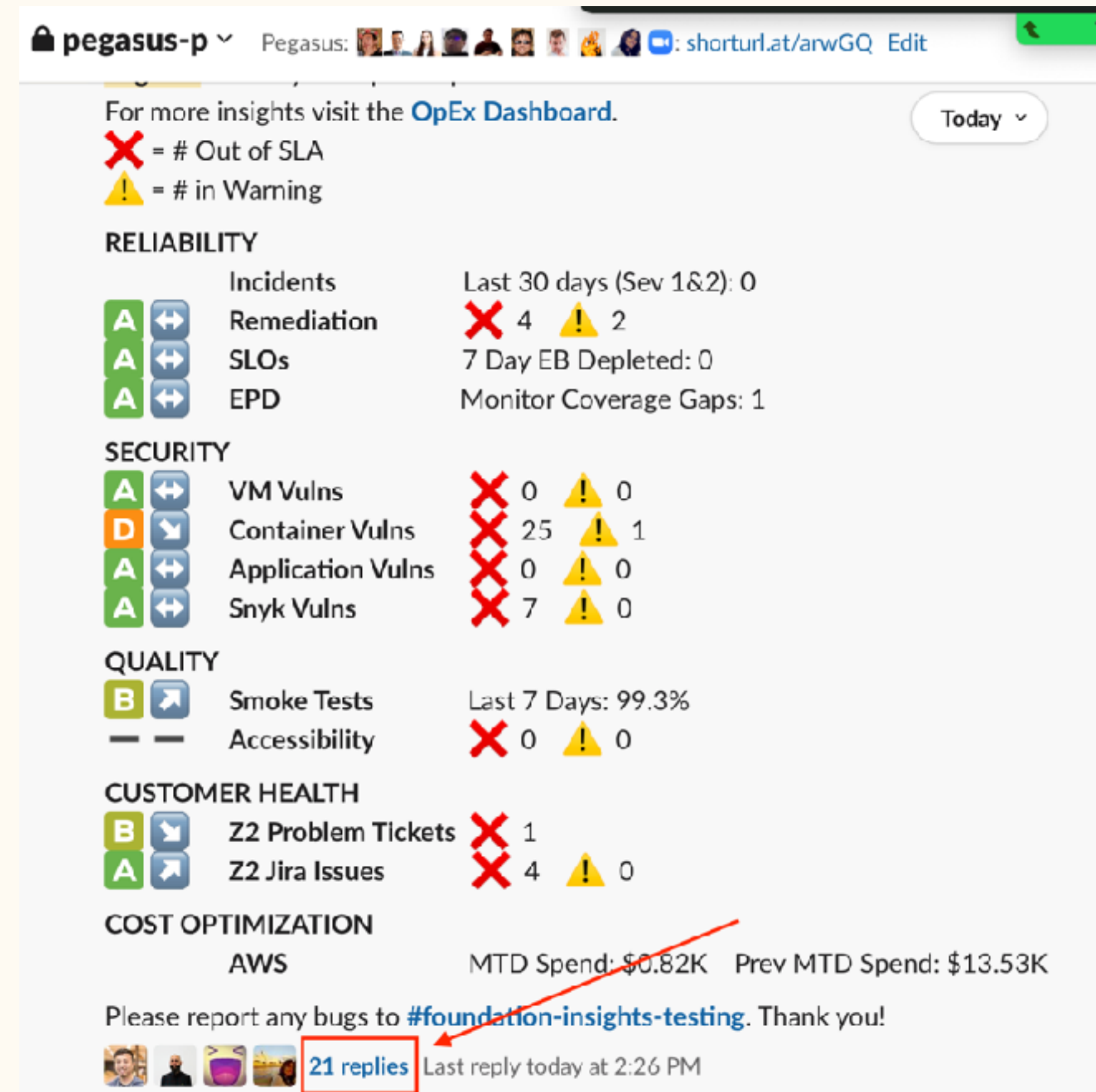
- Being Compared to other Leaders is Motivating!
- Monthly Review Cadence was too long
- Pulling Insights news to move to Pushing Insights

# V6: What's Coming



## The Next Few Features

- Scheduled Slack Notifications with a team's score - **SHIPPED**
- Coming Soon:
  - Immediate notifications when scores go below thresholds
    - Are these Unit Tests or CI for your Organisation ?
  - New Standard: Feature Flags
  - New Standard: Error Reporting



# The Results

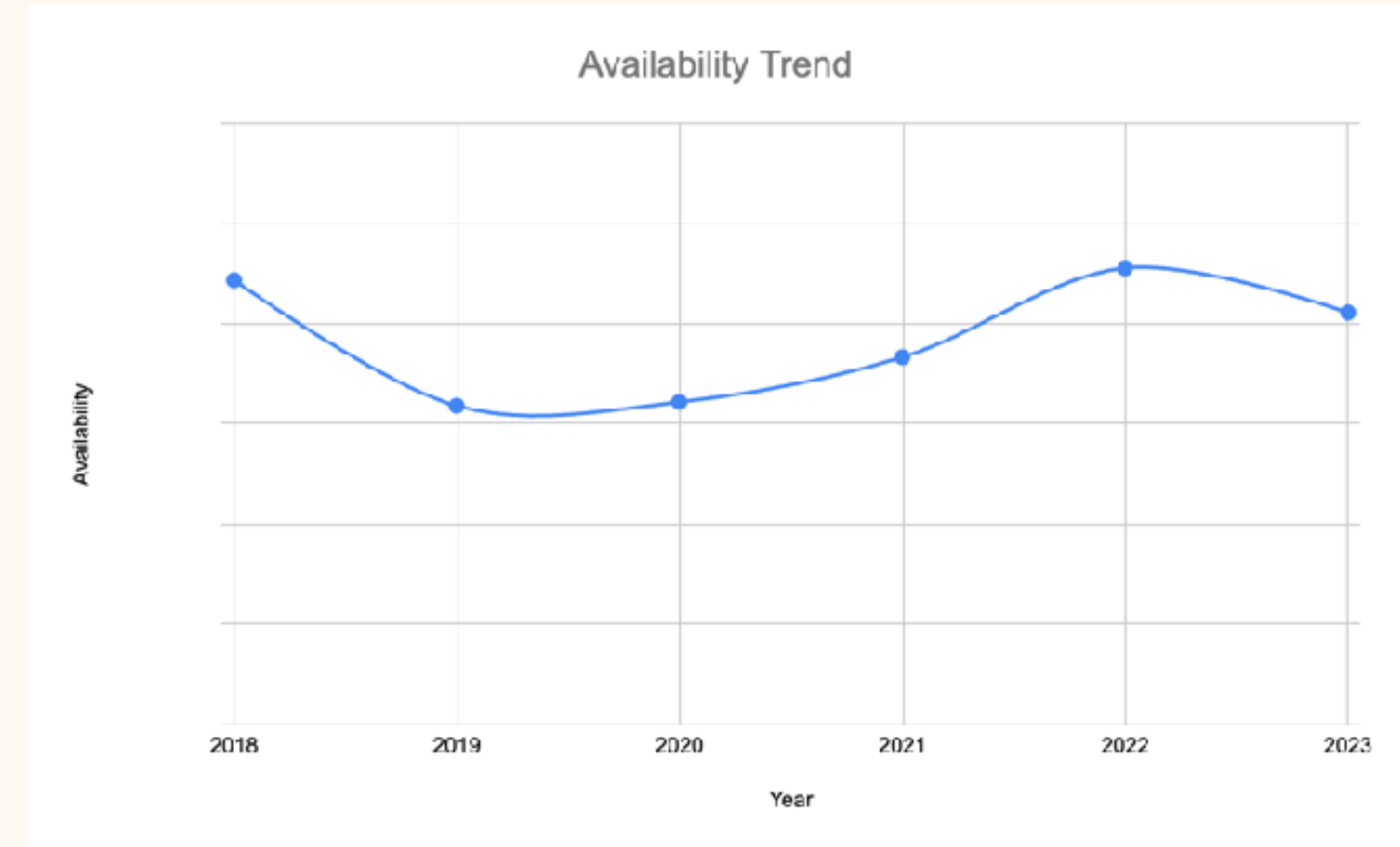


# The Results

Has this helped our customers?

Has this helped our engineering teams?

- No more company wide production freezes since early 2021  
... local freezes only.
- Empowered teams rolling out new standards, reduced rollout times
- Ensure ALL Systems ( including Heritage Listed Systems ! )  
are in good health
- Improved availability for our customers  
.... during 30% YoY traffic and data growth



# Recommendations

- Don't "Part Time" the Data Warehouse and Reporting ... Dedicate People and Money
- Data Modelling
  - Consistent Org Structure in all Data Sources
  - Central Service Catalog
- It is a Product ... Seek Feedback from Users

The End

John Viner - [www.linkedin.com/in/johnviner](https://www.linkedin.com/in/johnviner)