



# How we progressively deliver changes to Kubernetes

## Using Canary deployments and feature flags

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**Bob Walker**

Field CTO

Octonaut since 2018

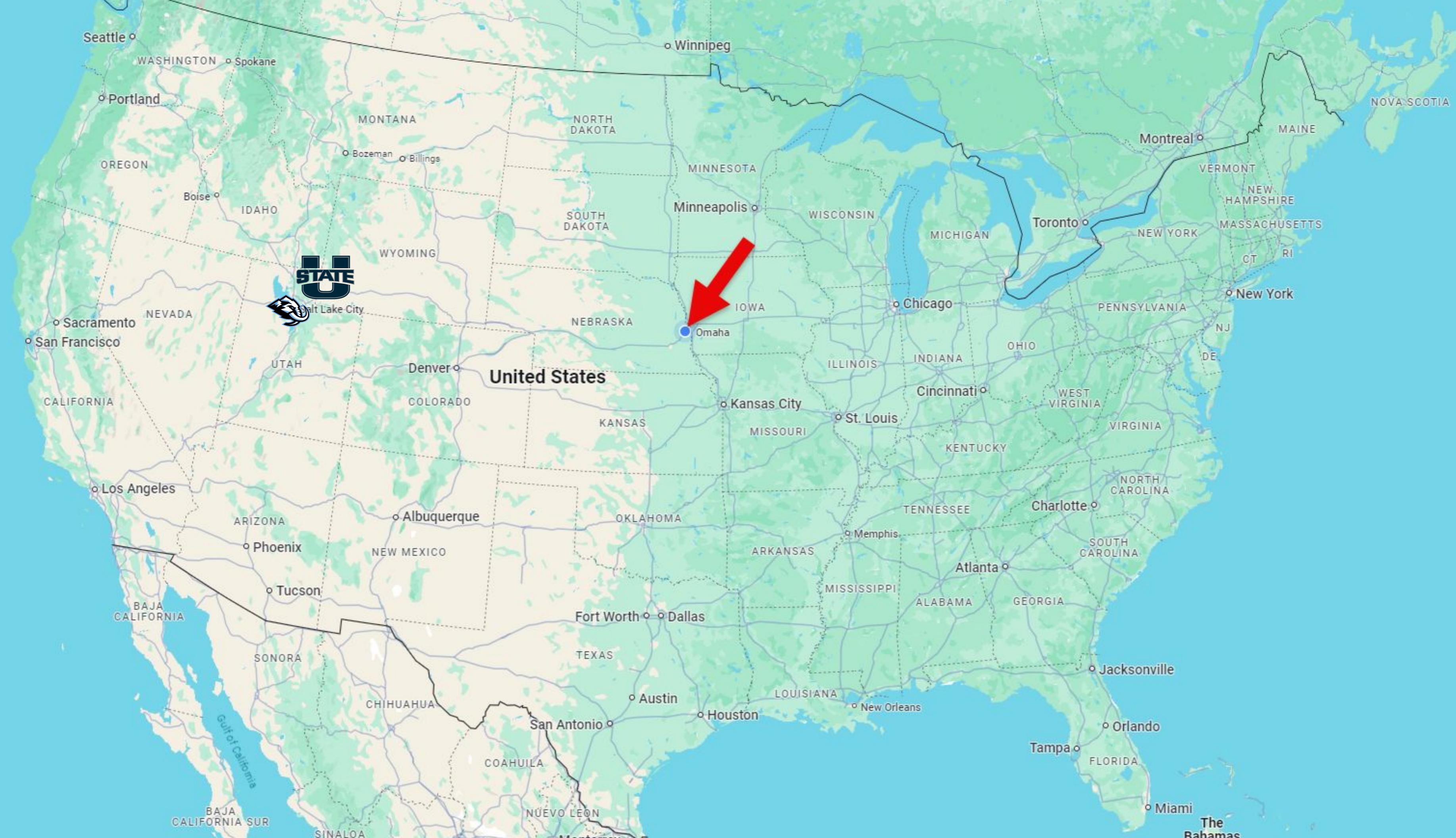
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Farm Credit Services  
of America



Sandhills Global.



Octopus Deploy



# Free White Paper

<https://octopus.com/publications>





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# Goals **this session**

**for**

- Provide solutions you can apply in your day to day  
(Assuming your use case is similar)
- Debunk the myth that canary deployments means routing traffic
- Why you need to separate deploying new code from releasing functionality
- Not a sales pitch of Octopus Deploy  
(But you will have to learn what we to understand our challenges)



# Background + context



# Self-hosted + Cloud

## Octopus Cloud

Deployment-as-a-service

JULY 2018



## Octopus Server

Octopus on customers'  
infrastructure

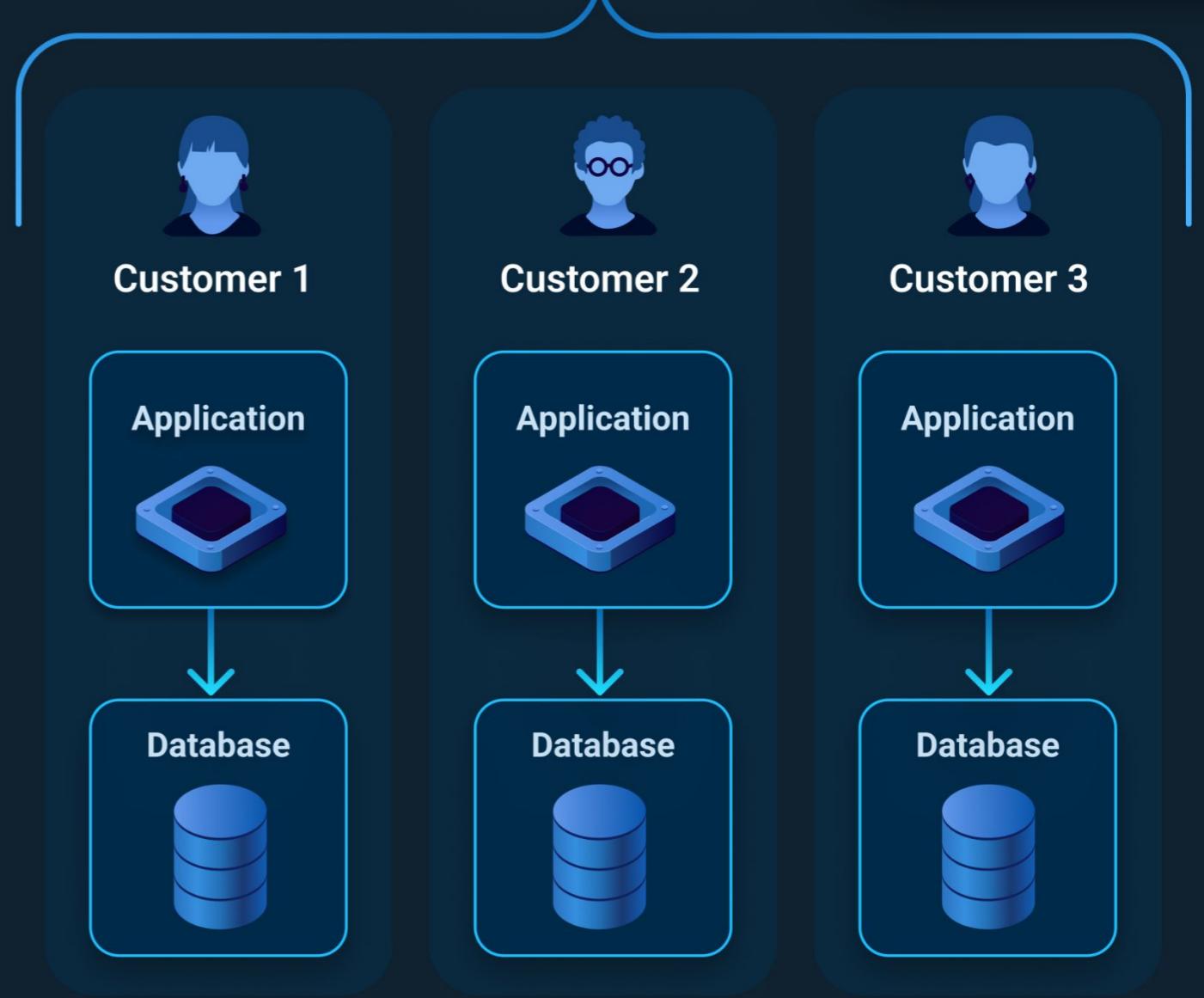
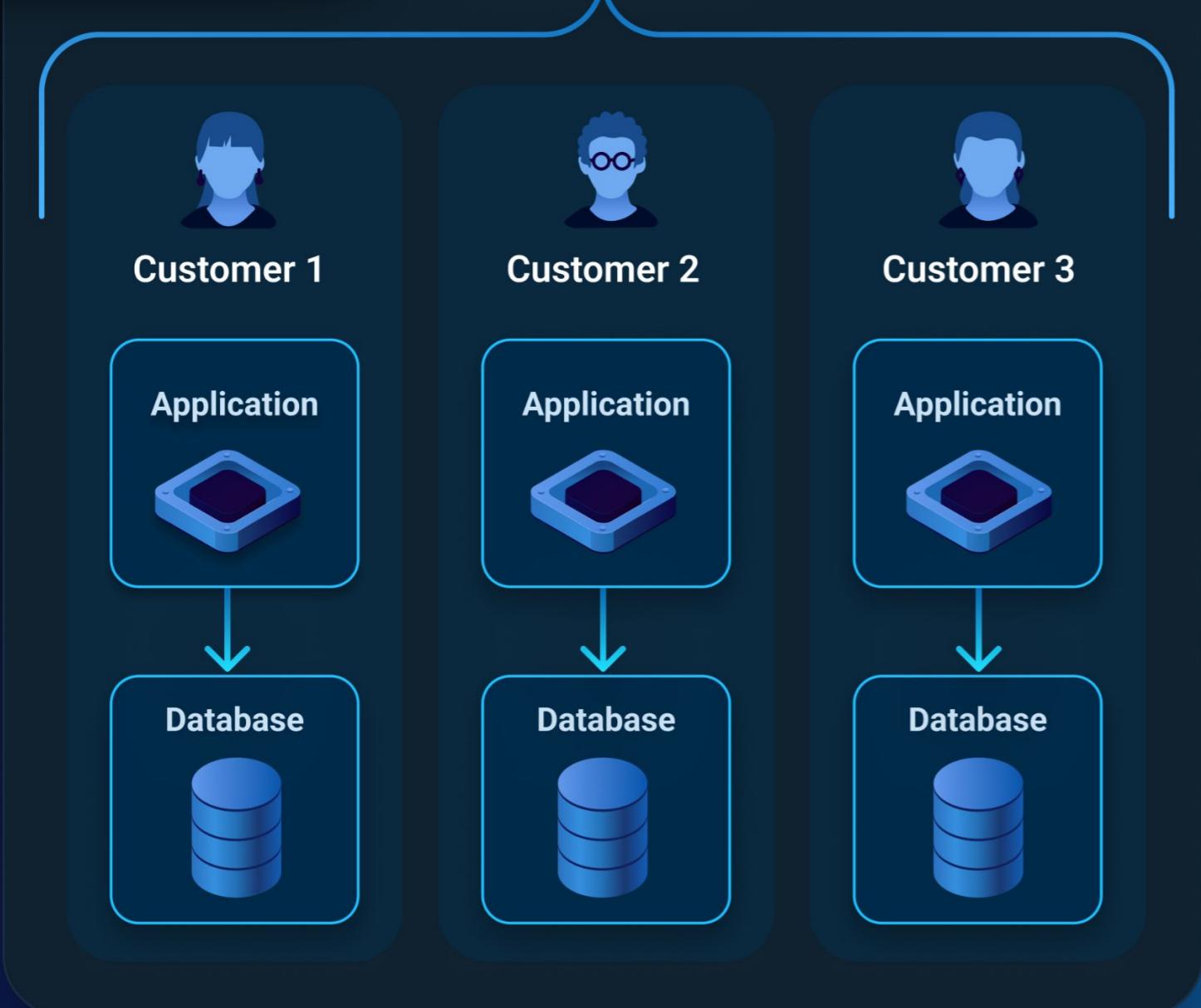
JUNE 2012



# Cell-based architecture

## Reef #1

- K8s Cluster
- Azure SQL Server
- Azure Storage



## Reef #2

- K8s Cluster
- Azure SQL Server
- Azure Storage



**1600+ customer  
instances hosted  
across 3 regions**

US

Europe

Australia



# Our **Kubernetes** Config

- 8 Reefs - 8 K8s Clusters
- 300 - 500 Instances per reef
- VMSS - 3 to 6 nodes
- E20s\_v4 - 20 vCPUs / 160 GB RAM



2025.2

2025.2 (Build 12990)

Thursday, July 17, 2025

Recommended

2025.2 (Build 12986)

Thursday, July 17, 2025



2025.2 (Build 12978)

Tuesday, July 15, 2025

2025.2 (Build 12967)

Tuesday, July 8, 2025

2025.2 (Build 12966)

Tuesday, July 8, 2025

2025.2 (Build 12955)

Monday, July 7, 2025

2025.2 (Build 12935)

Friday, June 27, 2025

2025.2 (Build 12923)

Tuesday, June 24, 2025

2025.2 (Build 12920)

Monday, June 23, 2025

2025.2 (Build 12902)

Wednesday, June 18, 2025

2025.2 (Build 12885)

Tuesday, June 10, 2025

2025.2 (Build 12568)

Wednesday, May 28, 2025

Cloud



2025.2 (Build 12221)

Monday, May 26, 2025

Cloud

2025.2 (Build 11861)

Friday, May 23, 2025

Cloud

2025.2 (Build 11629)

Thursday, May 22, 2025

Cloud

2025.2 (Build 10930)

Saturday, May 17, 2025

Cloud

2025.2 (Build 9747)

Saturday, May 10, 2025

Cloud

2025.2 (Build 9370)

Wednesday, May 7, 2025

Cloud

2025.2 (Build 8689)

Friday, May 2, 2025

Cloud

2025.2 (Build 8076)

Tuesday, April 29, 2025

Cloud

2025.2 (Build 7821)

Saturday, April 26, 2025

Cloud

2025.2 (Build 7366)

Saturday, April 19, 2025

Cloud

2025.2 (Build 7176)

Wednesday, April 16, 2025

Cloud

2025.2 (Build 6682)

Friday, April 11, 2025

Cloud

2025.2 (Build 5317)

Tuesday, April 1, 2025

Cloud

2025.2 (Build 4861)

Saturday, March 29, 2025

Cloud

2025.2 (Build 4621)

Thursday, March 27, 2025

Cloud

2025.2 (Build 3781)

Friday, March 21, 2025

Cloud

2025.2 (Build 3087)

Tuesday, March 18, 2025

Cloud

2025.2 (Build 2026)

Tuesday, March 11, 2025

Cloud

2025.2 (Build 1694)

Saturday, March 8, 2025

Cloud

2025.2 (Build 937)

Tuesday, February 25, 2025

Cloud

2025.2 (Build 488)

Tuesday, February 18, 2025

Cloud

2025.2 (Build 18)

Saturday, February 15, 2025

Cloud

SELF-HOSTED IS  
ALWAYS N-1

SELF-HOSTED IS  
RELEASED AFTER  
MULTIPLE  
CLOUD VERSIONS

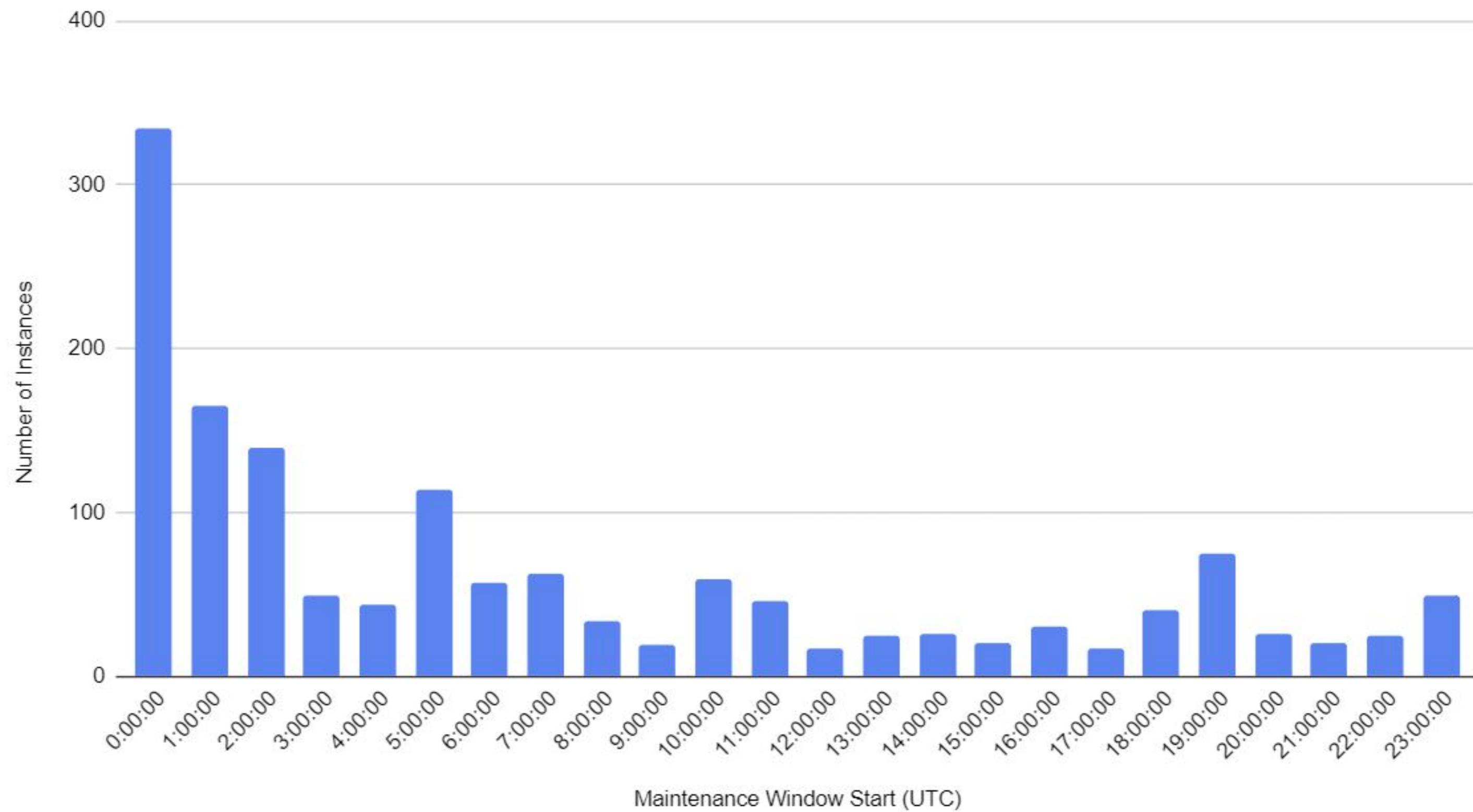
CLOUD IS ONE  
QUARTER AHEAD  
OF  
SELF-HOSTED



# **Self-inflicted challenges**



## Number of Instances vs. Maintenance Window



CODE APERTURE

 Personal Demo Instance **Configuration**bobjwalker.octopus.app 

<b>Display name</b>	Personal Demo Instance	<a href="#">Rename</a>
<b>Instance URL</b>	bobjwalker.octopus.app	<a href="#">Change</a>
<b>Technical contact</b>	Bob Walker <a href="mailto:bob.walker@octopus.com">bob.walker@octopus.com</a> 	<a href="#">Copy email</a> 
<b>Region</b>	West US 2	<a href="#">More info</a> 
<b>Resource usage</b>	File storage: 6 of 1000 GB	<a href="#">More info</a> 
<b>Static IP addresses</b>	52.250.93.128/28	<a href="#">More info</a> 
<b>Maintenance window</b>	In order to update your instance to newer releases of Octopus Deploy, we may occasionally need to take it offline for a short period.  You have nominated the following maintenance window: <b>9:00 AM UTC – 12:00 PM UTC</b>	<a href="#">Change window</a>



**2024.3 (Build 12647)**

Tuesday, September 3, 2024



Cloud

**2024.3 (Build 12251)**

Friday, August 30, 2024



Cloud

**2024.3 (Build 11587)**

Sunday, August 25, 2024



Cloud

**2024.3 (Build 10989)**

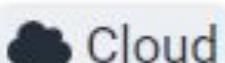
Friday, August 16, 2024



Cloud

**2024.3 (Build 10840)**

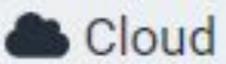
Thursday, August 15, 2024



Cloud

**2024.3 (Build 10714)**

Wednesday, August 14,  
2024



Cloud

**2024.3 (Build 9887)**

Wednesday, August 7, 2024



Cloud

**2024.3 (Build 9242)**

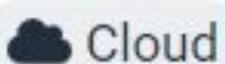
Saturday, August 3, 2024



Cloud

**2024.3 (Build 8336)**

Thursday, July 25, 2024



Cloud

**2024.3 (Build 8206)**

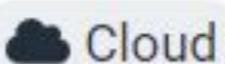
Thursday, July 25, 2024



Cloud

**2024.3 (Build 7892)**

Tuesday, July 23, 2024



Cloud

**2024.3 (Build 7660)**

Monday, July 22, 2024



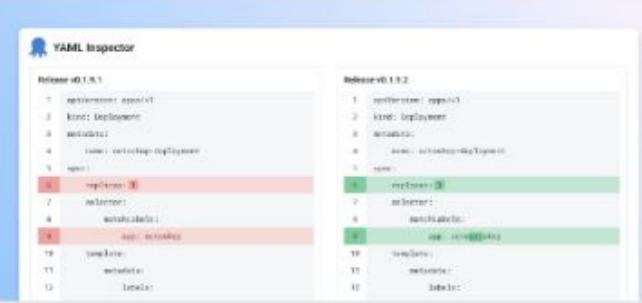
Cloud

**MULTIPLE DEPLOYS PER WEEK**



2025.2

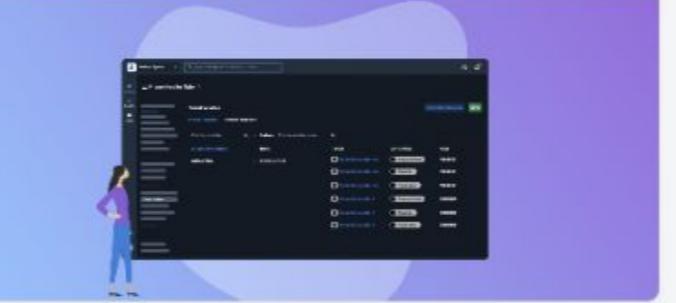
### Kubernetes Manifest Inspection



### Kubernetes manifest view



### Ability to scope common tenant variables to environments



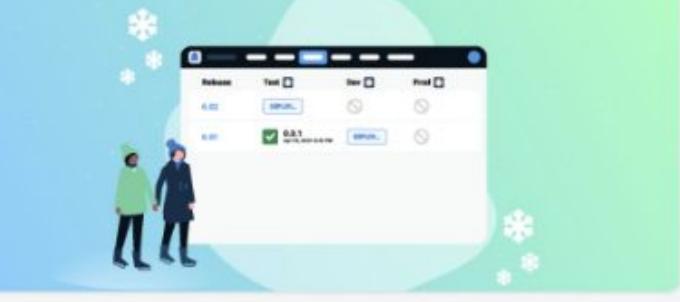
### Freeze by Tenant



### OpenID Connect for Container Registries in External Feeds



### Recurring Deployment Freezes



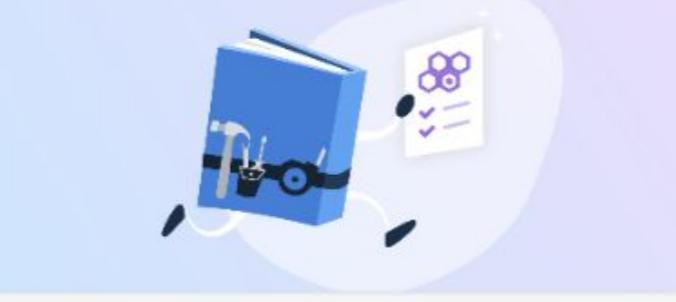
### Deployment Freezes by Project



### ITSM for Runbooks



### Add Priority Deployments to Runbooks



2025.2 NEW FEATURES

2025.1

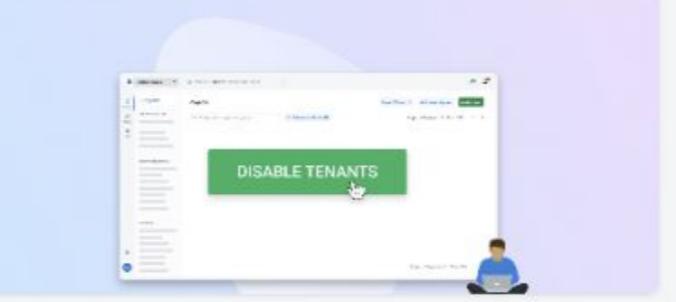
### Improved encryption and algorithm support



### Config as Code for Runbooks



### Ability to disable tenants



### Generic OIDC - Octopus as a Client



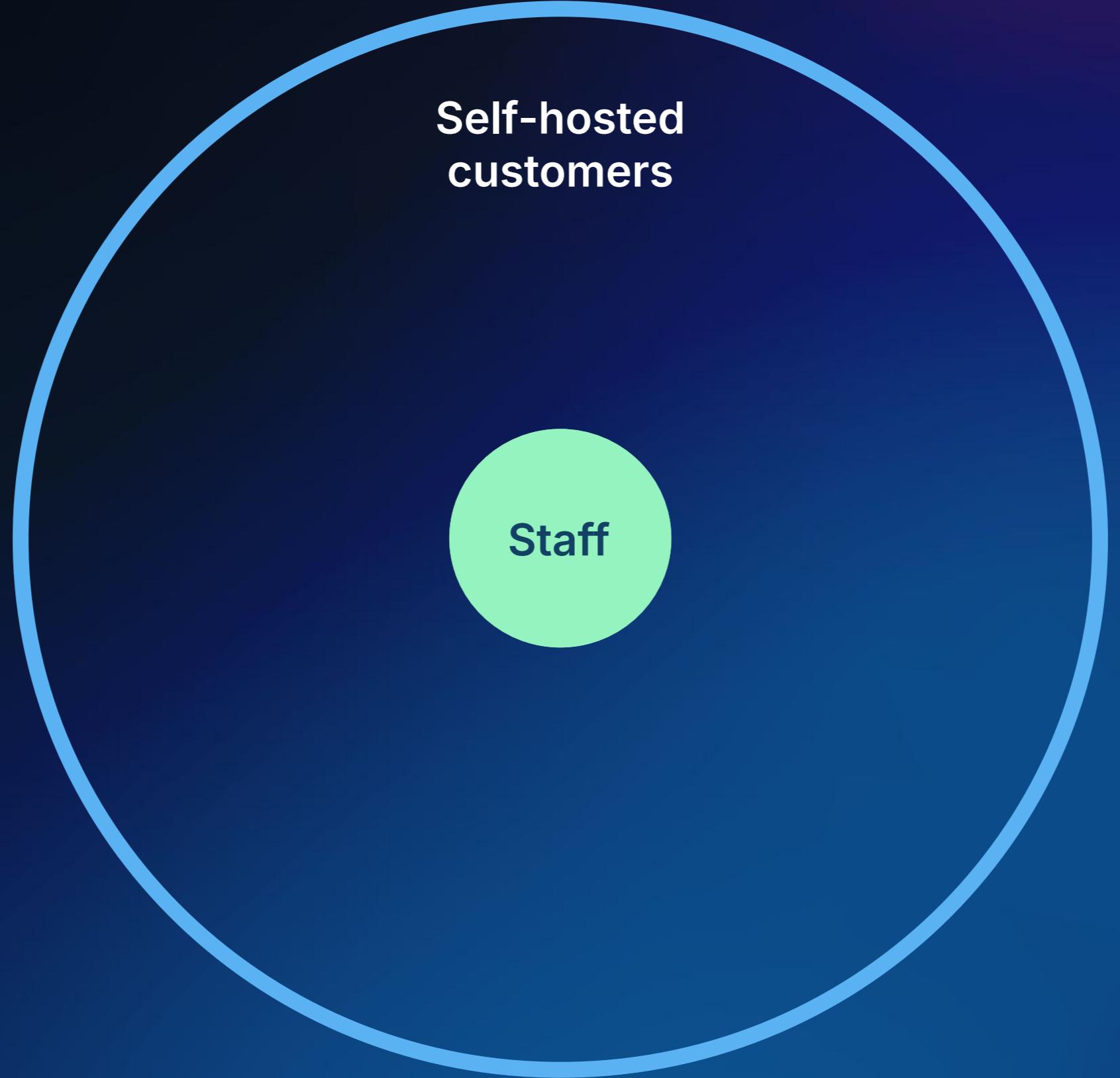
### Task queue efficiency



### Kubernetes Object Status for Helm



2025.1 NEW FEATURES

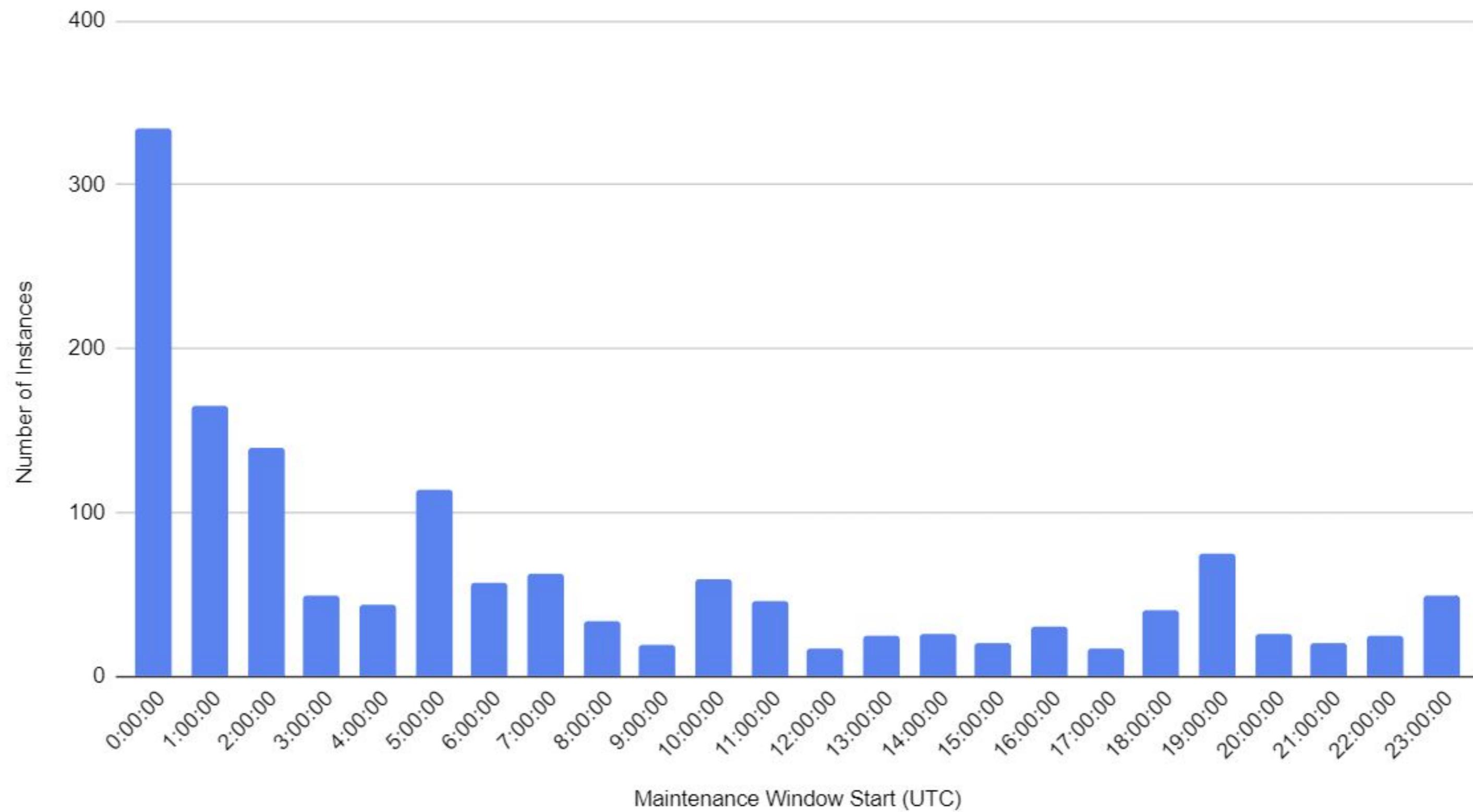


Self-hosted  
customers

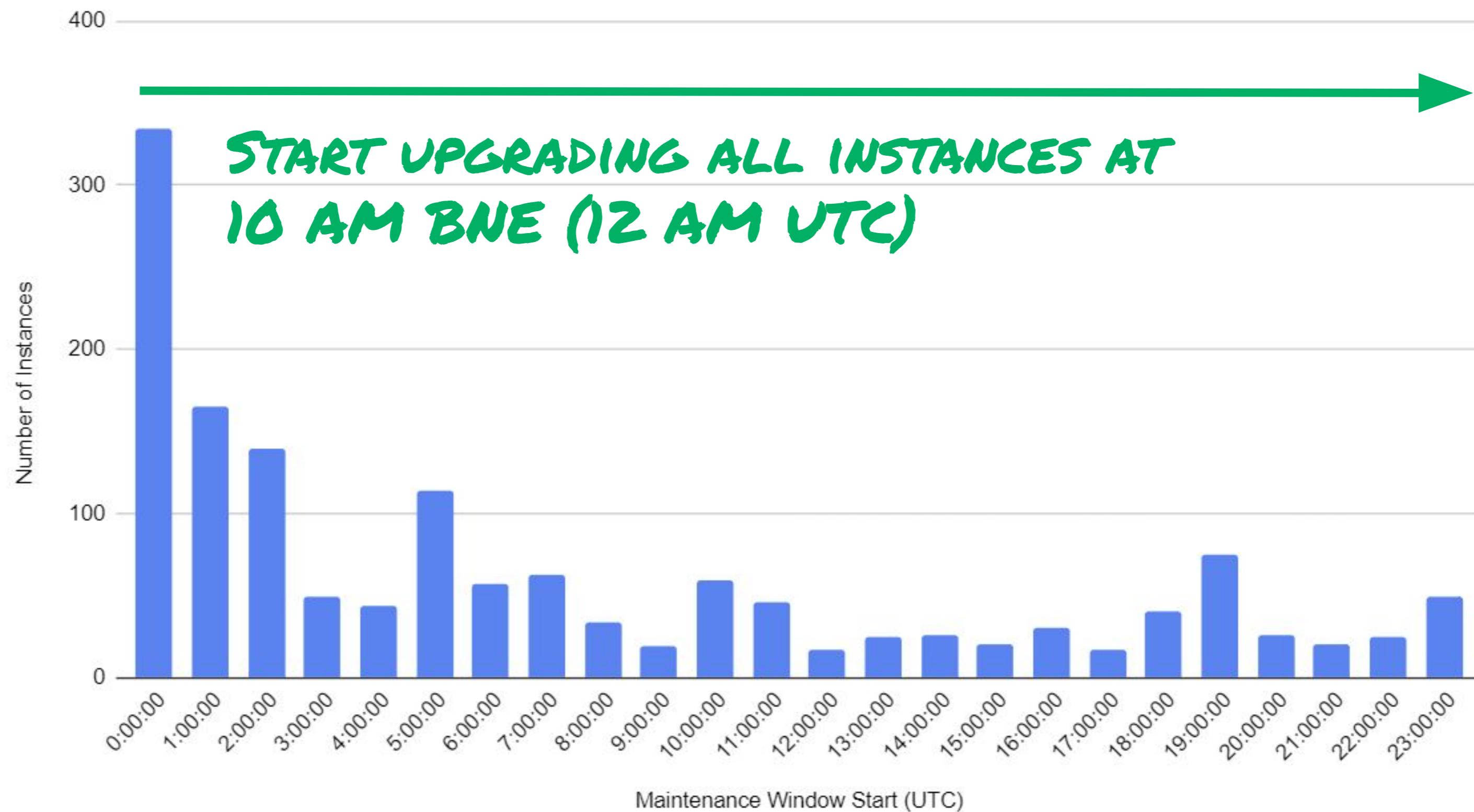
Staff



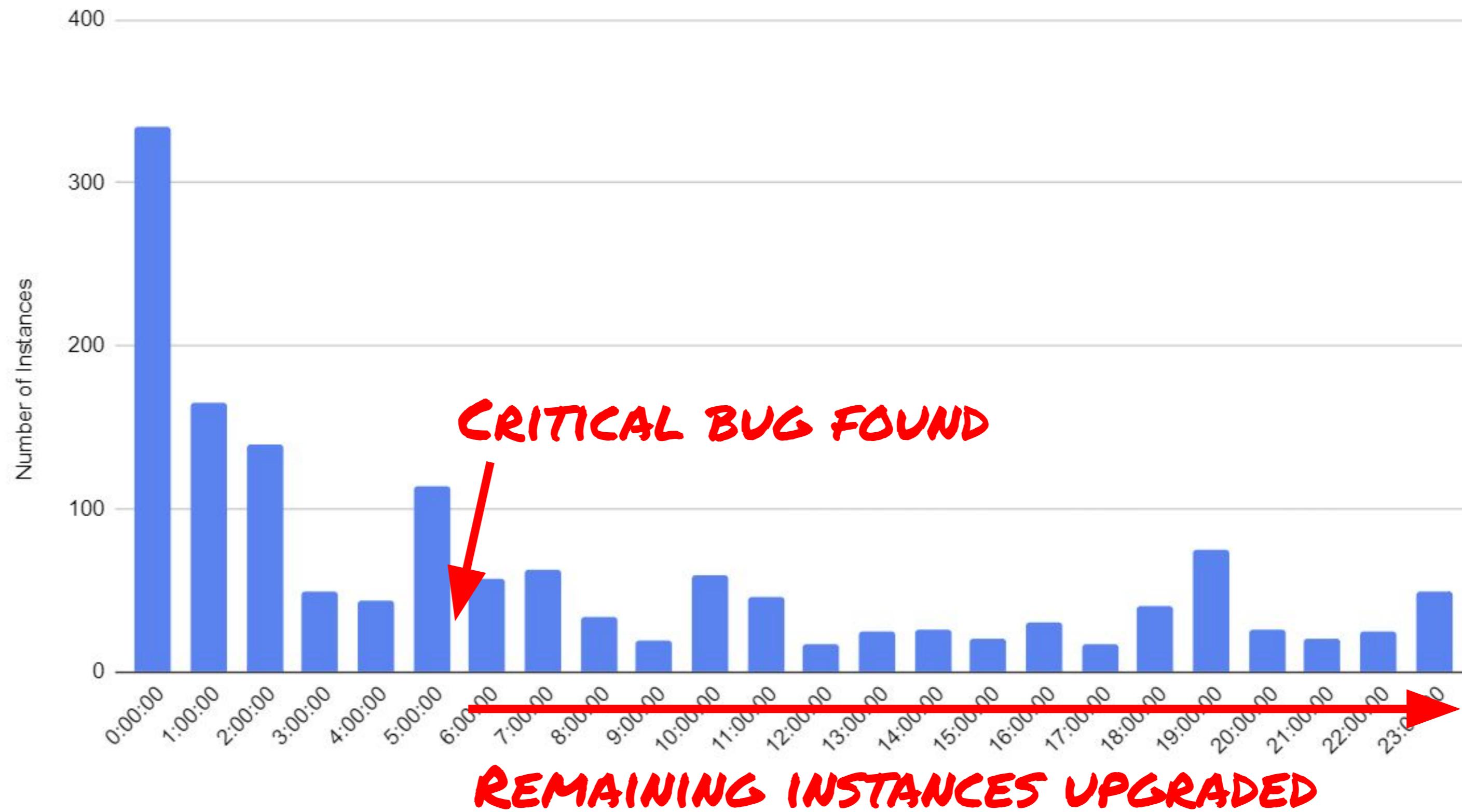
## Number of Instances vs. Maintenance Window



## Number of Instances vs. Maintenance Window



## Number of Instances vs. Maintenance Window



# Solution v1



THE LIST  
OF EARLY  
ADOPTERS  
INSTANCES  
WERE  
STATIC



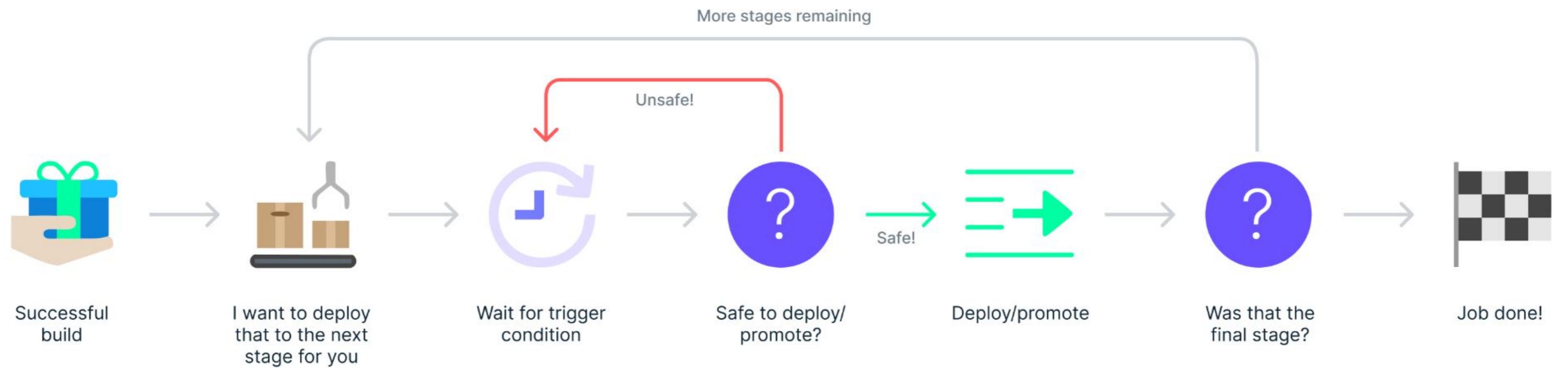
ANDON  
CORD

ANYONE  
CAN PULL  
IT

PULLING  
STOPS  
ASSEMBLY  
LINE



# Let the enthusiastic promoter do the work



# Andon Cords

## Healthy

The release pipeline will continue to move forward.

## Who can pull the Andon Cord?

- **Anyone.** Yes, that means you!

## When should you pull an Andon Cord?

- You can't deploy.
- You can't edit or create a deployment process, project or space.
- You can't create or edit releases.
- You can't run or run, edit or create a runbook.
- You can't edit or create users and/or permissions.
- Something in the product doesn't look or feel right. You're not sure what yet, but something is off.
- ***If you're not sure, pull the Andon Cord!*** This ensures nothing bad will happen, and it buys time to think.

For more information about why we use Andon Cords, please see the [helpful docs](#).

 [Pull Andon Cord](#)

## Open (0)

No open problems.

## Resolved / Closed (549)

April 21st, 2022

NEW



**Rhys Parry** 6:42 PM



I'm concerned about the progress of updates to Cloud and thought it might be helpful to discuss here.

- The dominant, stable version in cloud is currently [2022.2.387-hotfix.903](#) from March 7 (46 days ago) ←
- Updates, including fixes since then, have not been available to cloud customers
- One consequence has been that step package updates are available for self-hosted customers (2022.1), but not cloud customers.
- As far as I can tell, the current early adopters' release ([2022.2.3108](#) from today) is the next possible candidate for going to cloud. That won't be for at least another week, assuming no further issues. ←
- With more changes continuing to accumulate, the likelihood of new issues seems high, reinforcing these delays. We ([#topic-steps](#)) have marked a delivery risk on the Milestones spreadsheet to indicate that work merged last month has not yet gone out widely to cloud customers.

Is the current approach scaling appropriately?

# ISSUES DISCOVERED

- Multiple days to make it through all rings to “stable”
- Staff / Insiders / Early Adopters didn’t cover **all** possible paths
- **Critical bugs** still made it to “stable”
- Weeks before a stable release



#1 reason of show  
stopping bugs  
new features



# Solution v2



DOG FOOD OUR APP

MAIN DEPLOY INSTANCE IS  
FIRST ONE UPDATED

DEPLOY TO RANDOM  
SUBSET OF INSTANCES

- 5% of active customers
- Rotating / randomized
- Updated after 3 days (at most)

MAJORITY OF USERS  
IN STABLE RING

Laggards

Stable (+2 days)

Canary customers  
(+3 days)

Staff





Default



Type Ctrl+Space to search or switch projects...



All Projects



Tenants

Tenant Tag Sets



Variable Sets

INFRASTRUCTURE

Overview

Deployment Targets

Environments

Machine Policies

Machine Proxies

Workers

Worker Pools

MANAGE

Accounts

Build Information

Certificates

External Feeds

Git Credentials

Lifecycles

Packages

Script Modules

Step Templates

## All Projects

Search projects...

Advanced filters

Filters applied

### Default Project Group

Development

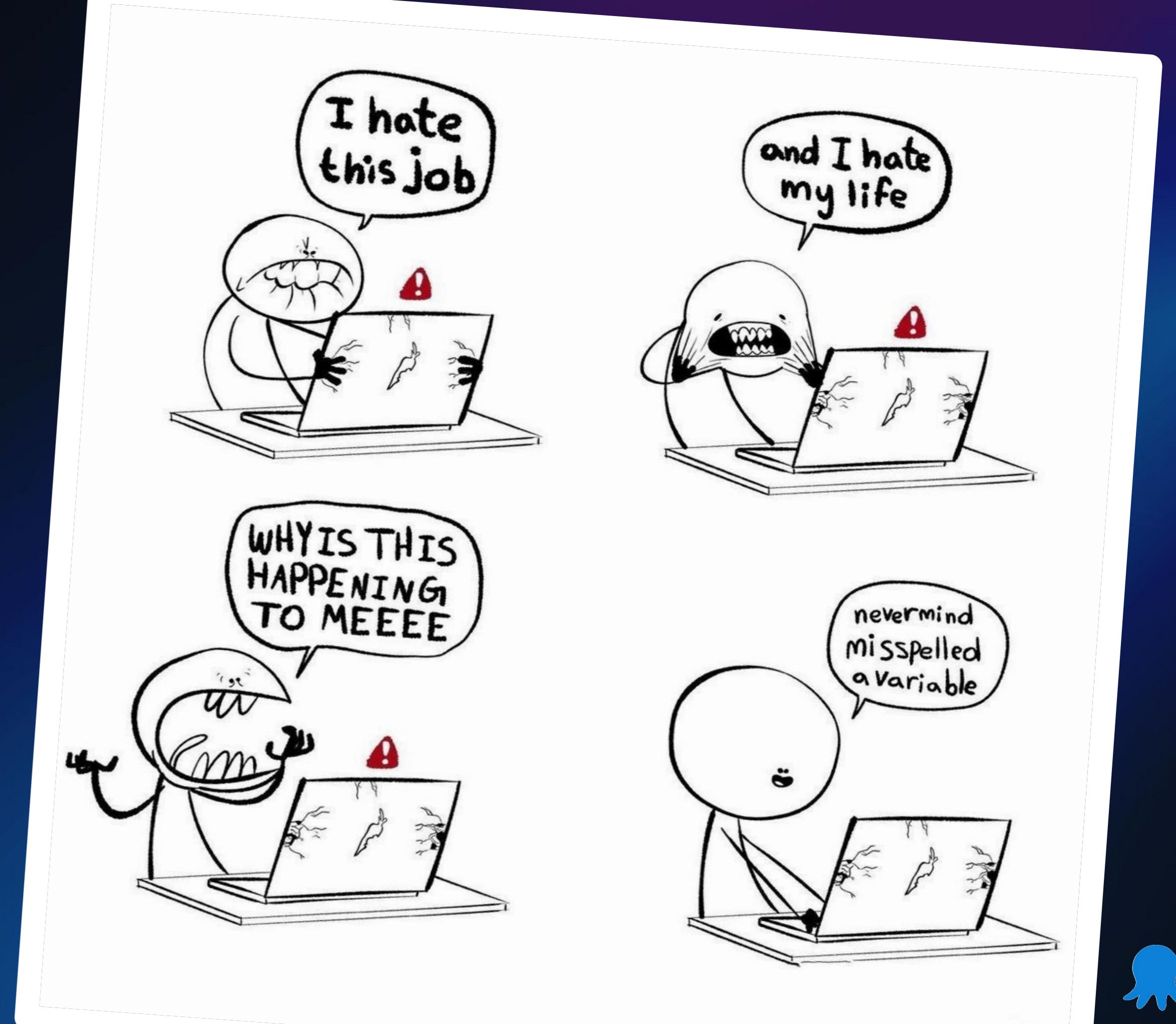
Test

Staging

Production

Pet Shop	2024.3.1.1-ClinicsBrand ing Mar 11, 2024 3:22 PM	1/1	2024.3.0.9 Mar 11, 2024 3:26 PM	1/1	2024.3.0.9 Mar 11, 2024 3:41 PM	4/4	2024.3.0.9 Mar 11, 2024 3:35 PM	5/12
Random Quotes	0.1.42 Feb 27, 2024 3:01 PM		0.1.79.1 Feb 27, 2024 3:24 PM		0.1.79.1 Feb 27, 2024 3:26 PM		0.1.79.1 Feb 27, 2024 3:30 PM	
Trident	4.0.56-helm.9 Apr 17, 2024 9:55 AM		4.0.56.466 Apr 17, 2024 10:21 AM		4.0.56.466 Apr 17, 2024 10:27 AM		4.0.43.421 Mar 19, 2024 8:56 AM	

We needed to  
gather **feedback**  
before updating  
all users



# When you are gonna merge two branches after a long time



## Feature Toggles

# OpenFeature.dev

Specification of on how feature toggles should work.

- Language SDK with providers that plug into that SDK.
- Define segments of users
  - Location
  - Team
  - Usage History
  - User sign-up
- The providers host a feature flag service for turning off/on toggles and defining segments.

Octopus Server

Feature Toggles

Name	Status	Environment
Allow Project Opt In To Resilient Executions	On	Branch Instances (Staging)
	On	Cloud Customers
	On	Branch Instances (Staging)
	On	Production
	On	Cloud Customers
	On	Branch Instances (Staging)

your app

feature-flagging client

OpenFeature SDK

Flags-R-us OpenFeature Provider

Flag eval.

eval. context

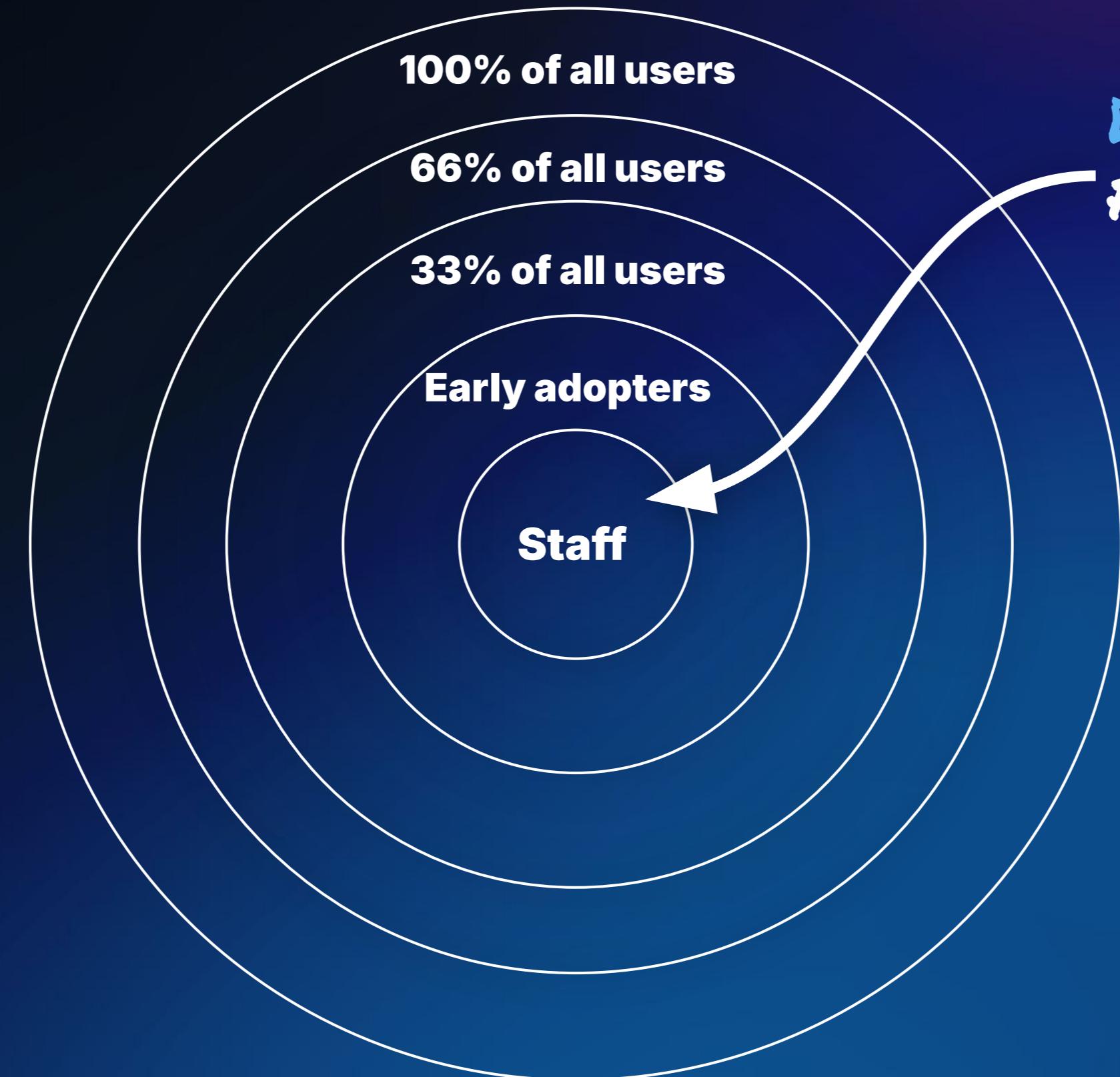
Flag eval.

eval. context

Flag eval.

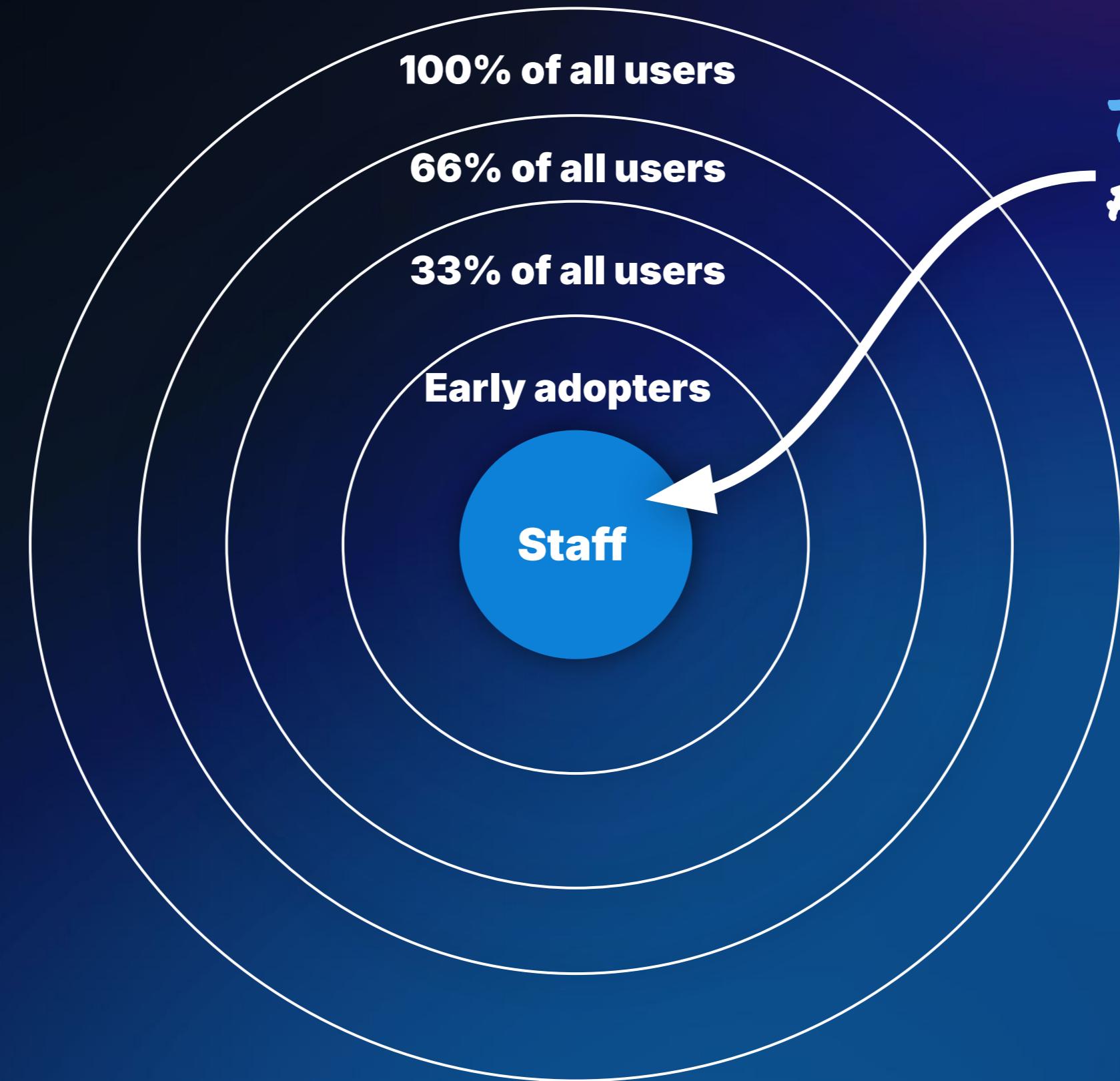
eval. context

Flags-R-us service



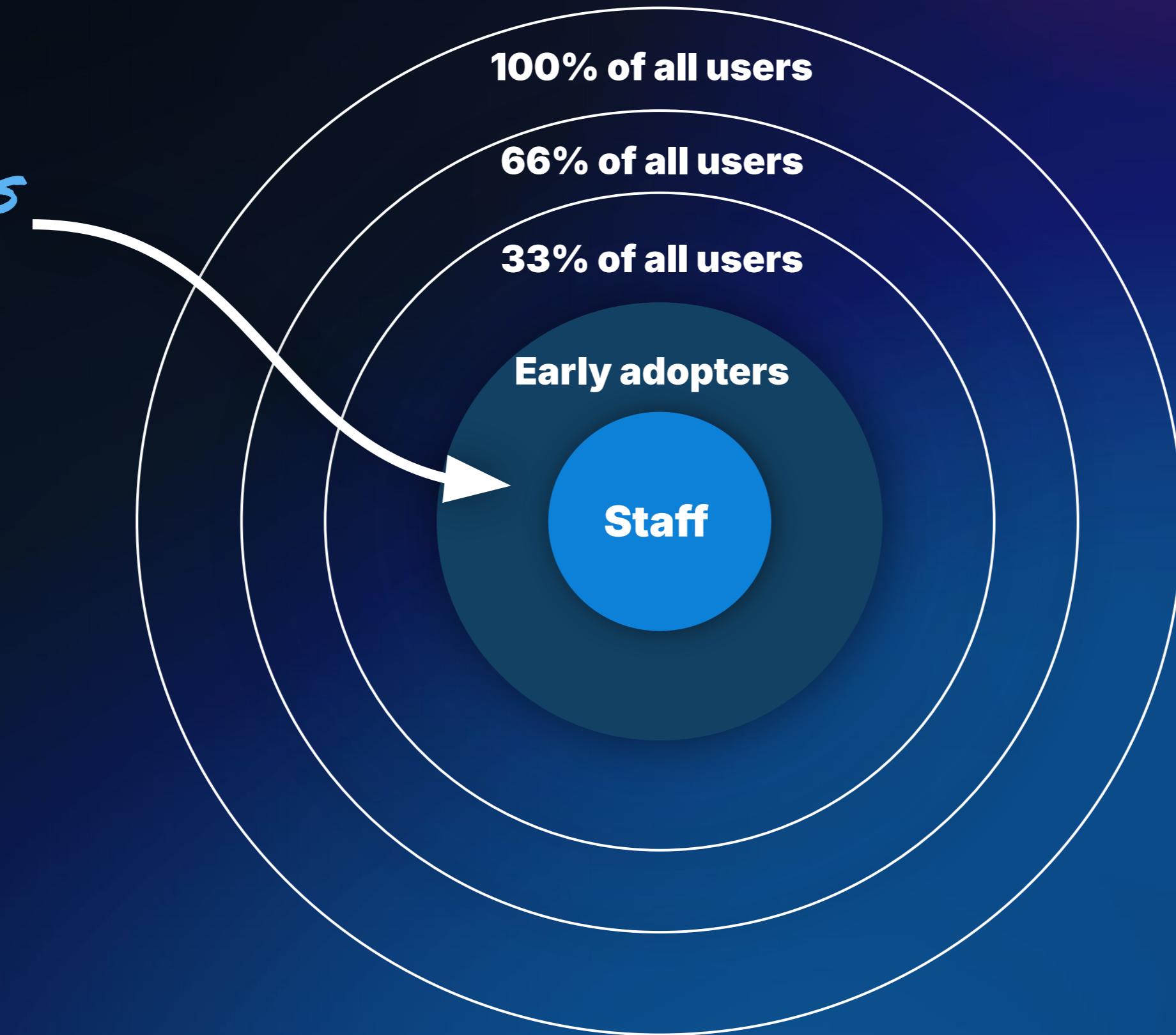
DEPLOY WITH  
FLAG TURNED OFF

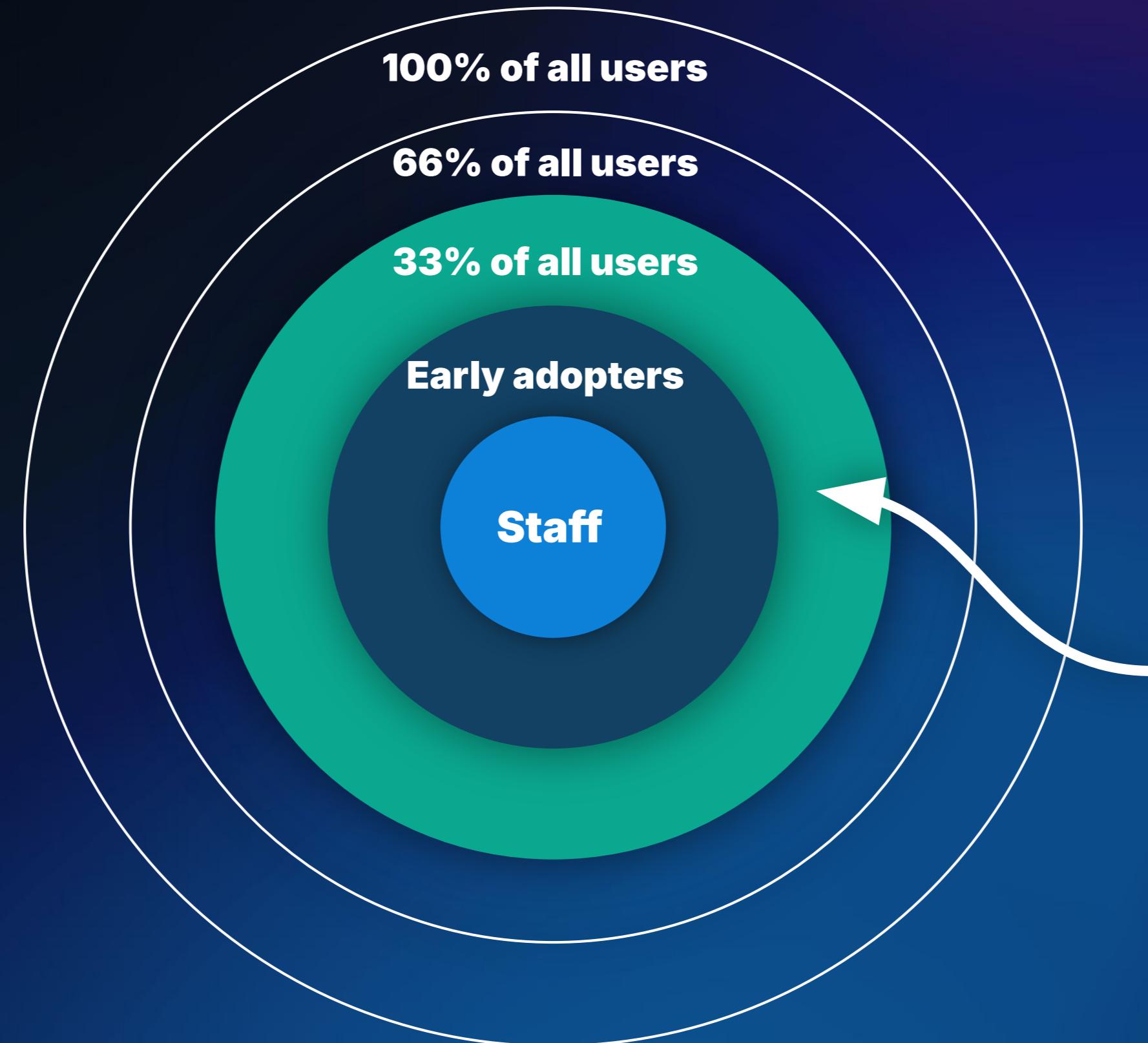




TURN ON FLAG  
FOR STAFF USERS

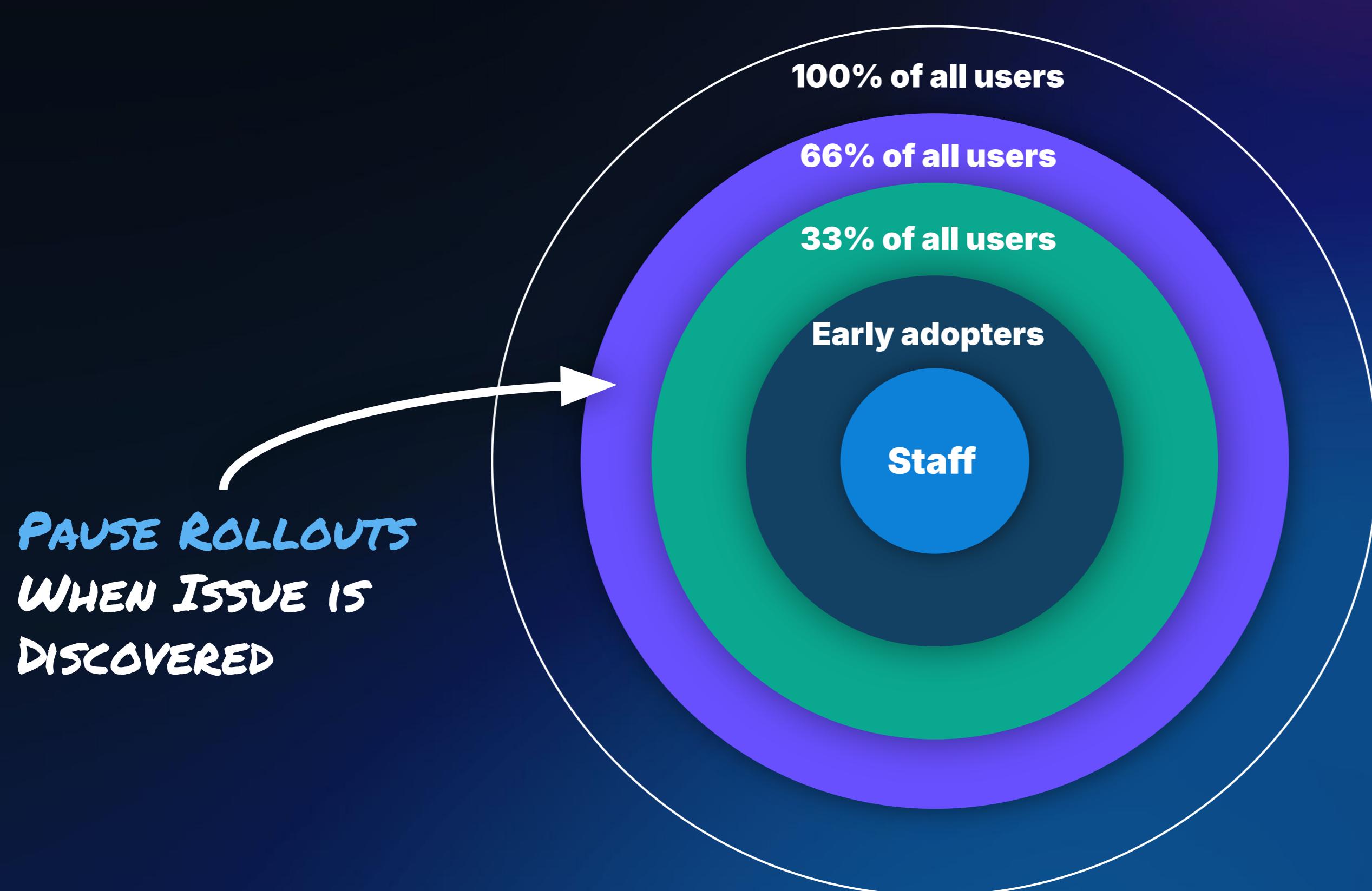
**EARLY ADOPTERS  
CAN OPT-IN**

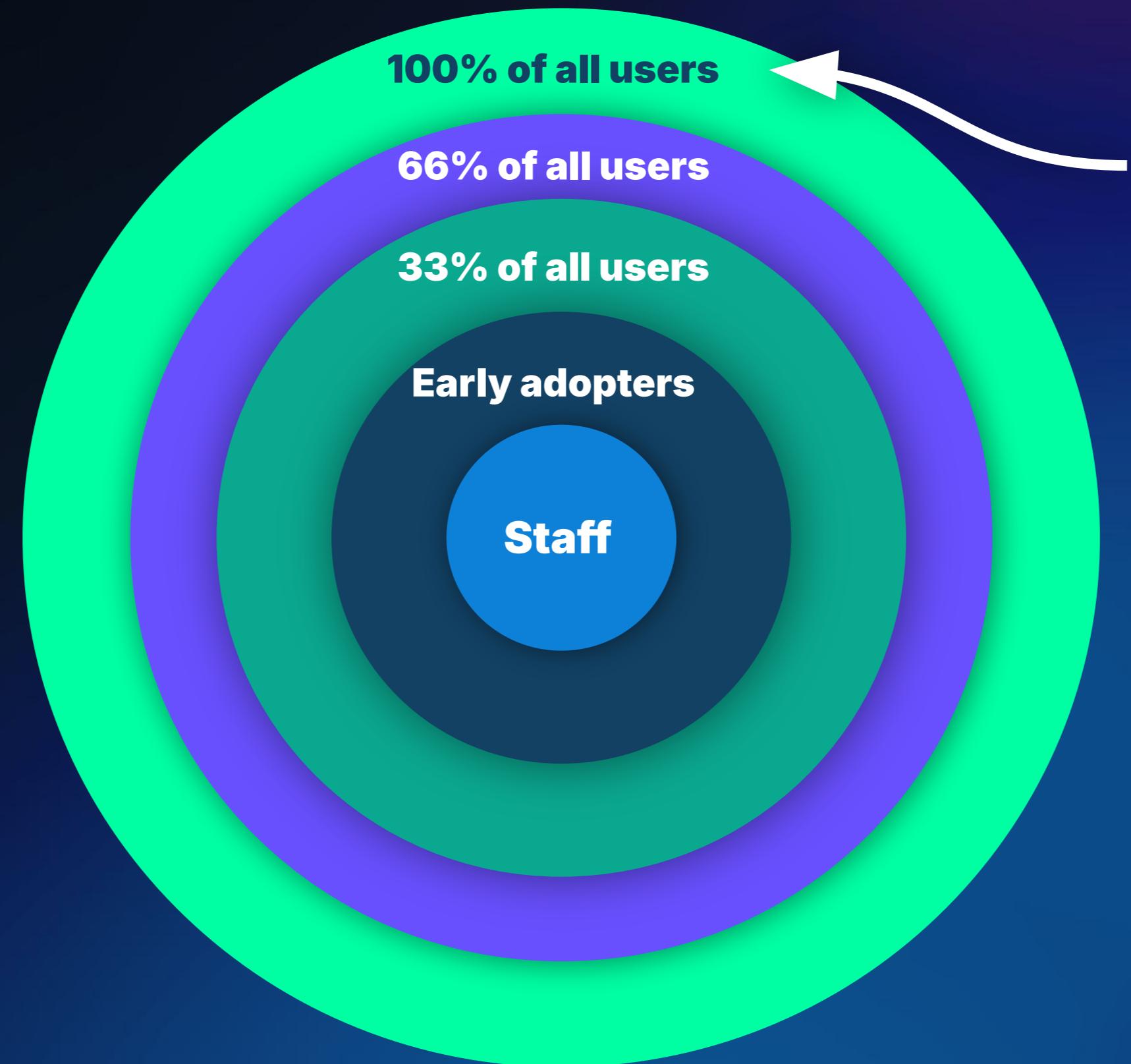




ENABLE FOR  
REMAINING  
USERS OVER  
PERIOD OF TIME







CONTINUE TO 100%  
BUT EXCLUDE  
CUSTOMERS UNTIL  
ISSUE IS RESOLVED



Feature Toggles

## Git Runbooks Migration

Save

⋮

EXPAND AI

Name Git Runbooks Migration git-runbooks-migration

Notes Enter markdown notes

### Environments

Add Environment

Branch Instances (Staging)

Production  bobwalker (93210-38123-34424-0240)

 geofflamrock (52813-83013-13426-32423)

 matt-richardson (14422-43153-05428-91393)

 michrich (26536-51719-66422-08236)  robpearson (07302-11441-38429-68838)

Cloud Customers  caitlyn (81532-51943-29424-61)

 claimsxten (85067-69362-42425-31633)  deploy (86975-7807)

 fctg (28283-23273-85426-51305)  fish-net (51662-13732-134)

 recruitwizard (40147-20555-01421-42353)  vista (85312-6343)

 vista2 (95223-72613-36426-49244)

## Edit Environment

Environment

 Production

### Tenants

Select which tenants should be targeted by this toggle

Included tenants

All Tenants

Specific Tenants

 bobwalker (93210-38123-34424-02406) 

 michrich (26536-51719-66422-08236) 

 geofflamrock (52813-83013-13426-32423) 

 matt-richardson (14422-43153-05428-91393) 

 robpearson (07302-11441-38429-68838) 

Included Tenants

Percentage of Tenants

Excluded Tenants

### Segments

Cancel

Ok



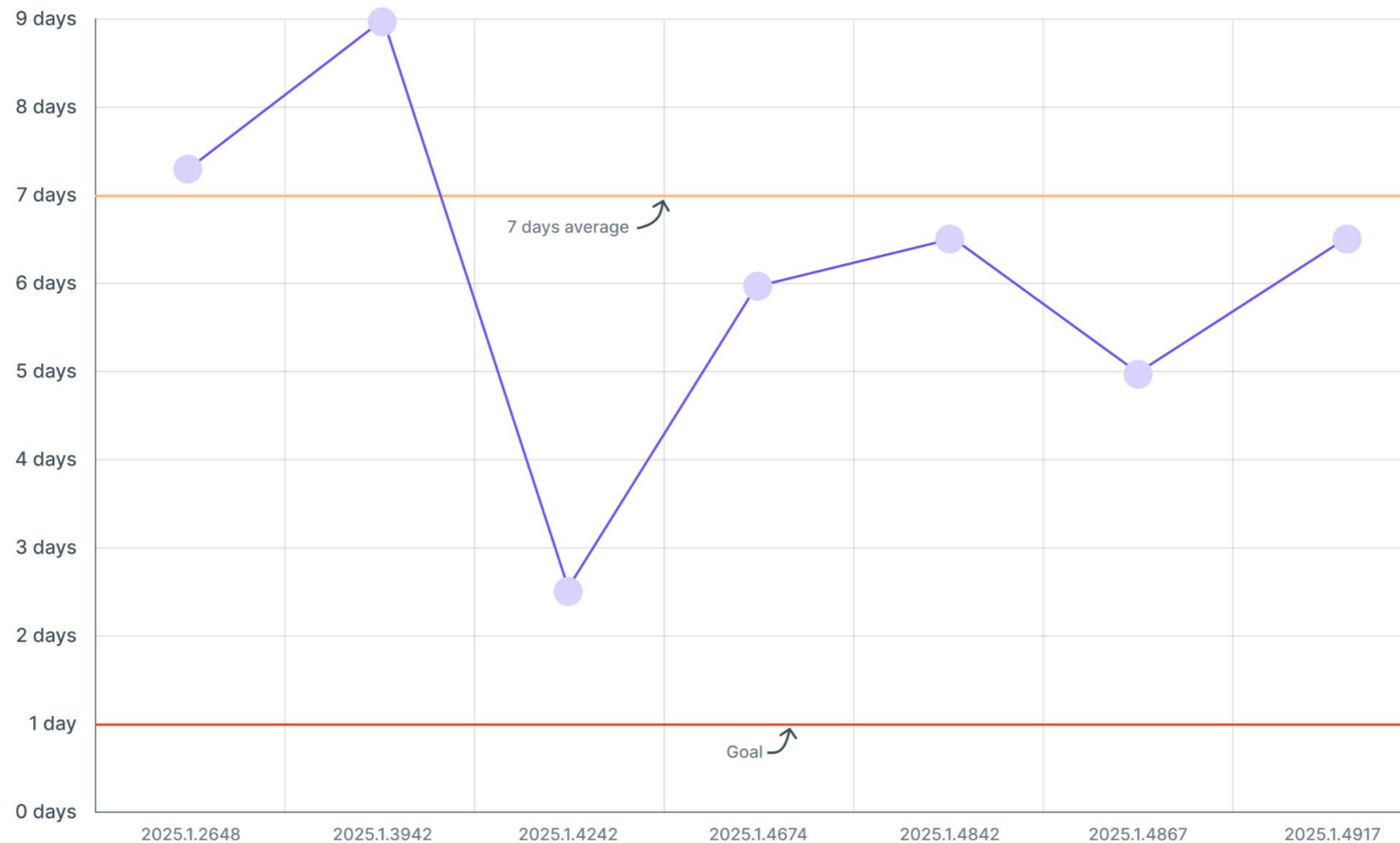
Month	Uptime %	Weekly unplanned downtime	Uptime % incl. planned maintenance	Weekly downtime incl. planned maintenance
June 2025	99.9974%	21s	99.9307%	420s
May 2025	100%	0s	99.9125%	532s
April 2025	99.9925%	49s	99.9479%	315s
March 2025	99.9809%	119s	99.9292%	434s
February 2025	100%	0s	99.9212%	483s
January 2025	99.9924%	49s	99.9397%	371s
December 2024	100%	0s	99.9666%	203s
November 2024	100%	0s	99.8895%	672s
October 2024	99.9973%	21s	99.917%	504s
September 2024	99.9977%	14s	99.9165%	511s
August 2024	99.9955%	28s	99.8978%	623s
July 2024	99.9978%	14s	99.8602%	847s



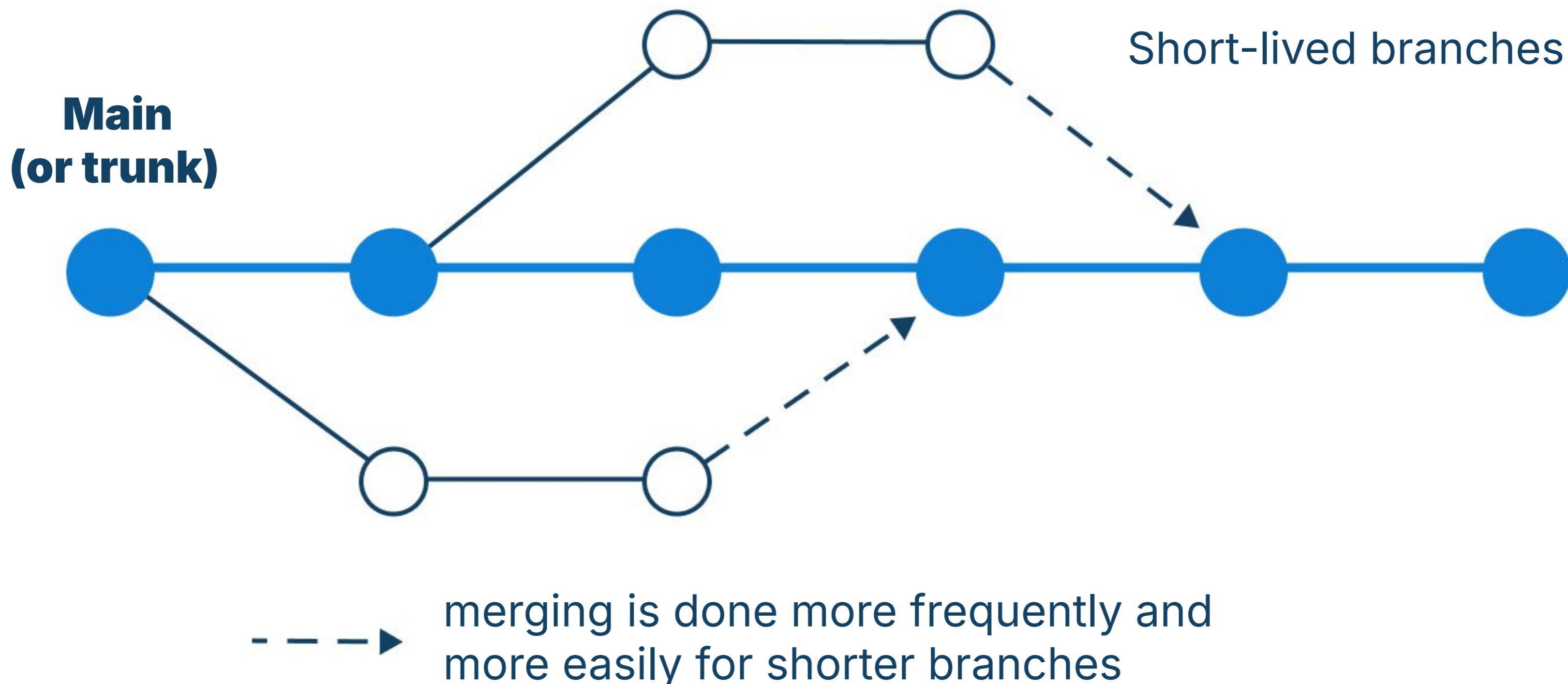
# Lead time changes (Cloud)

● Current measure: 4 days, 3 hrs. [Details]

● Goal: 1 day



# Trunk-based development



# Remaining challenges



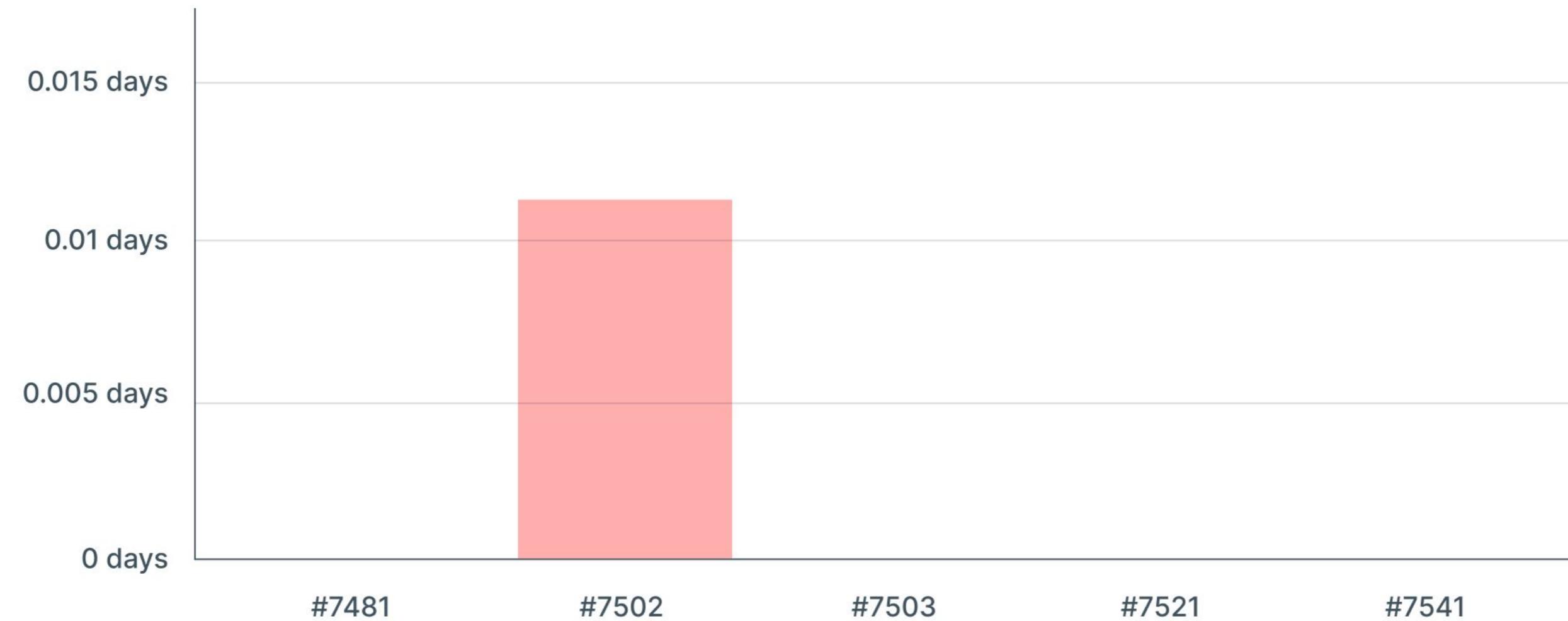
# Mean time to recovery (MTTR)

## Time to detect

5 days, 20hrs average

## Time to fix

- Current measure [Details]: < 1 hour
- Goal: < 1 hour to fix



# High severity defect escape rate

Only SEV-0 and SEV-1 issues are shared here.

For more details on tracking the high-severity defect escape rate, read [this document](#).

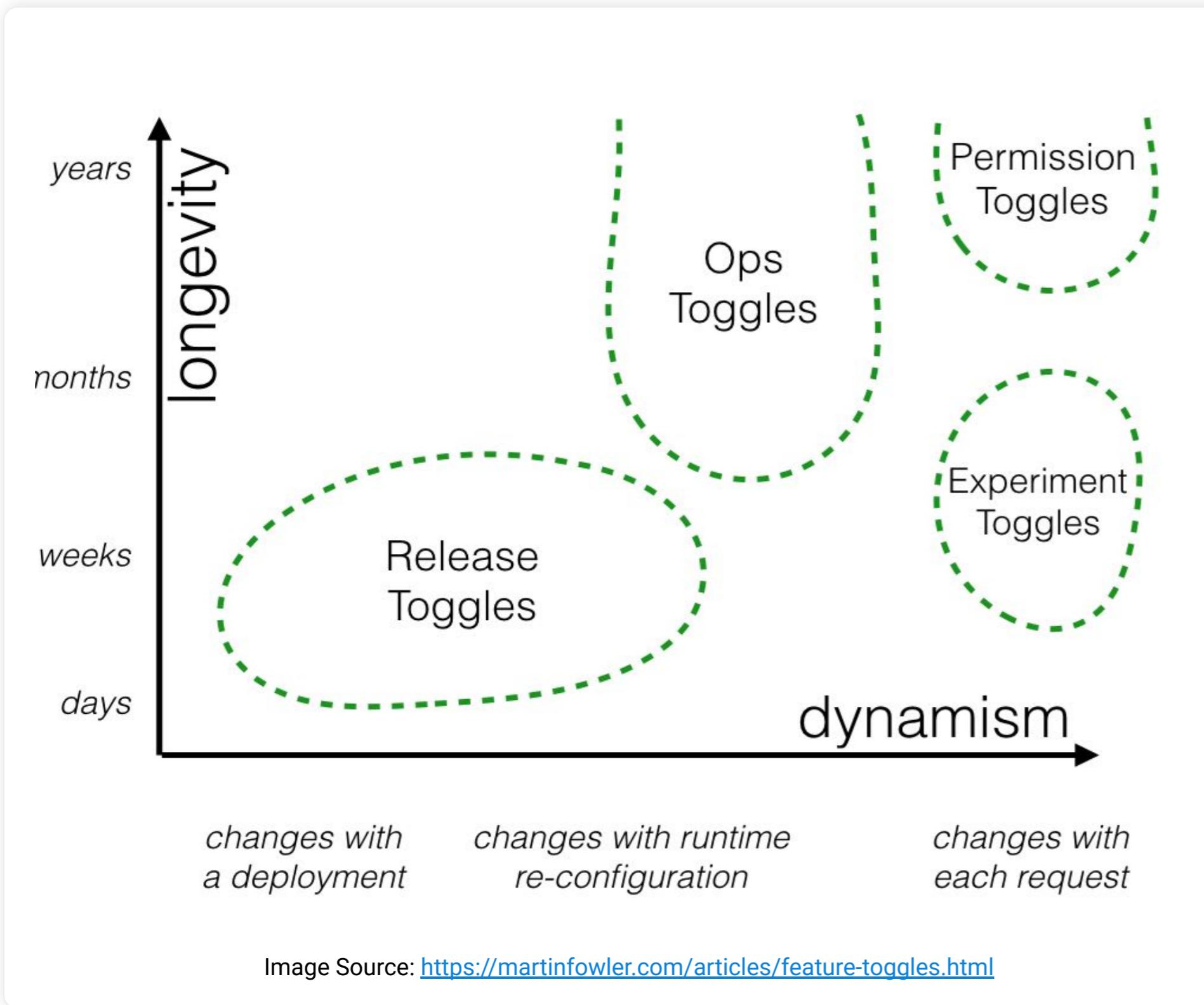
See [Vision: Octopus Server Delivery Pipeline \(2024 Update\)](#) for further details on change failure rate goal)

## ● December

- High severity defect escape rate = 1%
- Number of Commits: 550
- Number of commits causing high severity issues: 2

Reporting date	Defect Title	Defect Details	Platform of initial request	ARR affected(in USD)	Link
9th Dec	Deployment failure if there is an error in Pipeline Selector	This happened after adding a timeout cancellation token when running Compatibility Detector	Andon cord	N/A	<a href="#">Andon cord pull</a> <a href="#">Slack Thread</a> <a href="#">Github PR</a>
10th Dec	Task view will not tasks for Runbooks in Git Projects	The task view would try and load a Runbook from Git if the project is in Git, but Runbooks are not. This means the form does not display data.	Andon cord	N/A	<a href="#">Andon cord pull</a> <a href="#">Github PR</a>

# Feature flags require Expand and Contract Pattern



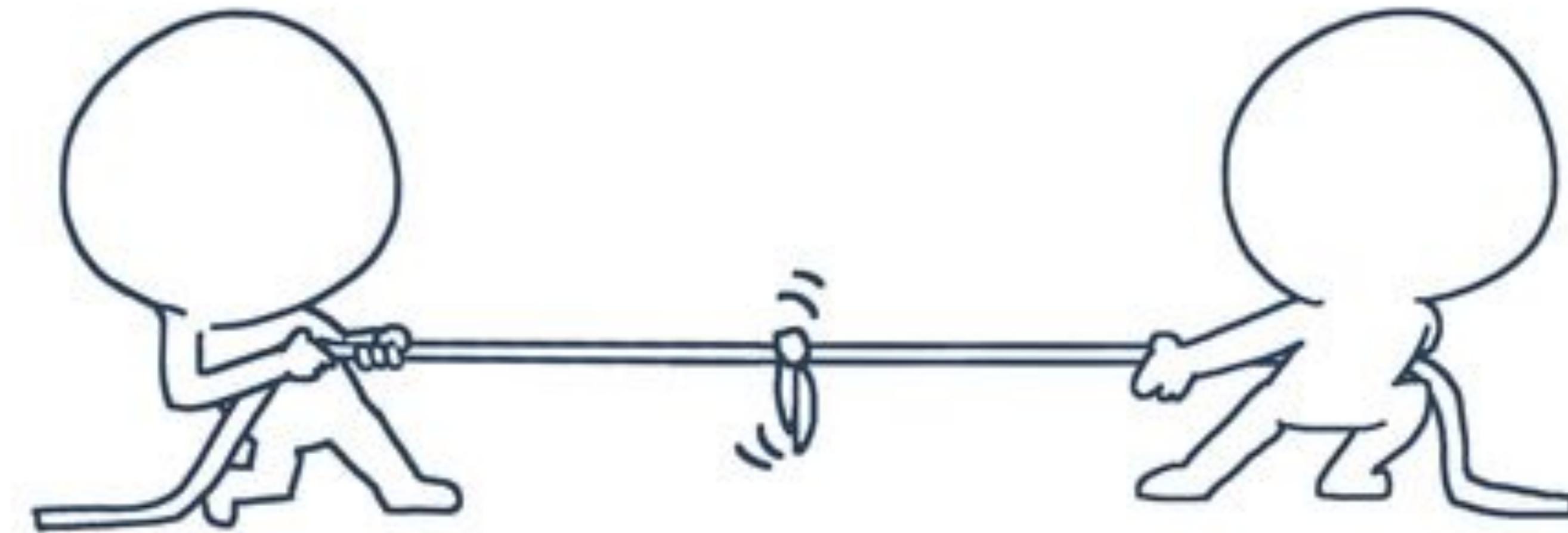
# OpenFeature

Standardizing Feature Flagging for Everyone

# When to use **feature toggles**?

**Feature Risk**

**Toggle Overhead**



# Key Takeaways

for

- Canary Deployments de-risk deployment failures  
not new features
- The safest deployment strategy separates deploying new code from releasing new functionality
- Treat your deployment pipeline like an assembly line - always moving forward
- Provide psychological safety for allow anyone to stop the assembly line
- Feature Toggles provide the best rollback strategy - turn off the feature for a subset or all users

this session



# Thank you



**Bob Walker**

Field CTO

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 @bobjwalker

 bobjwalker.octopus.app



White Paper

