AIRFLOW SUMMIT

GitHub’s Airflow Journey

Lessons, Mistakes, and Insights

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3.0

About me

Data Engineer at GitHub for past 3,5 years

Have lots of experience building and operating development platforms

Love upgrading software

Airflow at GitHub

1000

active DAGs

70

teams

50k+

tasks per day

GitHub is running Airflow for 9 years

Since 9 years ago

GitHub

- Got acquired by Microsoft
- Introduced GitHub Actions
- Acquired npm, Dependabot and CodeQL
- Introduced GitHub Copilot

Airflow

- Added CHANGELOG
- Added Kubernetes executor
- Graduated from Apache incubator
- Extracted DAG processor from scheduler
- Added RBAC and audit

Since 9 years ago

GitHub

- Got acquired by Microsoft
- Introduced GitHub Actions
- Acquired npm, Dependabot and CodeQL
- Introduced GitHub Copilot

- Got 18k pull requests

Airflow

- Added CHANGELOG
- Added Kubernetes executor
- Graduated from Apache incubator
- Extracted DAG processor from scheduler
- Added RBAC and audit

- Got 37k pull requests

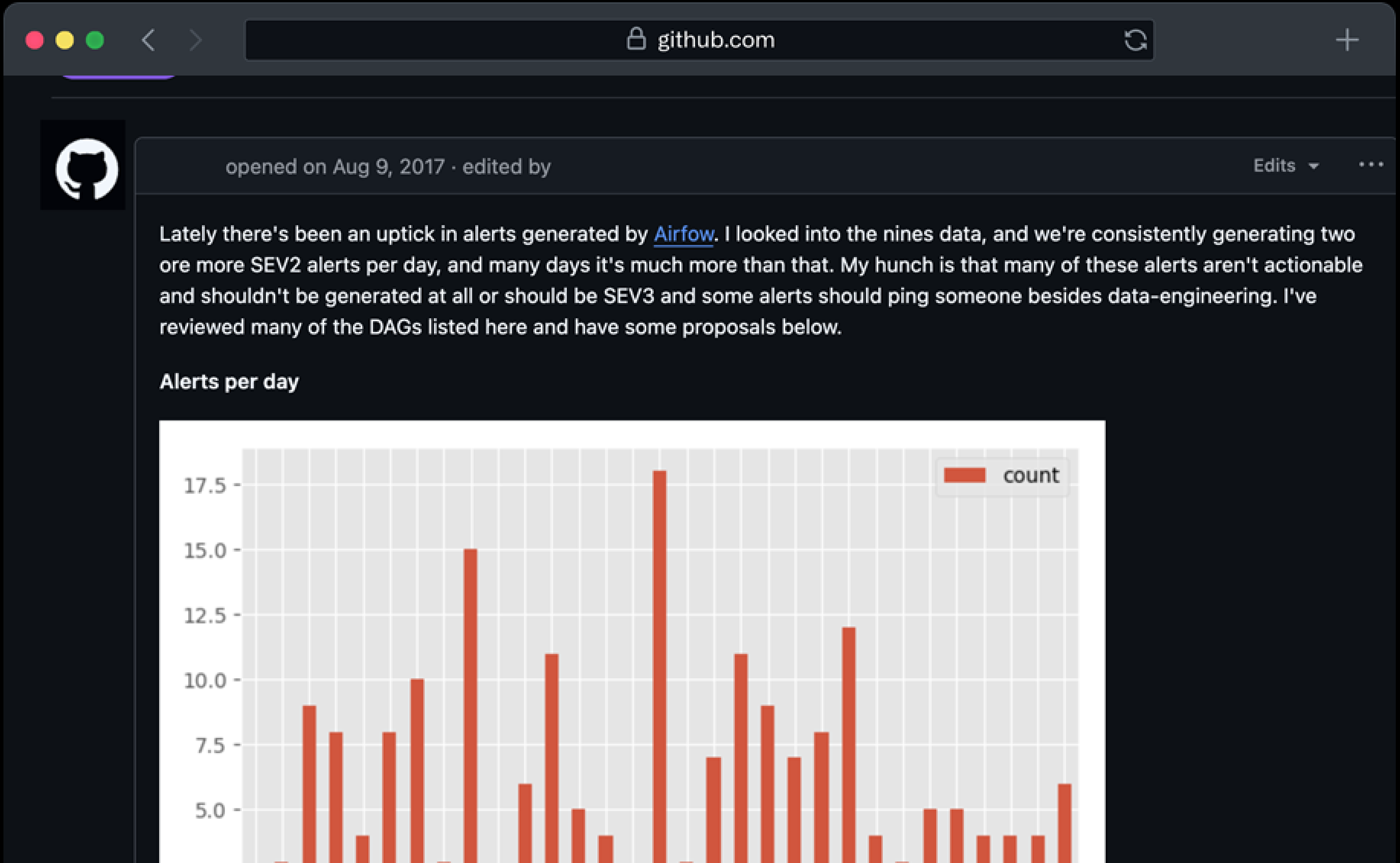
11 lessons about growing Airflow usage

How it started

- Needed to get some data for billing in June 2016
- Added more and more DAGs
- Everything is critical and important

What if we monitor all DAGs for failures?

Getting too many alerts



opened on Aug 9, 2017 · edited by

Lately there's been an uptick in alerts generated by Airfow. I looked into the nines data, and we're consistently generating two ore more SEV2 alerts per day, and many days it's much more than that. My hunch is that many of these alerts aren't actionable and shouldn't be generated at all or should be SEV3 and some alerts should ping someone besides data-engineering. I've reviewed many of the DAGs listed here and have some proposals below.

Alerts per day

What if we monitor ~~all~~ some DAGs for failures?

Lesson 0

DAG monitoring is not enough

- You need to monitor underlying infrastructure
- Possibly monitor that DAGs finish at expected time

We need more data for analysis

We need more data for analysis

Let’s add more people

Lesson 1

ETL is too much for a single team

Self-serve for ETL

Lesson 2

Make sure code has owners

- Use CODEOWNERS file
- Data owners are not always codeowners
- Someone who will debug and fix the issue when DAG fails
- Someone who can approve code
- Test it in CI and Airflow continuously

Follow Airflow best practices

Lesson 3

Provide example DAG

- No one wants to learn the code, it is easier to copy
- Keep it up-to-date and running in your cluster

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- Fix deprecations

Lesson 3

Provide example DAG

- No one wants to learn the code, it is easier to copy
- Keep it up-to-date and running in your cluster
- Fix deprecations
- Do not create custom DAG class

Lesson 4

Do linting and code format

- ruff
- SQLFluff
- Unit tests for required params in DAGs

Lesson 5

Make backfills simple for users

- DAG to do backfills of other DAGs with all the steps and configs

Lesson 6

Check operators and connections

- Know your connection specifics and issues and test them

20%

Increase in number of PRs to Airflow DAGs

Year comparison, excluding library code

100%

Increase in number of issues with Airflow DAGs

10%

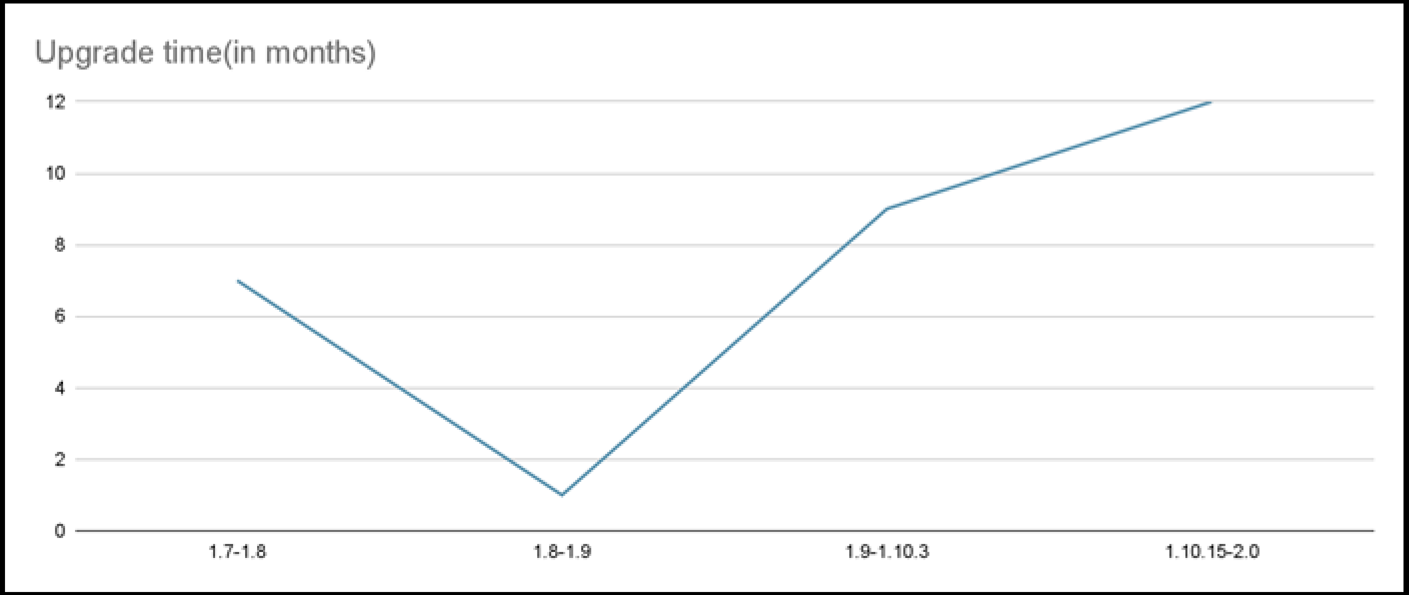
increase for issues for our team

30%

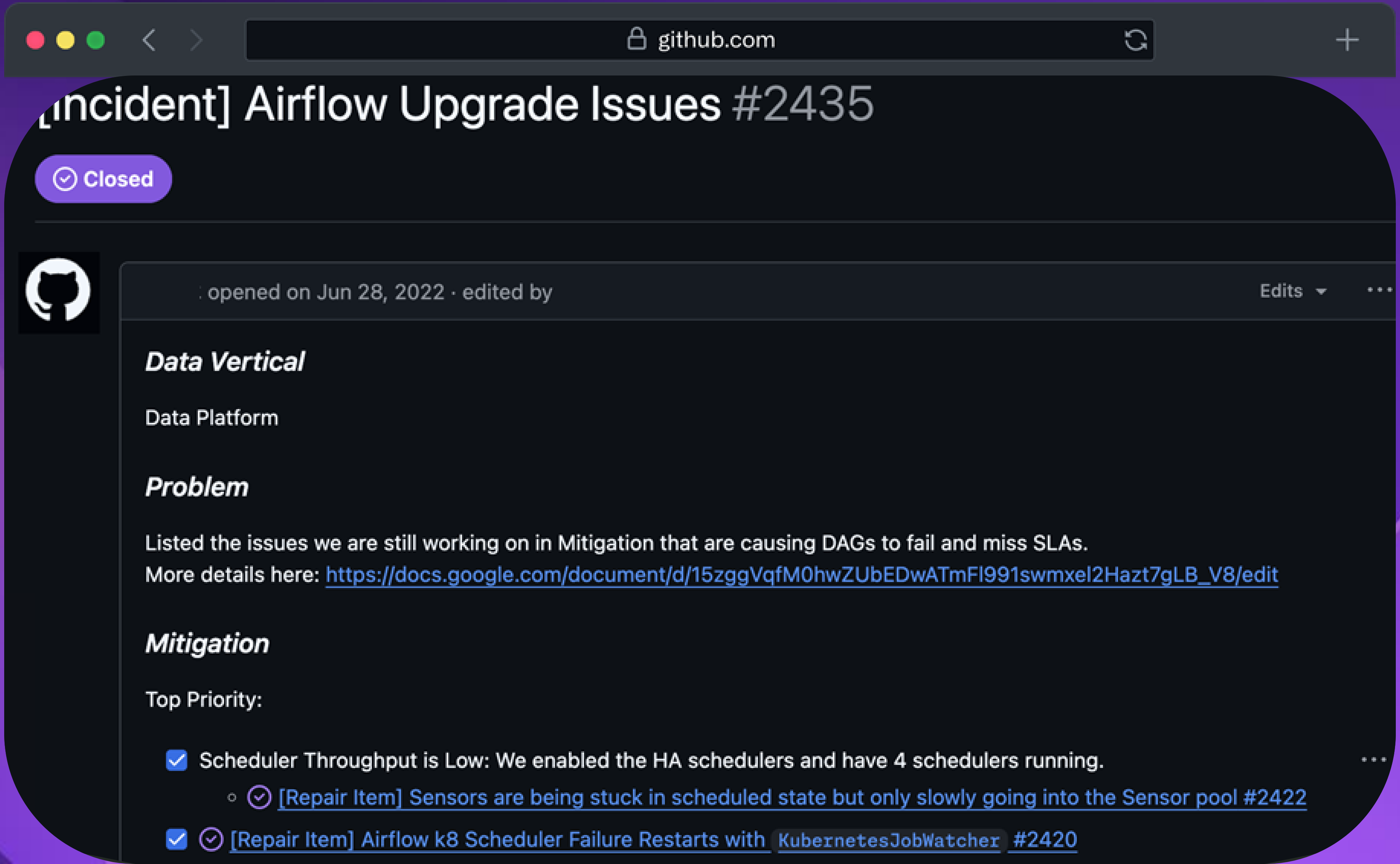
more DAGs

Running a platform

Upgrades



Year long upgrade



[Incident] Airflow Upgrade Issues #2435

Closed

opened on Jun 28, 2022 · edited by

Data Vertical

Data Platform

Problem

Listed the issues we are still working on in Mitigation that are causing DAGs to fail and miss SLAs.
More details here: https://docs.google.com/document/d/15zggVqfM0hwZUbEDwATmFl991swmxel2Hazt7gLB_V8/edit

Mitigation

Top Priority:

- ☑ Scheduler Throughput is Low: We enabled the HA schedulers and have 4 schedulers running.
    - ✓ [Repair Item] Sensors are being stuck in scheduled state but only slowly going into the Sensor pool #2422
- ☑ ✓ [Repair Item] Airflow k8 Scheduler Failure Restarts with `KubernetesJobWatcher` #2420

Lesson 7

Use open source knowledge

- Do not copy just code
- Contribute back PRs and issues

Lesson 8

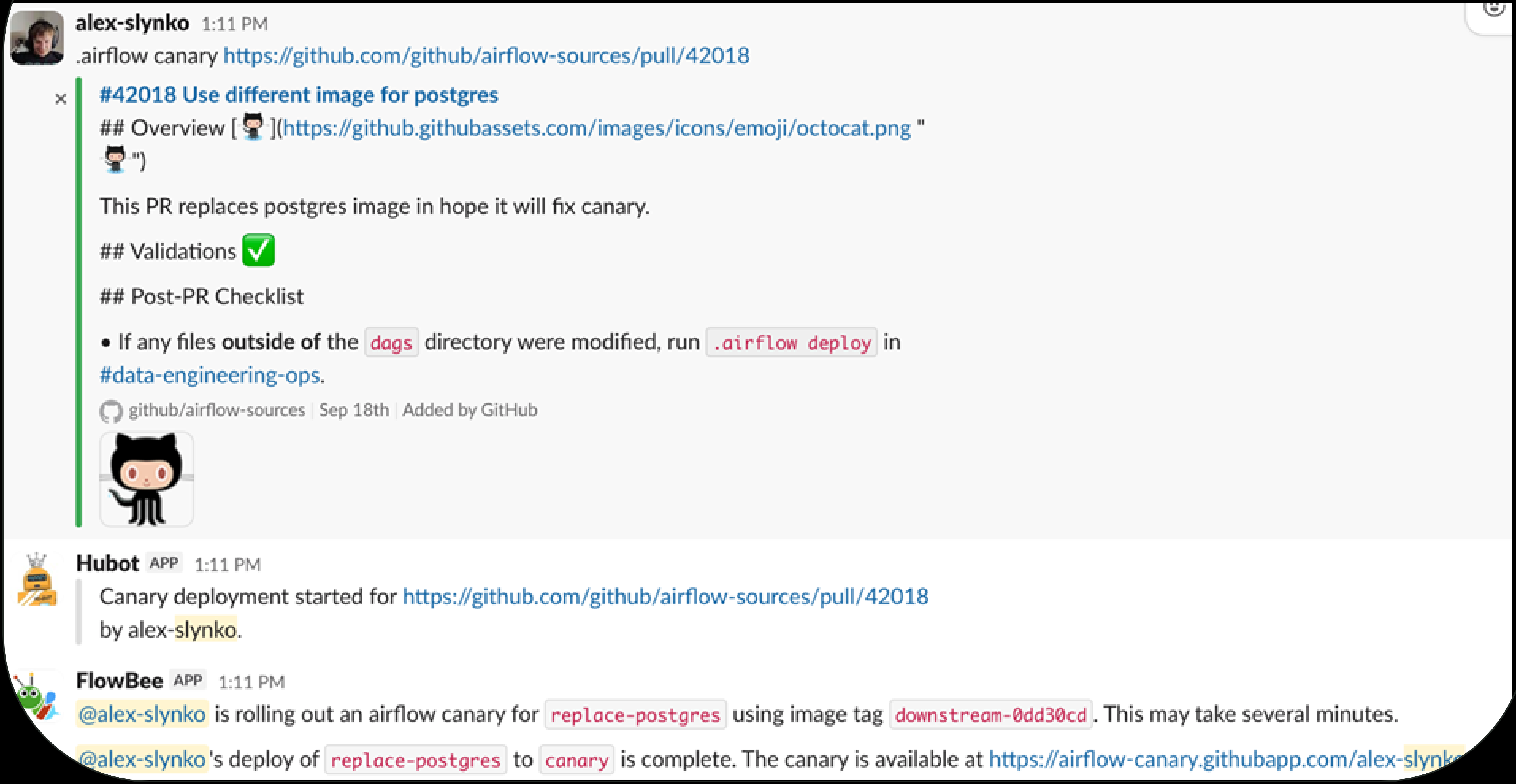
Simplify setup and development

- Codespaces/devcontainers - same setup inside container

Lesson 9

Ephemeral dev environments

- One staging is not enough
- It is hard to test upgrades on single environment



alex-slynko 1:11 PM

.airflow canary https://github.com/github/airflow-sources/pull/42018

#42018 Use different image for postgres

Overview [ ](https://github.githubassets.com/images/icons/emoji/octocat.png "
")

This PR replaces postgres image in hope it will fix canary.

Validations ✅

Post-PR Checklist

- If any files **outside of** the `dags` directory were modified, run `.airflow deploy` in #data-engineering-ops.

github/airflow-sources | Sep 18th | Added by GitHub

Hubot APP 1:11 PM

Canary deployment started for https://github.com/github/airflow-sources/pull/42018 by alex-slynko.

FlowBee APP 1:11 PM

@alex-slynko is rolling out an airflow canary for `replace-postgres` using image tag `downstream-0dd30cd`. This may take several minutes.

@alex-slynko's deploy of `replace-postgres` to `canary` is complete. The canary is available at https://airflow-canary.githubapp.com/alex-slynk

Lesson 10

Simplify CI

- It should be easy to change Airflow versions
- The test setup should be simple

Lesson 11

Upgrade packages

- Use Dependabot

Time to major upgrade

4

months

Reduced issues by

20%

PR number increased by

30%

Things to do

Test operators and connections in DAG

Make sure you have dev environment to test

Fix deprecations

Things to do

Contribute to Airflow

✓ Test operators and connections in DAG

Make sure you have dev environment to test

Fix deprecations

Thank you

@alex-slynko