

Argo Proposal for CNCF Incubation

Intuit, BlackRock

What is Argo?

Argo is a set of Kubernetes-native tools for running and managing jobs and applications on Kubernetes. This is exemplified by the Argo tagline, "Get stuff done with Kubernetes!"

Argo makes it easy to combine **workflows**, **events** and **deployments** to declaratively create jobs and applications on Kubernetes.

- [Argo Workflows](#) - Container-native Workflow Engine
- [Argo CD](#) - Declarative GitOps Continuous Delivery
 - Rollouts - Declarative Progressive Delivery and Experimentation
- [Argo Events](#) - Event-based Dependency Manager

Argo Community (Public References)



Kubernetes Community Use Cases

VTT - Technical Research Centre of Finland

Batch processing

- Argo Workflows
- Container-native workflow engine
- Multi-step workflows modelled as directed acyclic graph (DAG)
- Parallel steps
- Parameterizable
- Loops / conditionals
- Artifact support



VTT

6.5.2019 VTT – beyond the obvious

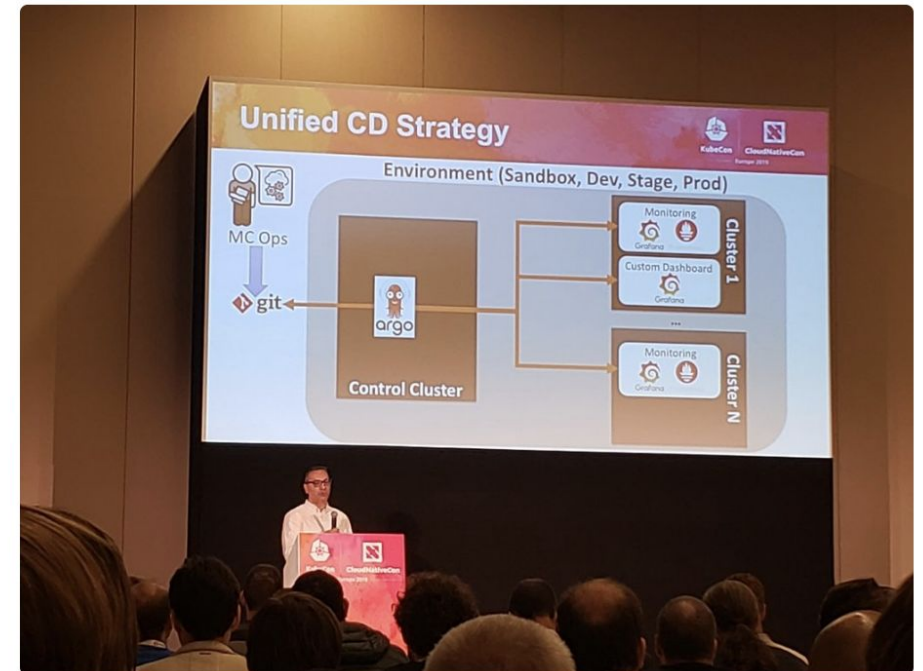
18

MasterCard

 **Ken Owens**
@kenowens12



What-unified CD working at scale! Awesome transformation @CloudNativeFdn projects #Prometheus #Fluentd and #argocd with #kustomize #CloudNativeCon #KubeConEU



♥ 6 2:33 AM - May 21, 2019



 See Ken Owens's other Tweets

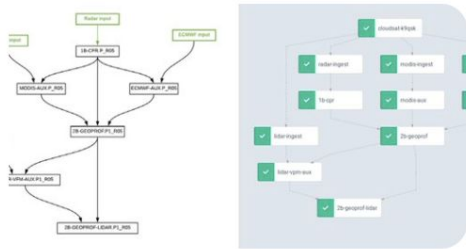


Kubernetes Community Chatter

JohannesKleinlercher @kl_johnny · Sep 6
 The best devops feeling ever: delete all your kubernetes objects and let #argocd recreate all your infrastructure from scratch. Thanks to @argoproj !

1 9 11

Cole Kennedy @colek42c · Sep 24
 Really excited about the work our @boxboat team is doing with @CIRA_CSU to modernize their #DataScience workflows improving #climatescience. @kubernetesio @argoproj



1 5

Iñaki @JuanchoRubalcav · Jun 6
 @JesseSuen I really like the work that you are doing for @argoproj thanks man !

1 1

Kelsey Hightower @kelseyhightower · Google
 Argo adds a workflow engine on top of Kubernetes and makes it easy to build continuous integration and data processing pipelines. Extra dope! applatix.com/open-source/ar...

briggs1 @briggs1 · Feb 7
 Thanks so much to @argoproj and @JesseSuen for this incredible blog post about the current state of Kubernetes configuration mgmt (with a hat tip to kr8!) blog.argoproj.io/the-state-of-k... glad this space is finally getting some attention!

1

Michael Goodness @opsgoodness · Aug 15
 Already a huge fan of Argo CD for GitOps-driven deployment. Tomorrow I see if Argo Events works to tie it all together.

Data Council @DataCouncilAI · Jul 24
 @grootd explains why @canva picked @kubernetesio-native workflow engine @argoproj as its primary #data orchestration system rather than @ApacheAirflow or others. Watch his full talk here bit.ly/30YNlVt #datacouncil

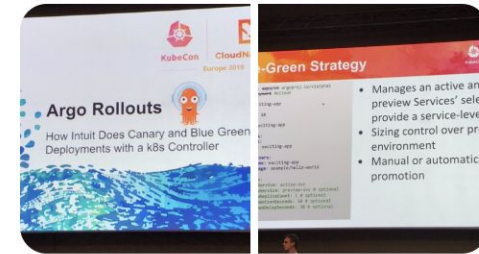


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Alessandro Marrella @amarrella · Jun 6
 Replying to @kubernetesio
 argo-cd @argoproj makes it a dream!

2

Adam Barreiro @adambarreiro · May 23
 One of the coolest demos! Declarative Blue green deployments @argoproj #KubeCon #CloudNativeCon



ticketmaster®

Joe Beda @jbeda · Jan 5, 2018
 Just finished #TGik8s 020. This time I looked at @argoproj. There is lot to like there! Thanks to all that participated. Recording is now up. (We also talked meltdown and API naming and other eclectic stuff.) j.hept.io/tgik020

Isaac Gaskin · 1st · 3w ...
 Melanated Millennial. Interested in containers and security. Site Re...
 congrats on the release! This version has some great quality-of-life features. We've already upgraded our production argocd server. 🍌

2 Likes | 2 Replies



heptio
 Now part of VMware



TESLA

Community Contributions

- 5000+ Stars, 900+ forks, 240 contributors, 1700 slack members
- 60% of contributions to Argo are from the community
- 147 releases
- Contributions include major features, complete with GUI



adamjohnson01 commented on Aug 27

Author Contributor + 😊 ...

Here is what the output of `argocd app get`

Active Maintenance Window

```
Maintenance Windows:* * * * *:1h
Maintenance State: Active
```

Inactive Maintenance Window

```
Maintenance Windows:* 10 * * *:1h
Maintenance State: Inactive
```



1



adamjohnson01 commented on Aug 29 • edited ▾

Author Contributor + 😊 ...

I have updated the ui so it highlights any active schedules

I think that perhaps the "Maintenance State" section is redundant as we have the highlighting?

Active Window

Sync Policy

Automated

DISABLE AUTO-SYNC

Prune Resources

DISABLE

Self Heal

ENABLE

Maintenance Windows

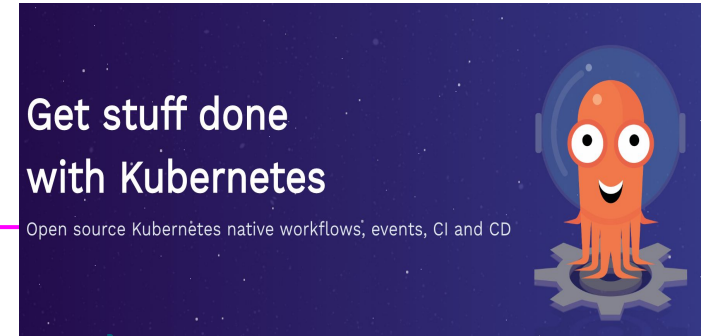
0 21 * * *:1h 1 * * * *:24h 0 23 * * 6:1h

Maintenance State

✔ Active

A Brief History

Aug 2017	Argo incubated at Applatix
Jan 2018	Applatix acquired by Intuit
Mar 2018	Argo CD incubated at Intuit
May 2018	BlackRock contributes Argo Events
Jun 2018	Kubeflow Pipelines powered by Argo
July 2018	Argo CD in production at Intuit
Nov 2018	Argo Rollouts incubated at Intuit
May 2019	Argo Rollouts launched at KubeCon
May 2019	Intuit selected as CNCF Top End User



applatix

Applatix joins Intuit!

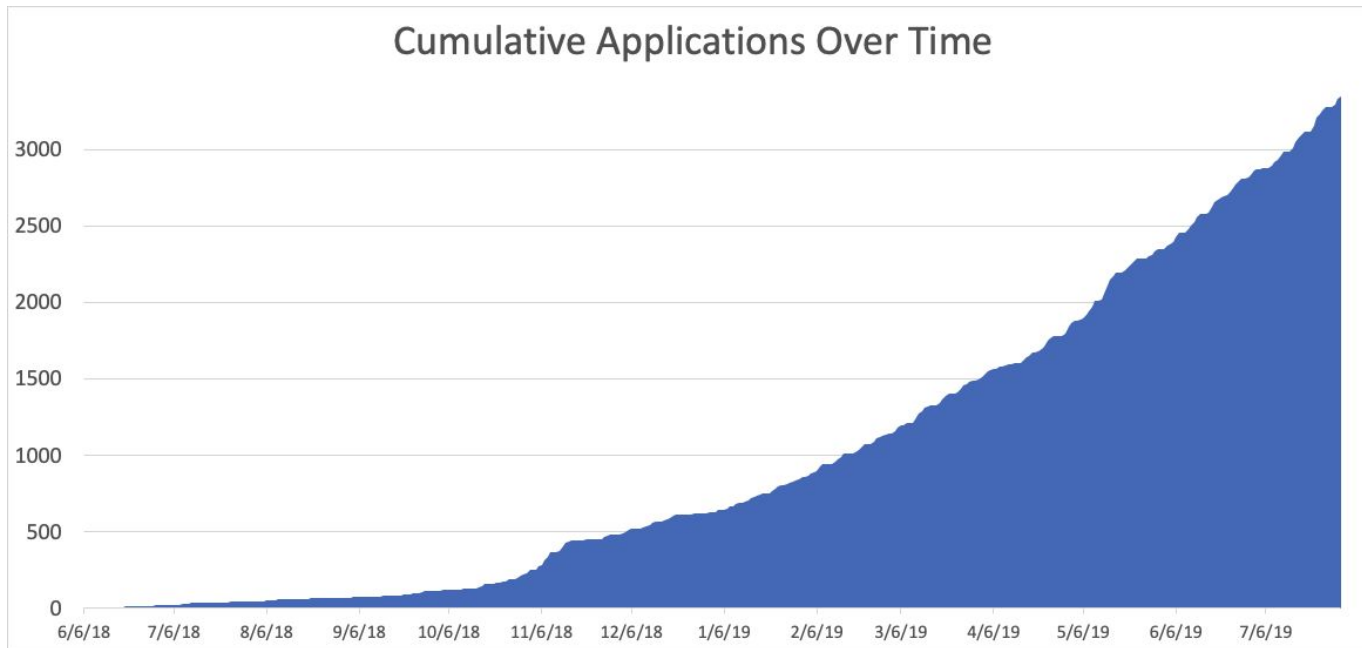


Pratik Wadher Following

Jan 22, 2018 · 2 min read



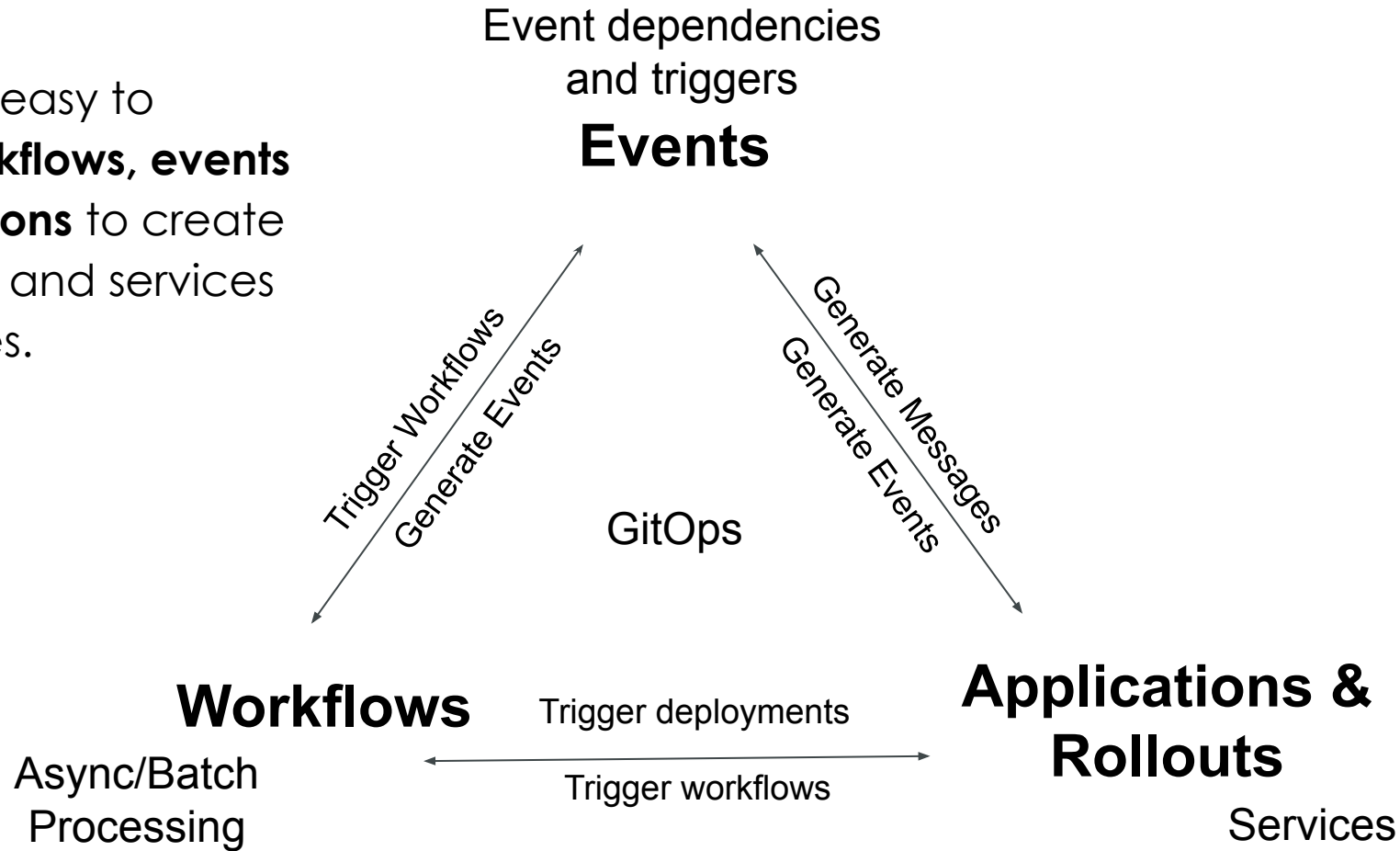
Kubernetes at scale @Intuit



- **Intuit**
 - 4 business units
 - 30+ business segments
 - 1000+ service developers onboarded
 - 40 Kubernetes platform developers/devops engineers
- **Intuit Kubernetes infrastructure**
 - 160+ managed clusters
 - 4400+ managed namespaces
 - 6000+ nodes

How are workflows, events, and deployments related?

Argo make it easy to **combine workflows, events and applications** to create complex jobs and services on Kubernetes.



Argo Workflows - Workflow Engine for Kubernetes

What is Argo Workflows?

- K8s controller and workflow CRD
- Every workflow step is a pod
- DAG and step-based DSL

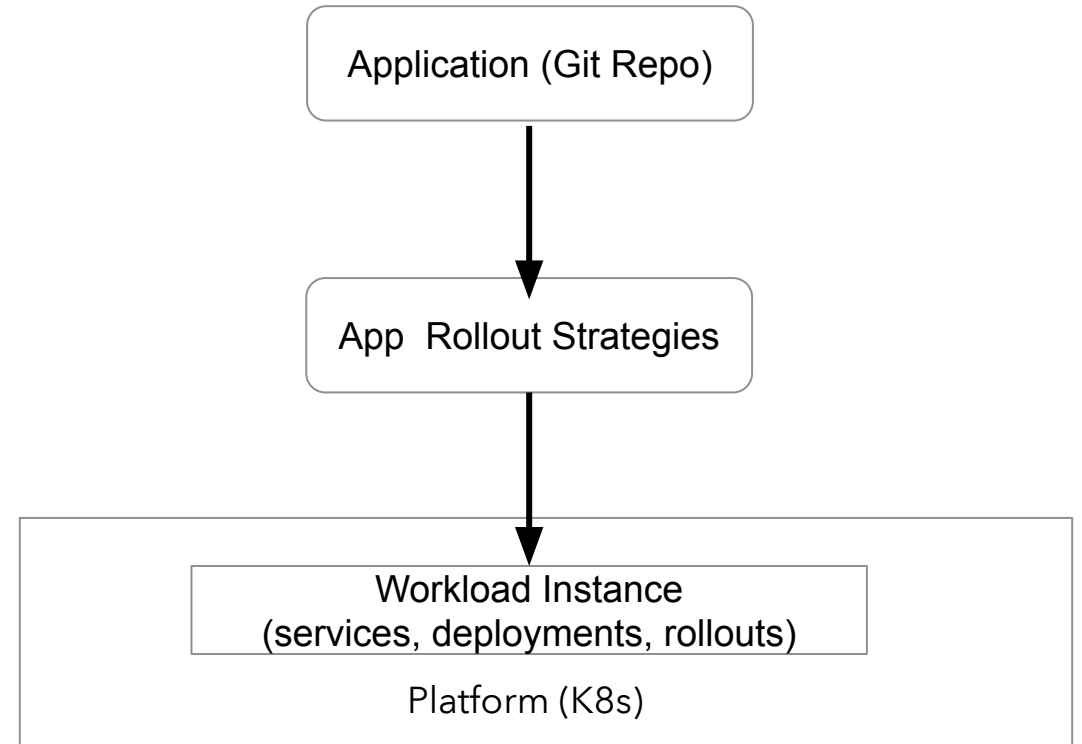
```
apiVersion: argoproj.io/v1alpha1
kind: Workflow
metadata:
  generateName: coinflip-recursive-
spec:
  entrypoint: coinflip
  templates:
  - name: coinflip
    steps:
```



Argo CD - Declarative Continuous Delivery for Kubernetes

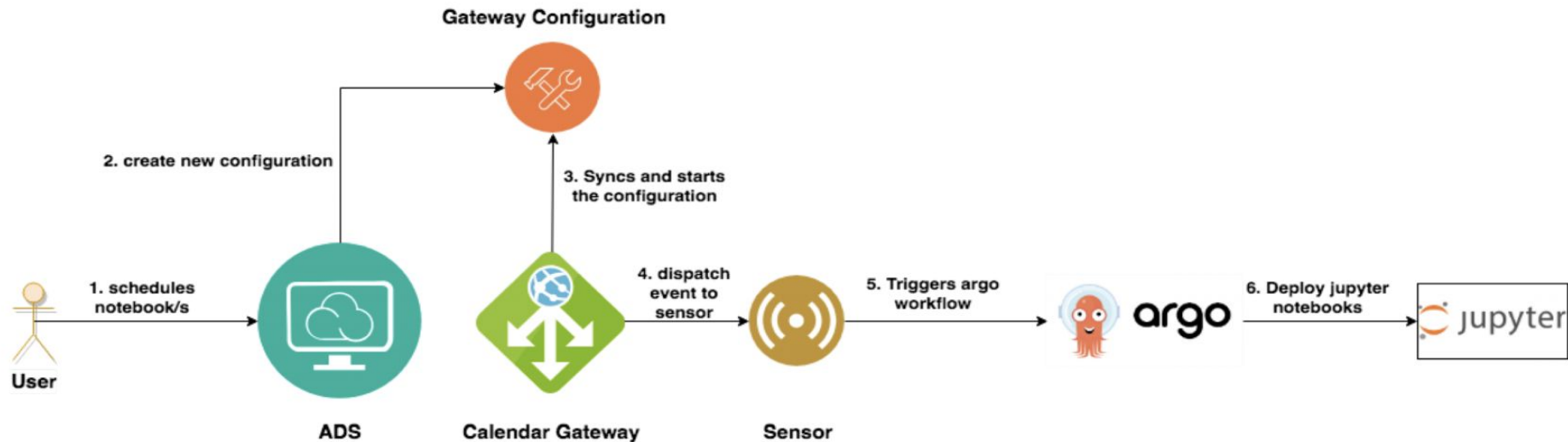
What is Argo CD?

- Git as the source of truth
- Application → Workload Instance
- Kubernetes-native - K8s CRDs
- Declarative (K8s YAML, kustomize, ksonnet, Helm)
- Clear separation between CI/Cd and deployment process
- Enterprise-friendly (RBAC, auditability, compliance, security)



BlackRock contributed Argo Events to trigger Argo Workflows

Data Science



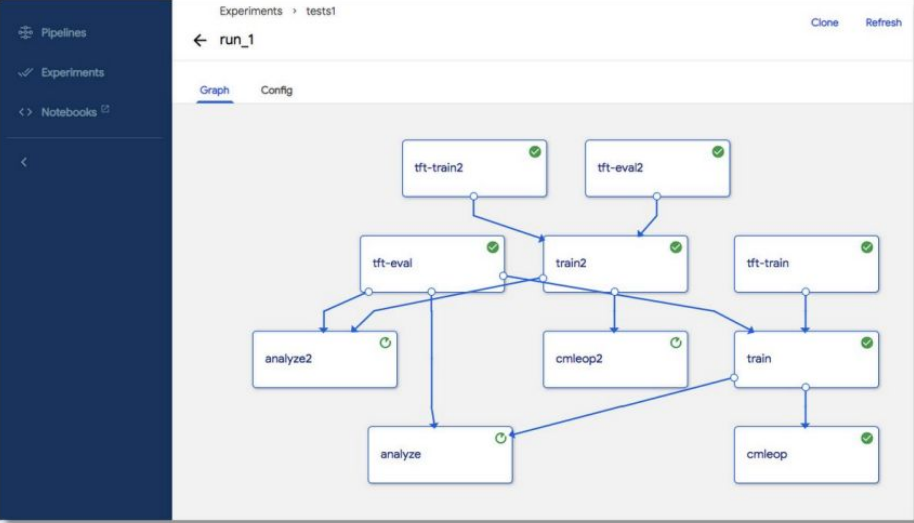
Fixed Income Notebooks

- Help BlackRock investment teams deliver market leading performance (alpha) to their clients
- Used for risk scaling, time-series transformation, running optimizations for financial models
- Includes equity models, commodity models which run on certain frequency like daily, monthly etc.
- Schedule varies from a normal cron job to a complex calendar logic.

Kubeflow uses Argo Workflows and Argo CD for pipelines and GitOps for ML

Kubeflow Pipelines

- Define complex ML workflows in Python
- Run pipelines regularly
- Visualize all runs and track all the results
- Powered by Argo



The screenshot displays the Kubeflow Pipelines interface. On the left, a navigation sidebar includes 'Pipelines', 'Experiments', and 'Notebooks'. The main area shows a workflow graph for 'run_1' under the 'Experiments > tests1' context. The graph consists of several nodes, each represented by a box with a green checkmark indicating completion. The nodes are: 'analyze2', 'tft-eval', 'analyze', 'tft-eval2', 'train2', 'cmleop2', 'tft-train2', 'tft-eval2', 'train', 'cmleop', and 'tft-train'. Arrows indicate the flow of data and dependencies between these steps.

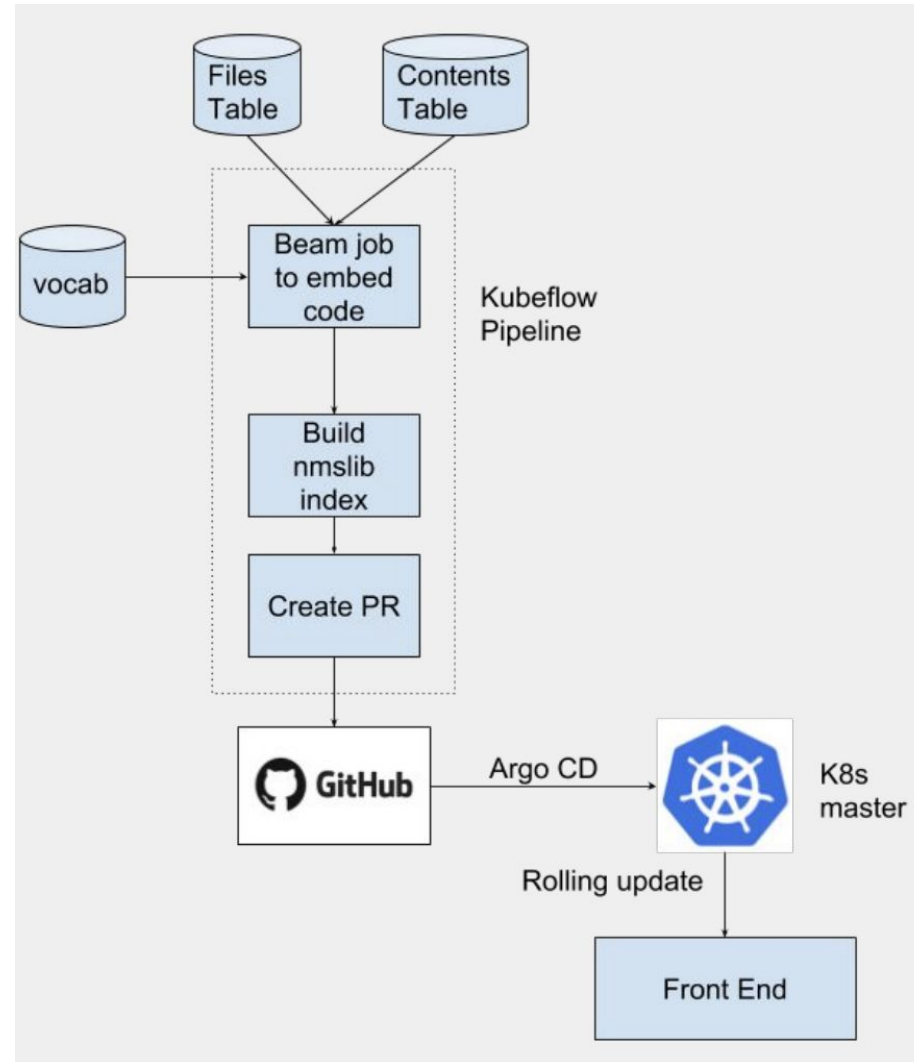
```
tfteval = dsl.ContainerOp(  
    name = 'tft-eval',  
    image = 'gcr.io/google-samples/taxi',  
    arguments = [ "--input_handle", ...]  
)  
  
tfttrain = dsl.ContainerOp(...)  
tfttrain.after(tfteval)
```

Source: https://schd.ws/hosted_files/kccna18/f2/%5Bpublic%5D%20Kubecon%202018%20NACode%20Search%20Presentation.pdf

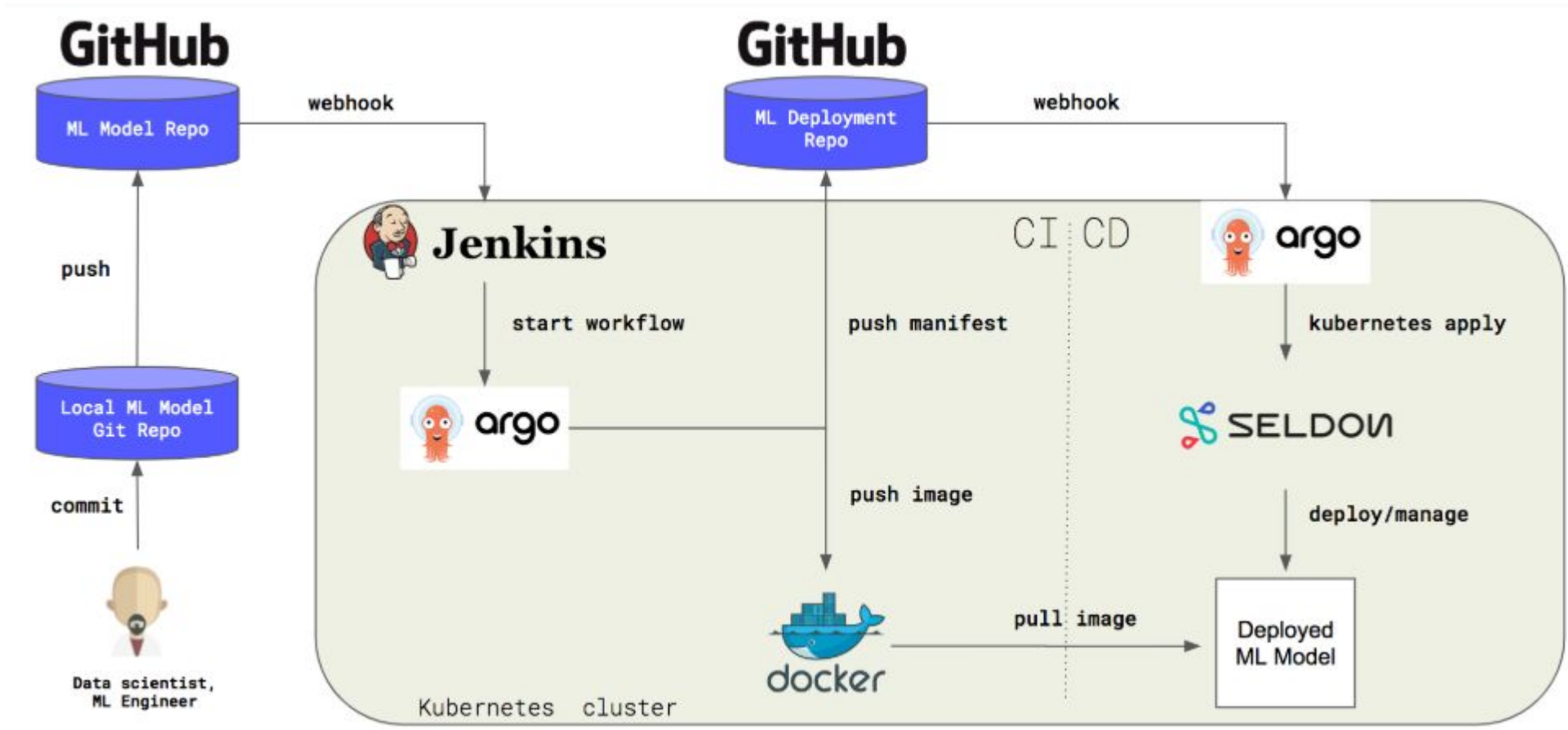
Kubeflow uses Argo Workflows and Argo CD for pipelines and GitOps

Kubeflow GitOps

- Use Kubeflow pipelines to periodically run the steps to compute the index
- Pipeline creates a PR updating the index served by the front end
- Argo CD synchronizes the deployed infrastructure



Seldon uses Argo Workflows and Argo CD to build and deploy models



Source: <https://docs.seldon.io/projects/seldon-core/en/latest/reference/release-0.2.6.html>

Alternatives to Argo

- Apache Airflow
 - From Airbnb
 - Workflow management platform
 - Not k8s-native
- Flux
 - From Weave
 - GitOps for Kubernetes
- Knative
 - From Google
 - Event management
 - More FaaS than workflows

Thank you!