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# Unveil the Secret Ingredients for Argo CD in the Enterprise-Scale

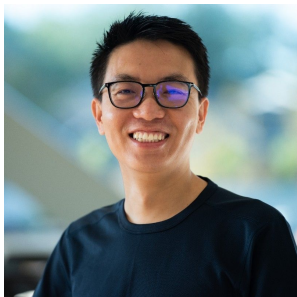
*Hong Wang & Yuan Tang, Akuity*

# Introductions



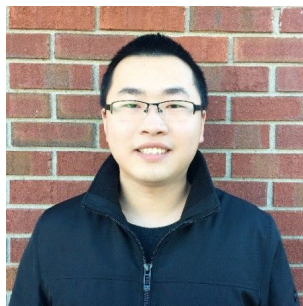
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## Hong Wang

*hong@akuity.io / @wanghong230*  
Founder and CEO at Akuity  
Argo Project



## Yuan Tang

*yuan@akuity.io / @TerryTangYuan*  
Founding Engineer at Akuity  
Argo Project



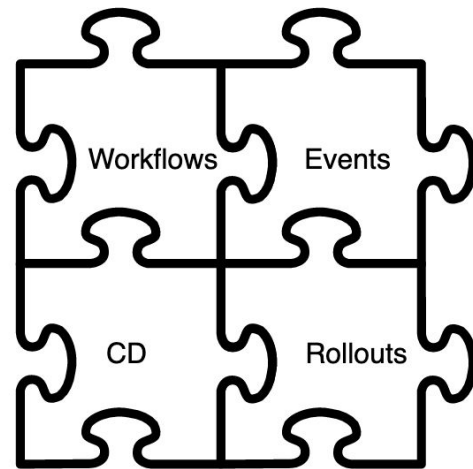


- <https://akuity.io>
- Vendor supported enterprise grade distribution of Argo
- Expert support and services from project maintainers

The [Argo Project](#) is a set of Kubernetes-native tools for deploying and running jobs and applications.

It uses **GitOps** paradigms such as continuous delivery, progressive delivery and enables **MLOps** on Kubernetes.

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



# Community



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# Community



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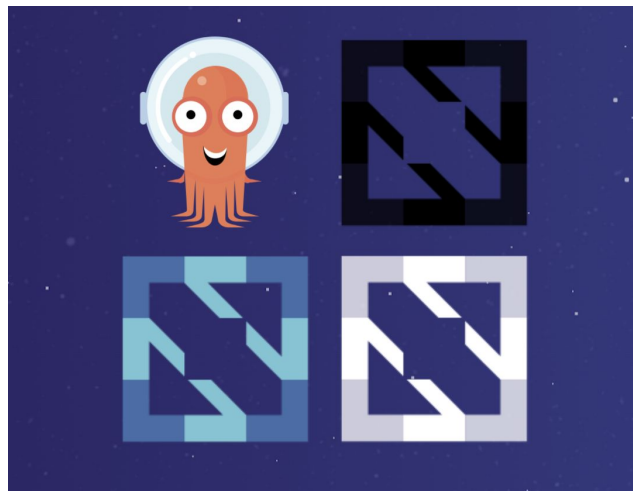


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- <https://github.com/argoproj>
- CNCF Incubation
- 20,600+ GitHub stars
- 3,600+ Slack members
- 600+ contributors
- 8,100+ commits
- 350+ end user companies
- 450+ releases



**Get stuff done  
with Kubernetes**

Open source Kubernetes native workflows, events, CI and CD

# ArgoCD Roadmap



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## v2.3 and beyond

- Input Forms UI Refresh
- Merge **ApplicationSet** controller into Argo CD
- Merge **Argo CD Notifications** into Argo CD
- Merge **Argo CD Image Updater** into Argo CD
- Compact Resources Tree
- Multi-tenancy improvements
- GitOps Engine Enhancements
- See detail [here](#)





# GitOps Operator Functions



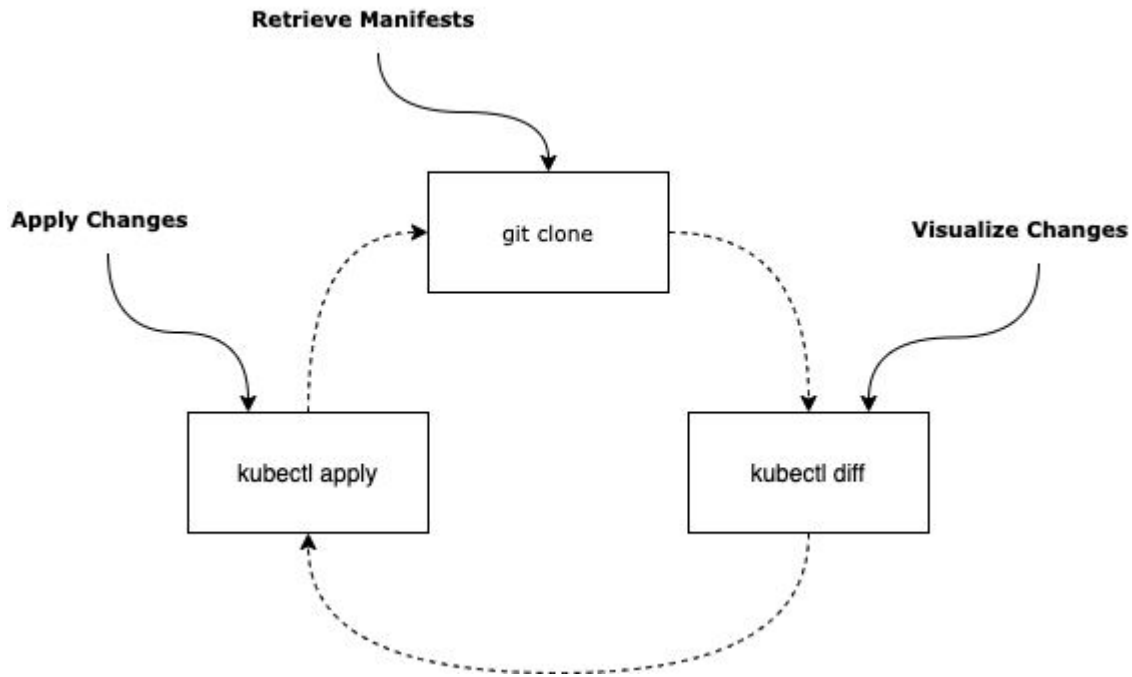
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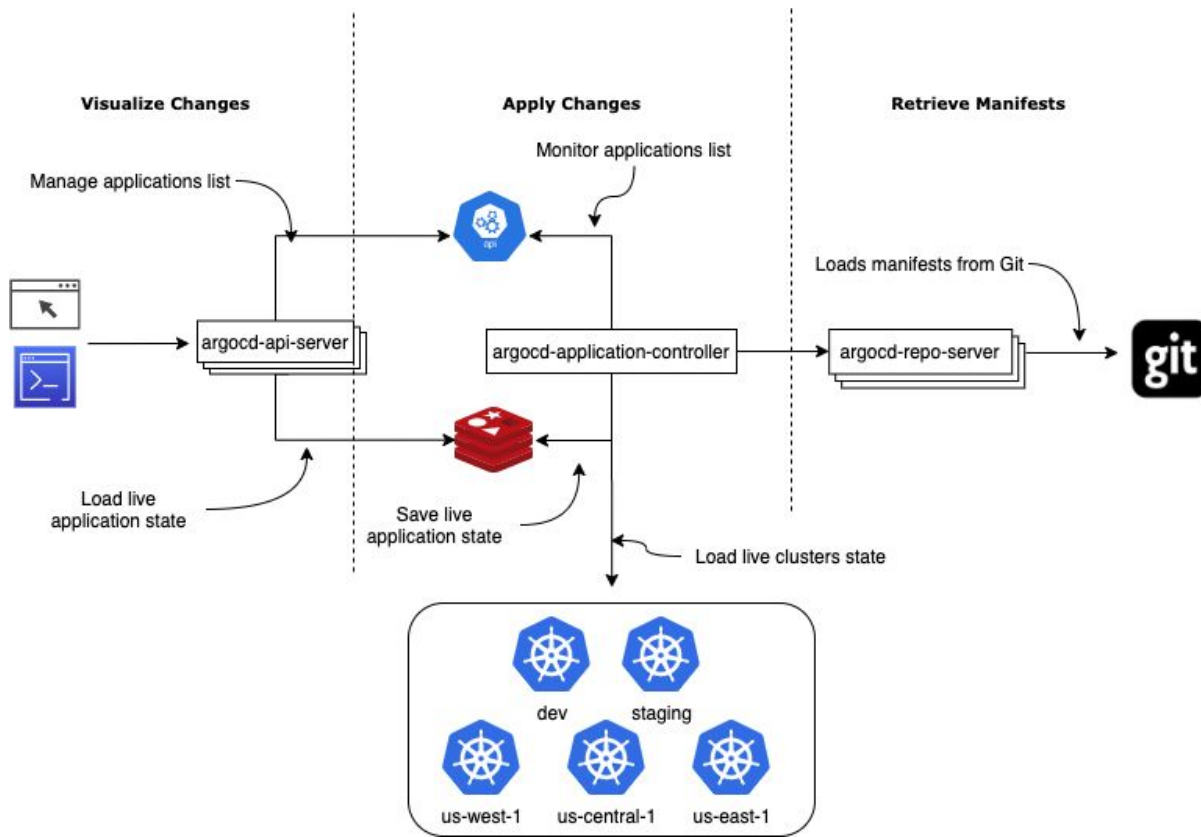


# Argo CD Architecture



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# Argo CD Is Multi-Tenant



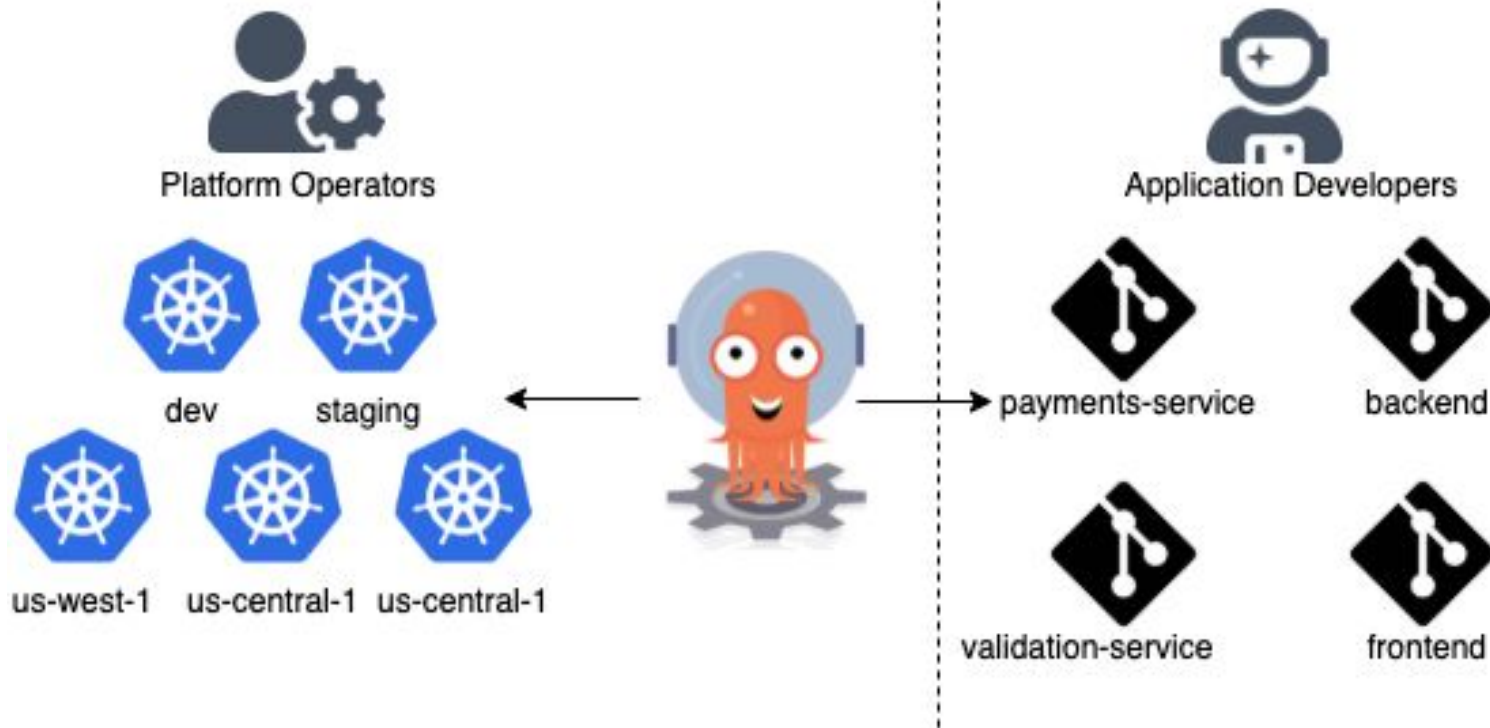
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# It scales well!



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## Overview



Uptime ▾

5 days

Clusters

26

Applications

2294

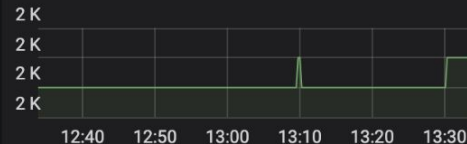
Repositories

503

Operations

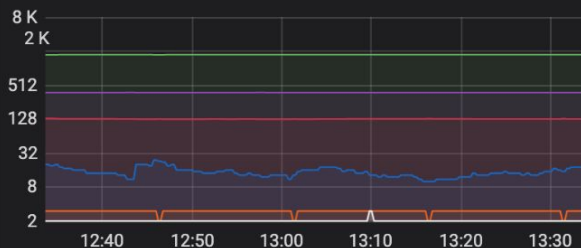
0

Applications



## Application Status

Health Status



	current ▾
Healthy	1.766 K
Missing	377
Degraded	128
Progressing	18
Suspended	3
Unknown	2

Sync Status

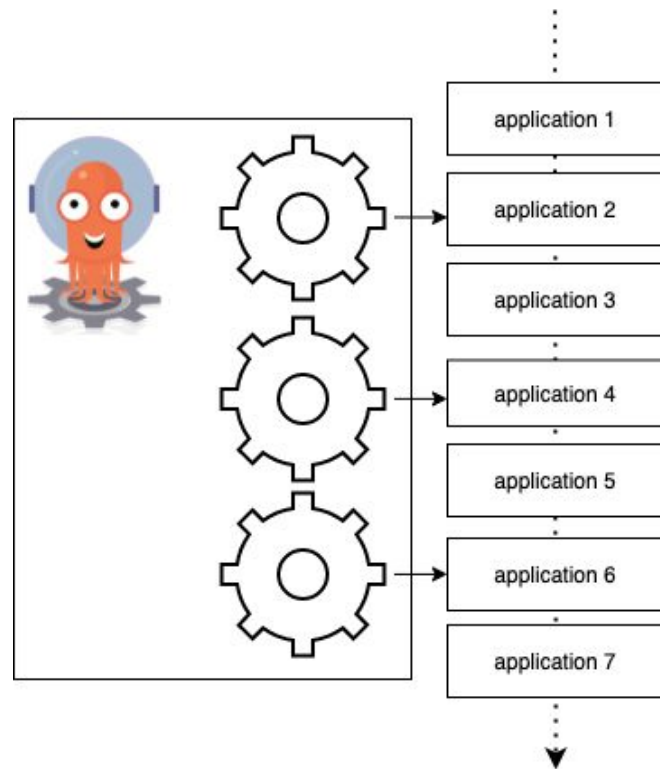


	current ▾
Synced	1.577 K
OutOfSync	573
Unknown	144

## Too Many Applications

- Argo CD controller runs with multiple workers
- Workers process applications sequentially
- Increase number of workers using “controller.status.processors” setting\*

```
1  apiVersion: v1
2  kind: ConfigMap
3  metadata:
4    name: argocd-cmd-params-cm
5    labels:
6      app.kubernetes.io/name: argocd-cmd-params-cm
7      app.kubernetes.io/part-of: argocd
8  data:
9    # Number of application status processors (default 20)
10   controller.status.processors: "100"
```

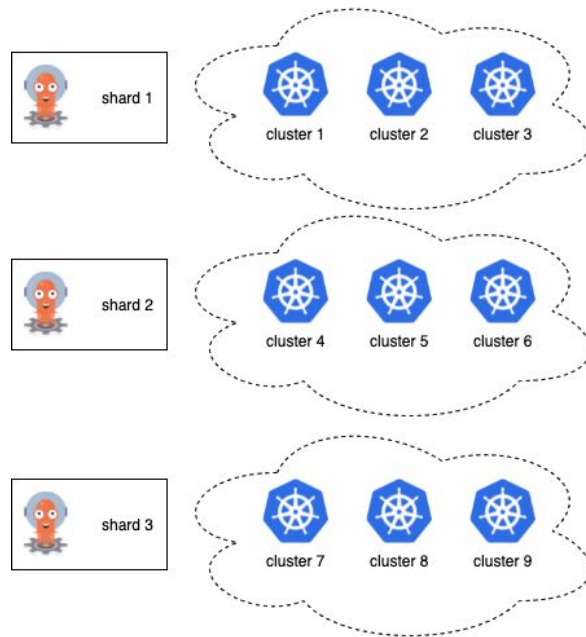


\* <https://github.com/argoproj/argo-cd/blob/master/docs/operator-manual/argocd-cmd-params-cm.yaml>

## Too Many Clusters

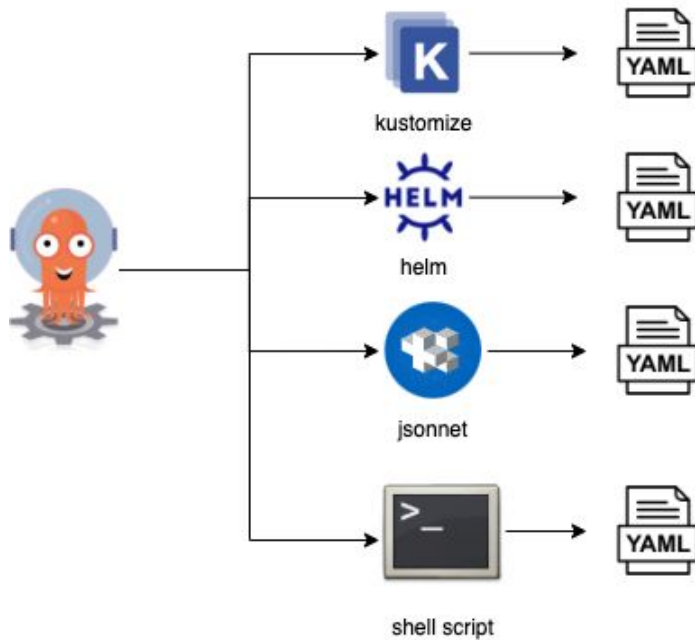
- Controller does not scale horizontally
- Uses too much CPU/Memory
- Run multiple controller with sharding

```
1  apiVersion: apps/v1
2  kind: StatefulSet
3  metadata:
4  |   name: argocd-application-controller
5  spec:
6  |   replicas: 2
7  |   template:
8  |     spec:
9  |       containers:
10 |         - name: argocd-application-controller
11 |           env:
12 |             - name: ARGOCD_CONTROLLER_REPLICAS
13 |               value: "2"
```



## Manifest Generation

- Not everyone uses YAML
- Config management tools use CPU/Memory
- Manifests are cached aggressively
- Increase number of repo server replicas



## Mono Repositories

- Mono repo is a deployment repository that holds manifests of multiple applications
- Commit in mono repo causes manifest regeneration of all applications and CPU/Memory spike
- Some config management tools does not allow concurrent manifest generation

```
→ mono-repo tree .
├── apps
│   ├── backend
│   │   └── deploy.yaml
│   ├── frontend
│   │   └── deploy.yaml
│   ├── payment-service
│   │   └── deploy.yaml
│   ├── processor
│   ├── validation-service
│   │   └── deploy.yaml
├── infra
│   ├── argo-cd
│   │   └── deploy.yaml
│   ├── argo-rollouts
│   │   └── deploy.yaml
│   ├── cert-manager
│   │   └── deploy.yaml
│   └── ingress-controller
│       └── deploy.yaml
```



## Mono Repositories - Limit Parallelism

- Too much parallelism requires too much memory and cpu
- Use “reposer.server.parallelism.limit” flag to limit concurrent manifest generation requests

```
1  apiVersion: v1
2  kind: ConfigMap
3  metadata:
4    name: argocd-cmd-params-cm
5    labels:
6      app.kubernetes.io/name: argocd-cmd-params-cm
7      app.kubernetes.io/part-of: argocd
8  data:
9    # Limit on number of concurrent manifests generate requests. Any value less the 1 means no limit.
10   reposer.server.parallelism.limit: "5"
```

## Mono Repositories - Cache Using Webhook

- Webhooks allows to re-use previously cached manifests
- Configure Webhook
- Annotation applications with `argocd.argoproj.io/manifest-generate-paths` annotation

```
apiVersion: argoproj.io/v1alpha1
kind: Application
metadata:
  name: guestbook
  namespace: argocd
  annotations:
    # resolves to the 'guestbook' directory
    argocd.argoproj.io/manifest-generate-paths: .
spec:
  source:
    repoURL: https://github.com/argoproj/argocd-example-apps.git
    targetRevision: HEAD
    path: guestbook
# ...
```

## Scales out of the box

- API server is a stateless proxy to etcd and redis
- Scales horizontally
- Might need a little extra memory to handle 5000+ apps due to in-memory caching



## Prometheus Metrics

- Argo CD exposes Prometheus metrics:
  - `argocd_app_reconcile` - reconciliation performance
  - `workqueue_depth` - depth of the controller queue
  - `argocd_app_sync_total` - sync operations
  - learn more at [metrics.md](#)
- Use community maintained Grafana dashboard: [dashboard.json](#)
- Review the high availability document: [high\\_availability.md](#)





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# Thank you!

*Questions?*