Path to GitOps

Migrating from Pipelines to Declarative Workflows

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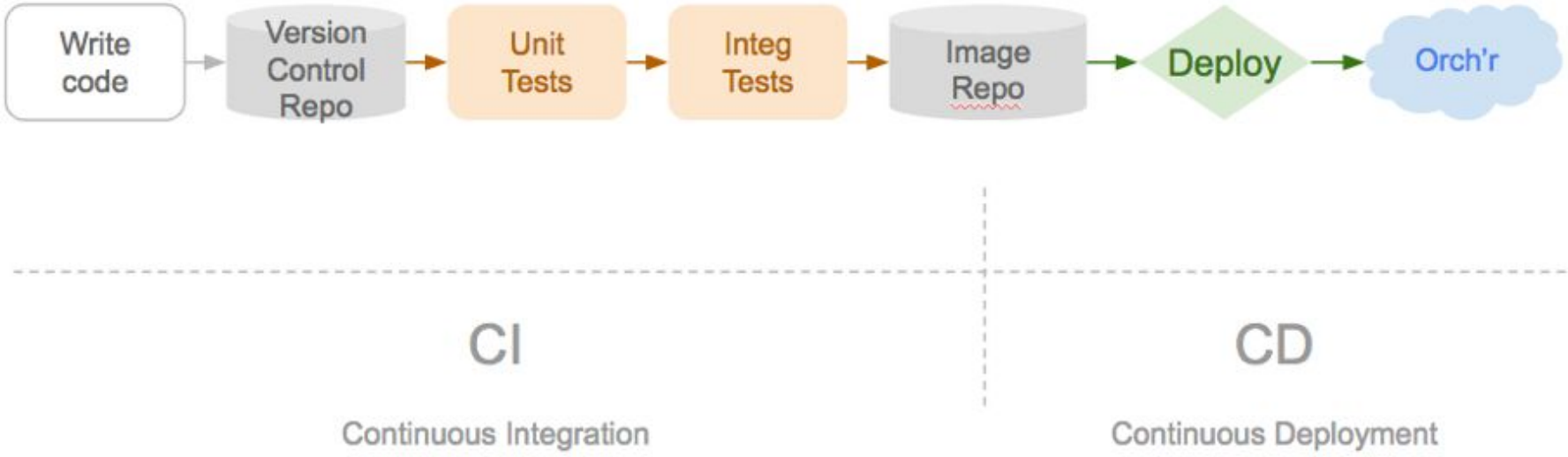
Agenda

- GitOps
- Monolithic Pipelines
- Challenges in Application Deployments
- Introduction to Workflows
- Demo

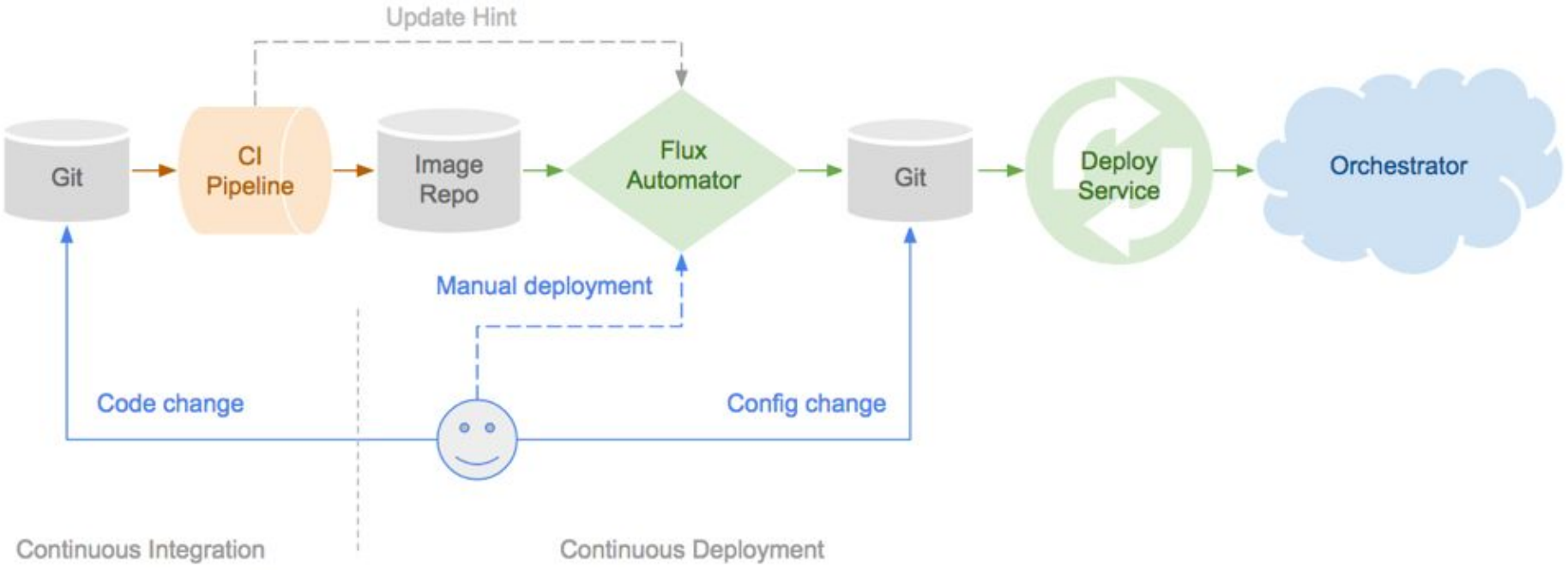
GitOps

- Term Coined in 2017 by Weaveworks
- Git (version control) as the **source of truth**
- Resource management and provisioning is **declarative**
- Infrastructure as Code is not enough
  - A `diff` is treated as a software bug
- Weaveworks Flux
  - GitOps Operator
  - CNCF Sandbox Project

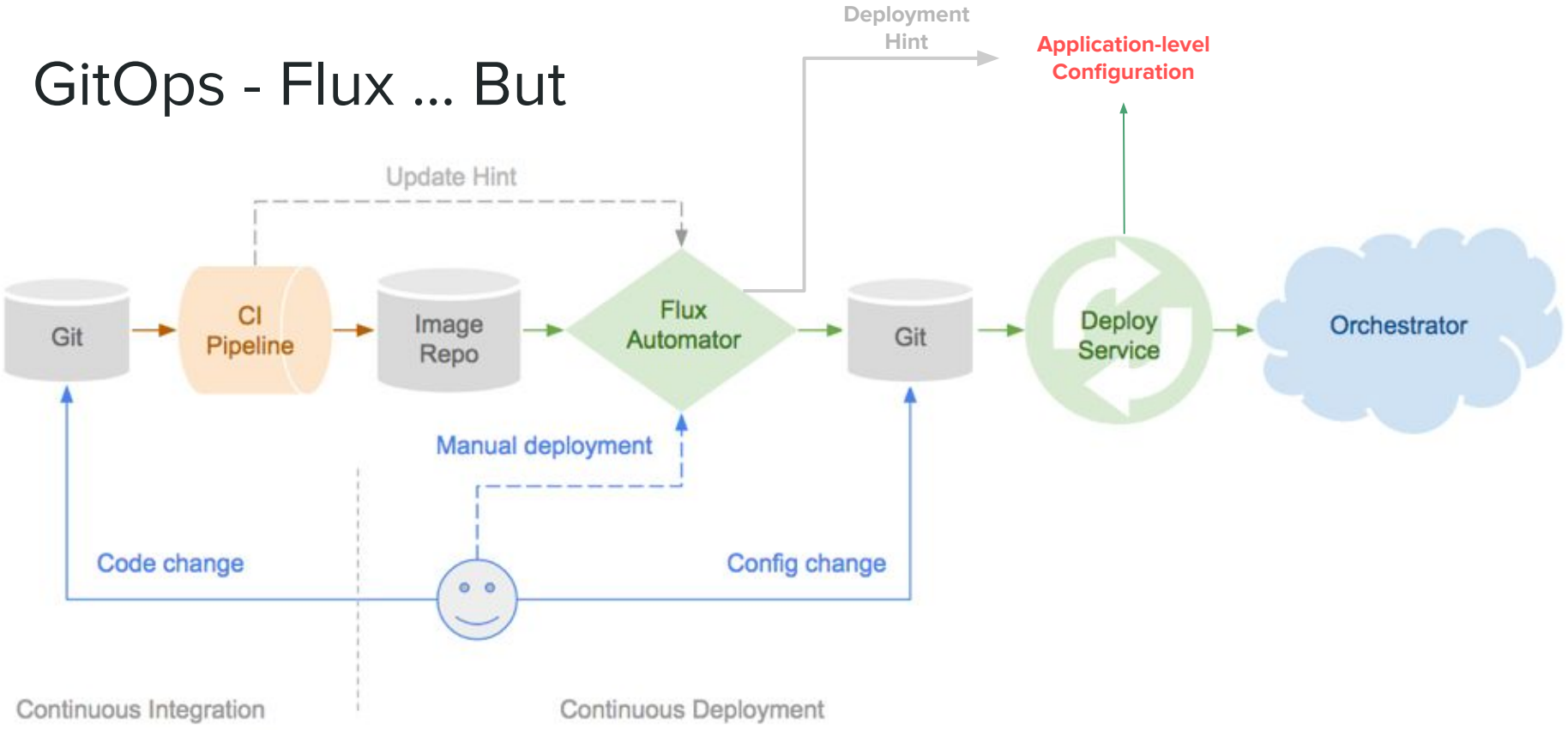
GitOps - Flux


Write code
Version Control Repo
Unit Tests
Integ Tests
Image Repo
Deploy
Orch'r
CI
Continuous Integration
CD
Continuous Deployment

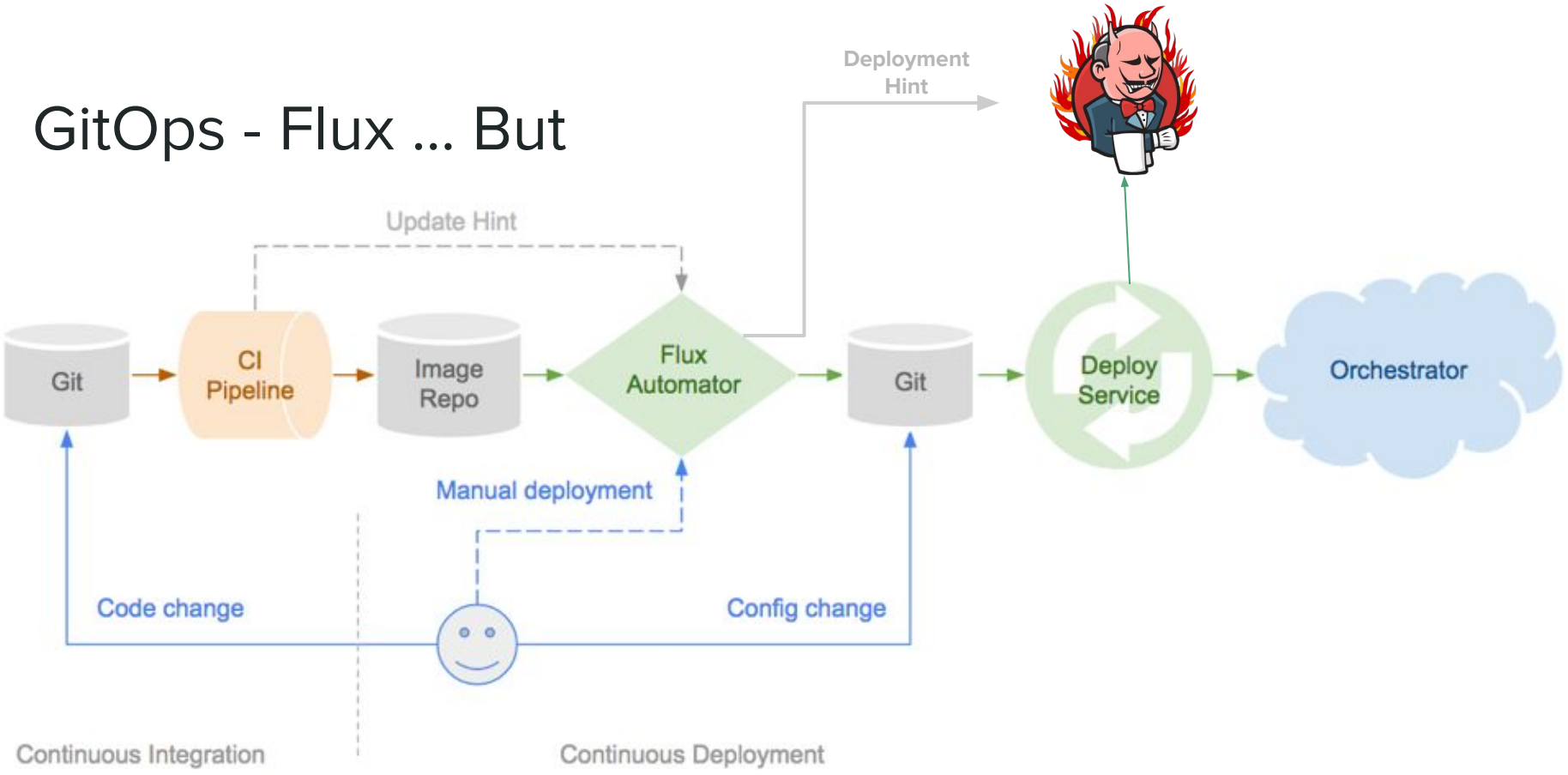
GitOps - Flux


Update Hint
Git
CI Pipeline
Image Repo
Flux Automator
Git
Deploy Service
Orchestrator
Manual deployment
Code change
Config change
Continuous Integration
Continuous Deployment

GitOps - Flux ... But



GitOps - Flux ... But




build
test: integration-&-quality
test: functional
test: load-&-security
approval
deploy: prod
Average stage times:
(Average full run time: ~5s)
836ms
20min 43s
9ms
7ms
89ms
5ms
#17
Sep 22
15:05
No Changes
Retry
Download
538ms
10s
10ms
8ms
72ms
(paused for 7s)
4ms
#16
Sep 22
15:04
No Changes
Retry
Download
479ms
6s
9ms
9ms
74ms
(paused for 6s)
5ms
#15
Sep 22
15:03
No Changes
Retry
Download
922ms
6s
10ms
9ms
failed
#14
Sep 22
15:03
No Changes
Retry
Download
1s
8s
12ms
9ms
80ms
(paused for 5s)
5ms
#13
Sep 22
15:02
No Changes
Download
942ms
9s
13ms
failed
#12
Sep 22
15:02
No Changes
Retry
Download
1s
6s
13ms
11ms
111ms
(paused for 5s)
aborted
master


build
test: integration-&-quality
test: functional
test: load-&-security
approval
deploy: prod
Average stage times:
(Average full run time: ~5s)
836m
#17
Sep 22
15:05
No Changes
Retry
Download
538m
master
#16
Sep 22
15:04
No Changes
Retry
Download
479m
master
#15
Sep 22
15:03
No Changes
Retry
Download
922m
master
#14
Sep 22
15:03
No Changes
Retry
Download
1s
master
#13
Sep 22
15:02
No Changes
Download
942m
master
#12
Sep 22
15:02
No Changes
Retry
Download
1s
master
Build
Test
Re-test
Deploy
Deploy again
Deploy and again
Keep deploying
Final deploy
Clean-up
Average stage times:
Total run time: ~1min 47s
16s
13s
17s
12s
12s
14s
318ms
15s
2s
#33
Nov 05
21:27
No Changes
Retry
13s
22s
35.41%
6s
Minutes remaining: ~1.04
#32
Nov 05
21:27
No Changes
Retry
Download
11s
9s
9s
9s
11s
22s
320ms
46.26%
Minutes remaining: ~0.43
#31
Nov 05
21:24
No Changes
Retry
14s
9s
49s
#30
Nov 05
21:24
No Changes
Retry
13s
22s
10s
12s
#29
Nov 05
21:23
No Changes
Retry
Download
15s
11s
21s
10s
10s
11s
314ms
22s
5s
#28
Nov 05
21:22
No Changes
Retry
Download
13s
10s
22s
10s
11s
22s
324ms
11s
192ms
#27
Nov 05
21:22
No Changes
Retry
Download
25s
10s
11s
20s
10s
11s
309ms
17s
1s
#26
Nov 05
21:21
No Changes
Retry
Download
19s
11s
14s
17s
10s
11s
321ms
21s
3s
#25
Nov 05
21:20
No Changes
#24
Nov 05
21:20
No Changes
Retry
Download
19s
16s
10s
9s
20s
10s
323ms
11s
865ms


build
test: integration-&-quality
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Average stage times:
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836m
538m
479m
#17
Sep 22
15:05
No Changes
Retry
Download
master
#16
Sep 22
15:04
No Changes
Retry
Download
Build
Test
Re-retest
Deploy
Deploy again
Deploy and again
Keep deploying
Final deploy
Clean-up
16s
13s
17s
12s
12s
14s
318ms
15s
2s
Average stage times:
Total run time:~1min 47s
13s
22s
35.41%
6s
Minutes remaining: ~1.04
46.26%

Stage View


Checkout Sources
Build
Unit Tests
Publish Artifacts
Checkout ARM Templates
Upload Deployment Script
Creating the resource group
Deploy Integration env
Installing trinity
Send SMS
Checkout Functional Tests
Install dependencies
Gateway Tests
Mail Tests
Average stage times:
(Average full run time: ~2min 51s)
854ms
15s
4s
1s
1s
2s
2s
55s
1min 6s
962ms
1s
813ms
4s
1s
#34
Jun 03
17:07
1 commit
892ms
15s
5s
1s
739ms
2s
3s
37s
35s
1s
796ms
815ms
4s
1s
#33
Jun 03
16:51
1 commit
975ms
17s
4s
1s
746ms
2s
2s
36s
35s
1s
2s
812ms
3s
1s
#32
Jun 03
16:40
No Changes
817ms
14s
4s
1s
2s
2s
2s
37s
35s
858ms
815ms
813ms
5s
779ms
#31
Jun 03
16:33
1 commit
792ms
16s
5s
1s
917ms
2s
2s
2min 56s
3min 9s
837ms
807ms
815ms
5s
1s
#30
Jun 03
16:32
2 commits
840ms
14s
4s
1s
926ms
2s
2s
2s
failed
#25
Jun 03
16:07
1 commit
809ms
14s
5s
1s
762ms
2s
2s
44s
35s
836ms
1s
814ms
3s
1s

Existing Challenges

- Deploying Microservices != Deploying Applications
- Enterprise applications can be a monolith of microservices
  - Dependencies on other running applications
  - Stateful service rollover
  - Tenant lifecycle operations
  - Integrity checking and auditing
  - Technical debt
- SREs / DevOps are not SMEs in debugging microservices
- Pipeline Stages as Code
  - But not groovy!

What we want is a Workflow

A **workflow** consists of an **orchestrated** and **repeatable pattern** of business activity enabled by the systematic organization of resources into **processes** that **transform** materials, provide services, or **process information** It can be depicted as a **sequence of operations**, declared as work of a person or group, an organization of staff, or one or more simple or complex mechanisms.

Requirements for a Workflow Solution

- Simpler to use
- Ease of Setup and Operations
- Modular
- Scalable
- Support lightweight executions
- Supports timeouts and retries
- Cloud Native (providers, logging, metrics)
- Reproducible Steps
- Not a SaaS

Requirements for a Workflow Soluti

Apache Airflow

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Argo Workflows

- Open Source
- Kubernetes Native Workflow Engine
- Uses Custom Resource Definitions (CRD)
  - Run steps in containers
  - Capture dependencies in DAGs
  - Pipelines 1st class K8s citizens
- Has multiple projects
  - ArgoCD + Flux == ArgoFlux (CNCF sandbox project)
  - Argo Events
  - Argo Rollout

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KEEP
CALM
IT IS
DEMO
TIME