LF NETWORKING

LFN Developer & Testing Forum

ONAP: How DT deploys ONAP with the help of Argo CD

ONAP, GitOps & Argo

@florianbachmann & andreas-geissler@telekom.de

The presenters

- Florian Bachmann
  from Frankfurt, Germany.
- At DT since 2013.
- Currently he is the PO of the "System Team" of TNAP.
- His biggest challenge: "*I try to eat all the cake & chocolate of the world (only the good one)*"
- twitter.com/florianbachmann

- Andreas Geißler
  from Cologne, Germany
- At DT since 2016.
- Currently he is the Architecture Lead of TNAP.
- His biggest challenge: "*To make all Helm Charts for Istanbul compliant and deployed*"
- You can write me an email: andreas-geissler@telekom.de

Agenda

- What is Argo

- Demos

- Good to know:
  - Argo CD
  - DevOps
  - Why Argo CD?!

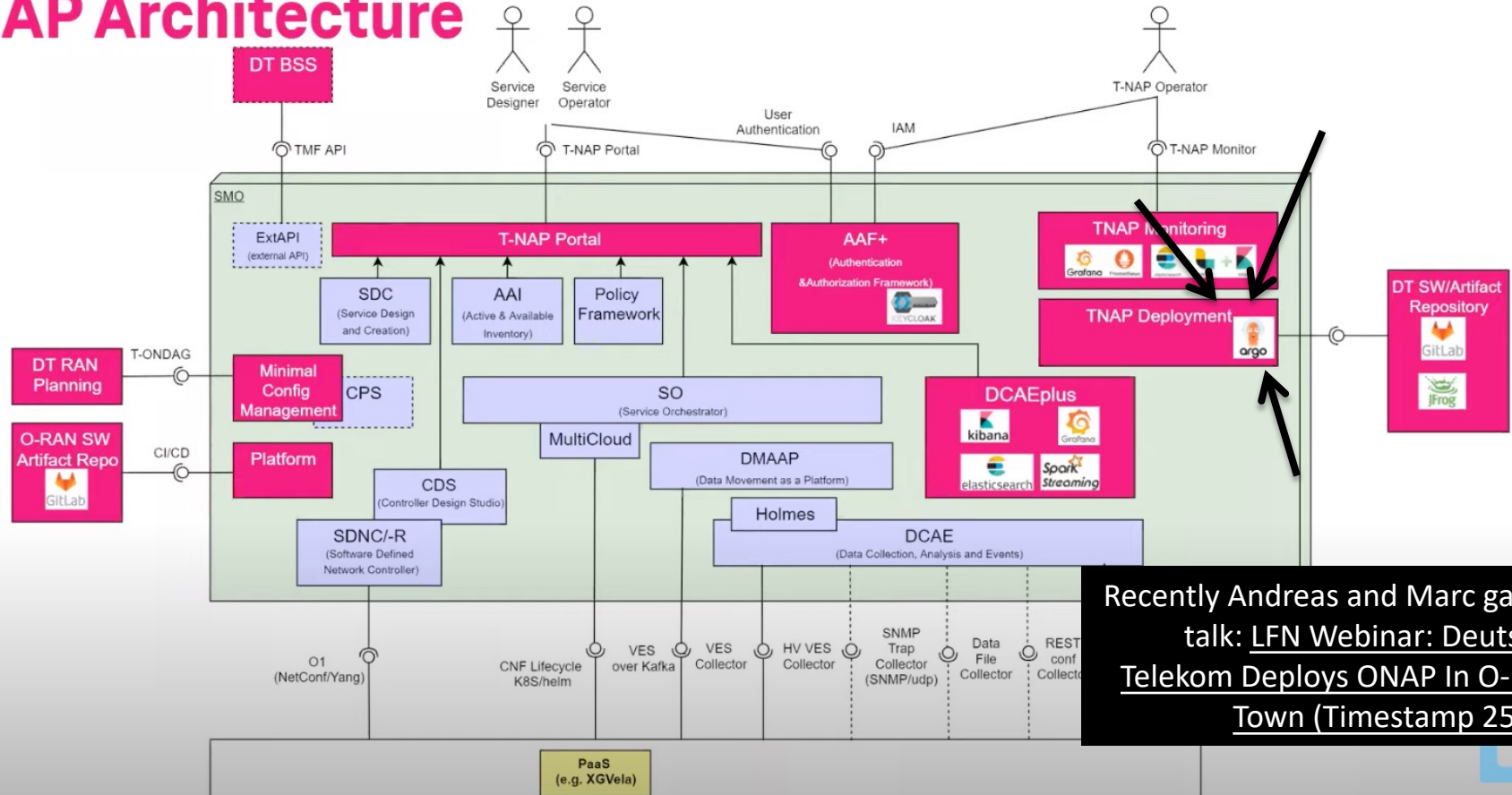- **The nitty gritty Details**: `localCluster: true`

ONAP at DT -> called TNAP
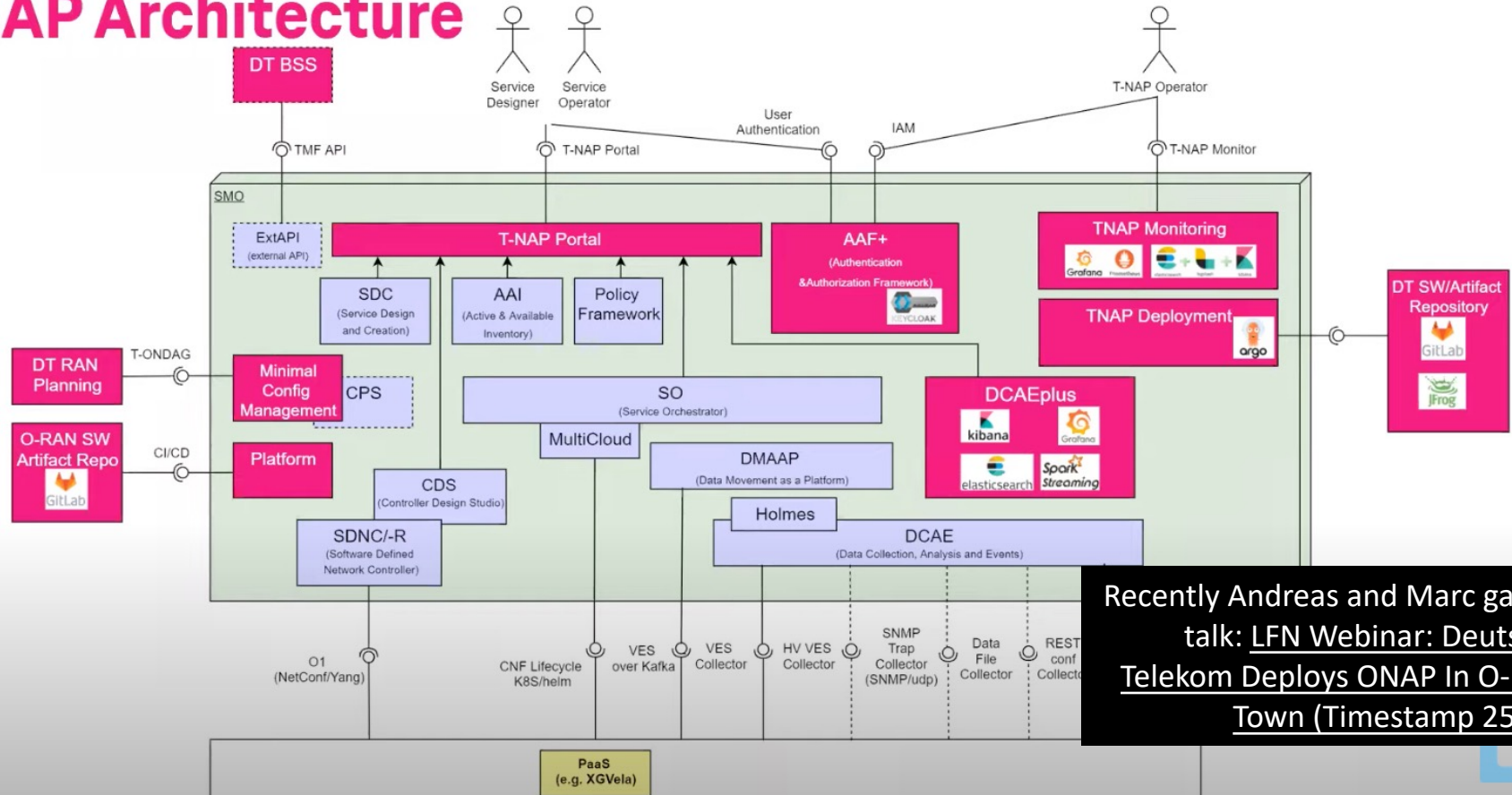
TNAP Architecture

Recently Andreas and Marc gave a talk: LFN Webinar: Deutsche Telekom Deploys ONAP In O-RAN Town (Timestamp 25:51)
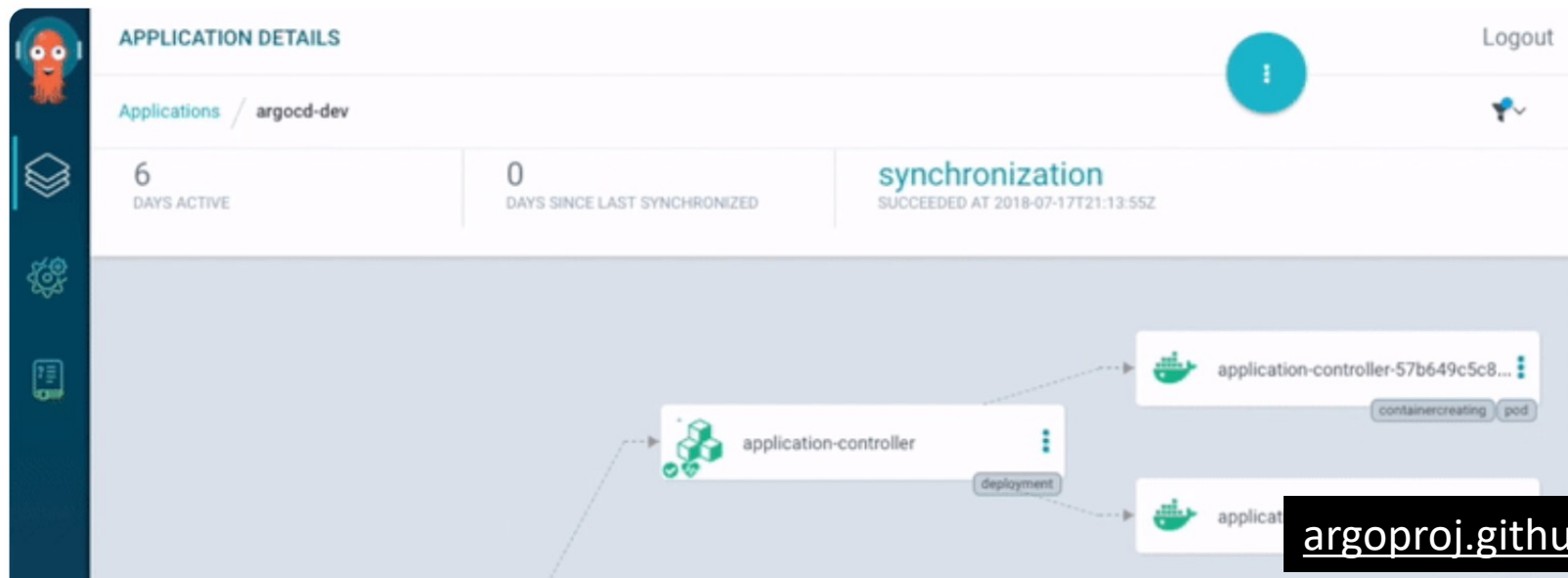
ONAP at DT -> called TNAP

TNAP Architecture

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The official Argo CD page

What is Argo CD?

Argo CD is a declarative, GitOps continuous delivery tool for Kubernetes.

argoproj.github.io/cd

There is no CI/CD
There are CI *and* CD!

1. The UI

2. Deploy a Gitlab runner into a k8s cluster
   - Just for learning and getting a feeling
   - start with version 0.33.0 update it later to 0.33.1
   - add it to all `kustomization.yaml`'s

3. Manually trying to change/destroy an existing ONAP component, e.g. `a1policymanagement`

There is no CI/CD
There are CI *and* CD!

Let's define GitOps

What is GitOps and Why?

- Argo CD helps us, doing GitOps.
  - what is GitOps, and why it is important, was perfectly answered by Cornelia Davis (@cdavisafc) in that talk:
    - KubeCon: GitOps Is Likely More Than You Think It Is - Cornelia Davis, Weaveworks
- A more recent recorded version of that talk exists as well:
  - GitOps Is Likely More Than You Think It Is (only ~~21~~ 34 views, I was one of them). Both talks are 99% similar, but the first one is more on point.
- The slides of the two talks can be found here:
  - https://static.sched.com/hosted_files/kccncna20/39/GitOpsIsMoreThanYouThink.pdf

GitOps - Cloud Native Agility and Reliability

Solution

GitOps is a set of modern best practices for deploying and managing cloud native infrastructure and applications.

Based on our experience operating a full cloud native stack
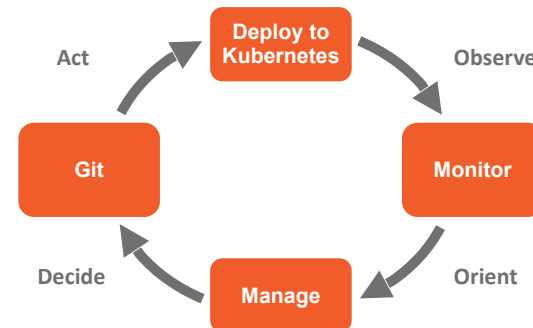
GitOps manages the whole stack:

- Cluster and application versioned configuration
- Security and policy enforcement
- Monitoring and observability
- Continuous Deployment of workloads

Benefits

- **Complete platform**: Single platform for infrastructure, core components and applications.
- **Productivity**: Dramatically increase deployments and faster feedback and control loop,
- **Reliability**: Enables cluster and application operator model with standardised tooling.
- **Compliance and Security**: Enforces standard security policy and an audit trail
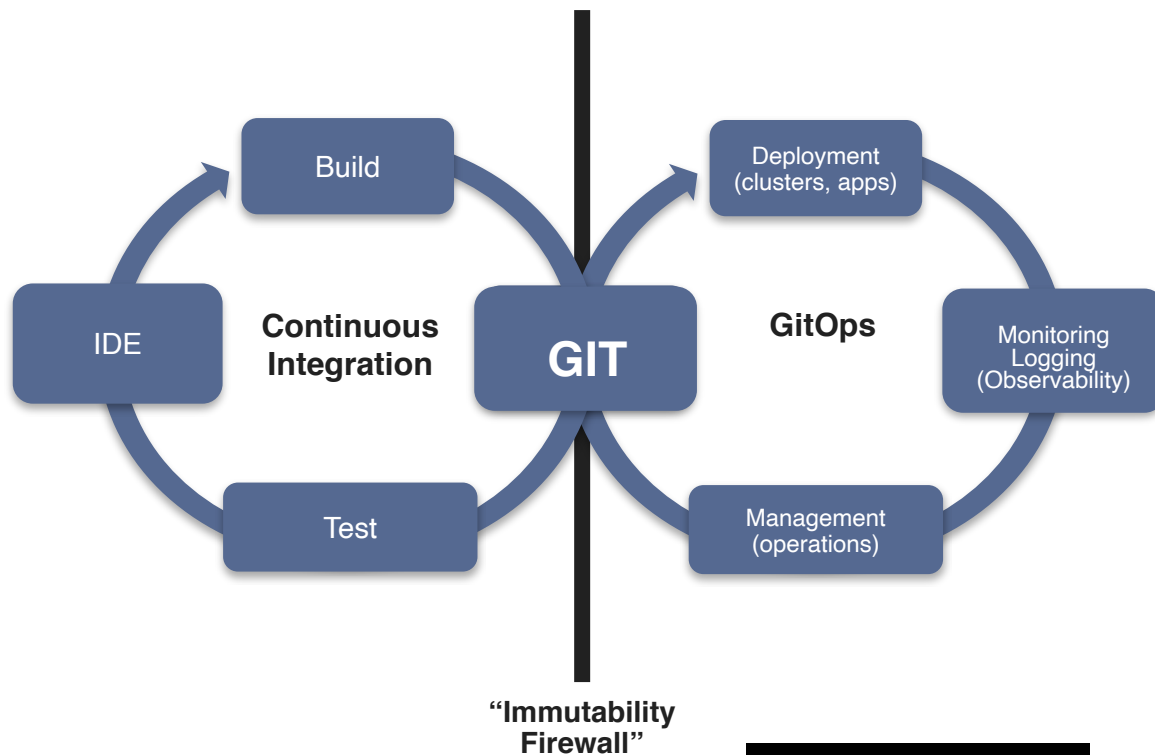- **Multi-cloud and on-premise**: Deploy a complete cluster from git with all applications.

Vision

- All application deployments, application operations and cluster management operations under one platform with a common workflow.

Act — Deploy to Kubernetes — Observe — Monitor — Orient — Manage — Decide — Git

Slide by Cornelia Davies; Kubecon 20, 2020

weaveworks

GitOps – An Operating Model for Cloud Native

Continuous Integration

IDE → Build → Test → **GIT**

"Immutability Firewall"

GitOps

Deployment (clusters, apps) → Monitoring Logging (Observability) → Management (operations)

Unifying Deployment, Monitoring and Management.

Git as the single source of truth of a system's desired state

ALL intended operations are committed by pull request

ALL diffs between intended and observed state with automatic convergence

ALL changes are observable, verifiable and auditable

Slide by Cornelia Davies;
Kubecon 20, 2020

weaveworks

@cdavisafc

GitOps Principles

Unifying Deployment

The entire system is described **declaratively**
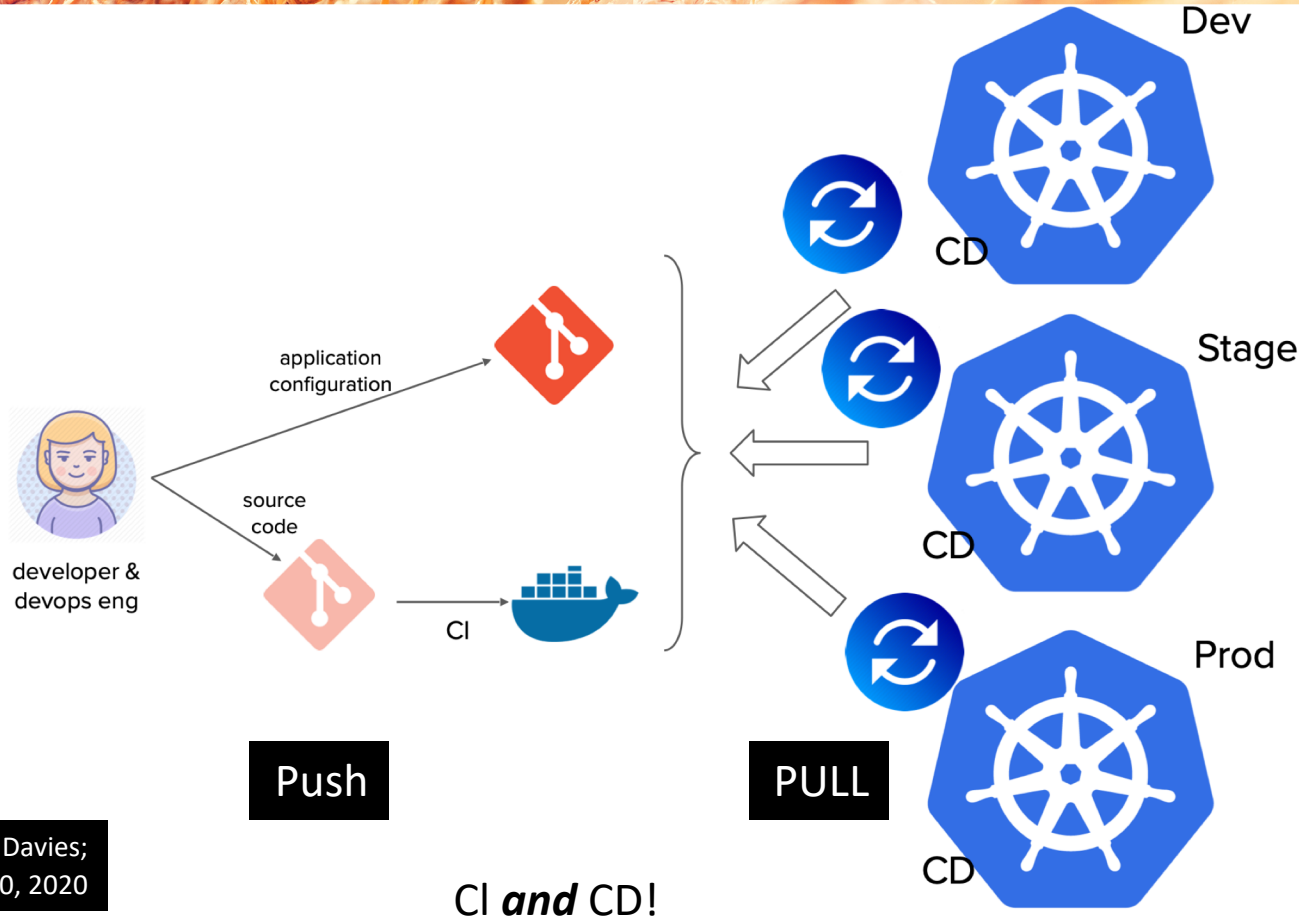
The canonical desired system state is **versioned** in git

Approved changes can be **automatically applied** to the system

Software agents ensure correctness and perform actions on divergence in a closed loop
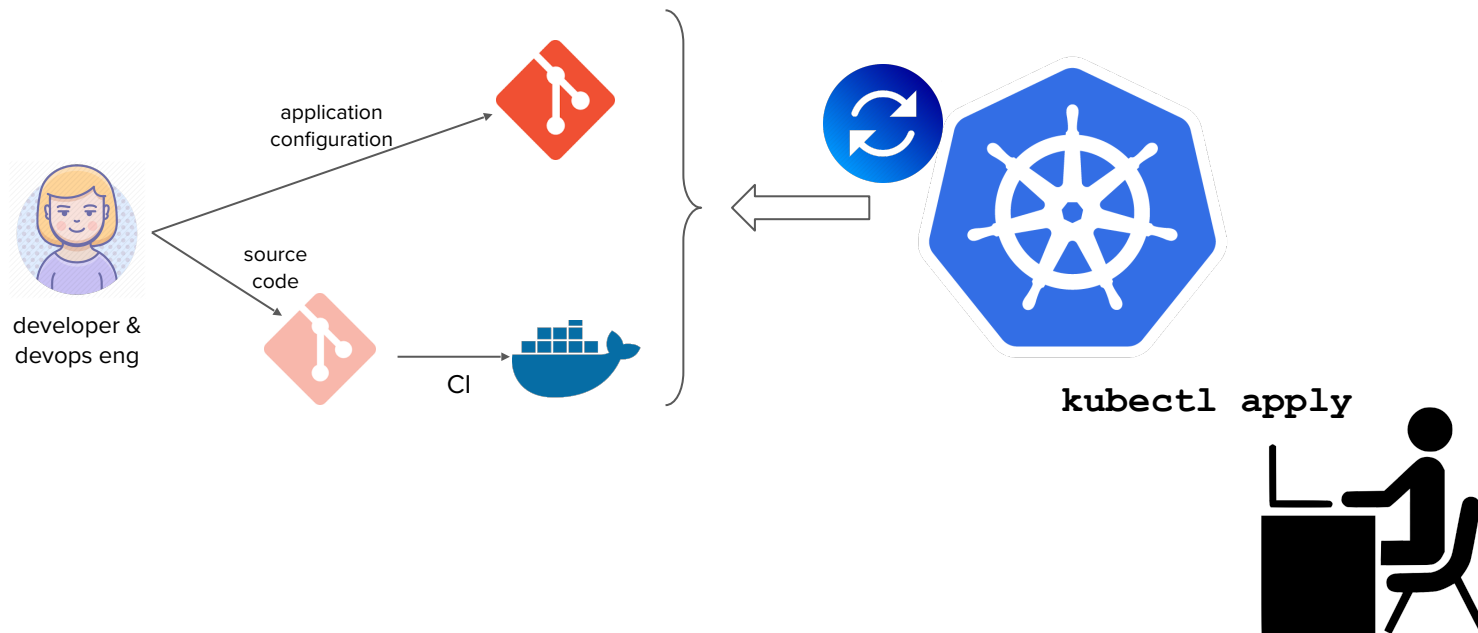
Slide by Cornelia Davies;
Kubecon 20, 2020

weaveworks

@cdavisafc

GitOps - Cloud Native Agility and Reliability

Drift detection and remediation

application
configuration

source
code

developer &
devops eng

CI

`kubectl apply`

Slide by Cornelia Davies;
Kubecon 20, 2020

weaveworks

@cdavisafc

Why Argo?!

- Argo CD - a tool for CD, but what says the CNCF Landscape about it.
  - https://landscape.cncf.io/
- CNCF Landscape - Continuous Integration & Delivery
  - https://landscape.cncf.io/card-mode?category=continuous-integration-delivery&grouping=category
- There are at least 47 tools regarding CI & CD. (checked 11.01.2022)
  - https://landscape.cncf.io/card-mode?category=continuous-integration-delivery&grouping=category
- Why Argo and not Flux
  - Flux CD joins forces with Argo CD project
- And consider: CNCF - The Trail Map
  - https://raw.githubusercontent.com/cncf/trailmap/master/CNCF_TrailMap_latest.png

Outlook: were we like to get better

- We got notifications! 😀
- Outlook were we like to get better:
  - KubeCon: GitOps Is Likely More Than You Think It Is - Cornelia Davis, Weaveworks (https://static.sched.com/hosted_files/kccncna20/39/GitOpsIsMoreThanYouThink.pdf)
    - Like:
      - Show slide 21 to 24 (pull request automatisation) → hint https://github.com/argoproj-labs/argocd-image-updater
      - Show slide 26 (Environment Customizations) - use a base config with kustomize
  - We already got Notifications: https://argocd-notifications.readthedocs.io/en/stable/services/slack/
- Summary of Argo:
  - Manage More Clusters with Less Hassle, with Argo CD Application Sets - Jonathan West & Kshama Jain (4:05)
  - Good to know: The Argo Architecture https://argo-cd.readthedocs.io/en/stable/operator-manual/architecture/
- More from Argo / other projects:
  - All from: The Argo Ecosystem: Tailoring Your Installation Through Comm... Jesse Suen & Alexander Matyushentsev
    - Argo at a glance (1:15)
    - Argo Design philosophy (4:09)
    - Argo makes heavy use of Annotations (4:27)
    - Argo benefits of individuals projects (5:09)

The nitty gritty Details

```
localCluster: true
```

- OOM from ONAP
  - https://gerrit.onap.org/r/gitweb?p=oom.git;a=tree;h=refs/heads/istanbul;hb=refs/heads/istanbul

- In our case, we split the OOM repo into several repos. One helm chart repo for each ONAP component.

Each component get's it's own helm repo

A	**a1policymanagement** 🛡 Maintainer		★ 0	4 weeks ago
A	**aaf** 🛡 Maintainer		★ 0	4 weeks ago
A	**aai** 🛡 Maintainer AAI - Active and Available Inventory - part of ONAP		★ 0	5 months ago
A	**appc** 🛡 Maintainer		★ 0	5 months ago
CDS	**cds** 🛡 Maintainer CDS - Controller Design Studio - part of ONAP		★ 0	4 weeks ago
C	**clamp** 🛡 Maintainer Control Loop Automation Management Platform - part of ONAP		★ 0	5 months ago
C	**consul** 🛡 Maintainer		★ 0	4 weeks ago
C	**contrib** 🛡 Maintainer CONTRIB - part of ONAP		★ 0	4 weeks ago
C	**cps** 🛡 Maintainer		★ 0	4 weeks ago

And deployed into our container registry

> cps-8.0.1.tgz
> dcaegen2-7.0.0.tgz
> dcaegen2-7.0.1.tgz
> dcaegen2-8.0.0.tgz
> dcaegen2-8.0.1-TNAP-5418.tgz
> dcaegen2-8.0.1.tgz
> dcaegen2-services-8.0.0.tgz
> dcaegen2-services-8.0.01.tgz
> dcaegen2-services-8.0.1-kpims.tgz
> dcaegen2-services-8.0.1-kpimstest.tgz
> dcaegen2-services-8.0.1-kpimstest1.tgz
> dcaegen2-services-8.0.1-mceh1.tgz
> dcaegen2-services-8.0.1-spcell-detector-1.tgz
> dcaegen2-services-8.0.1-spcell-detector-2.tgz
> dcaegen2-services-8.0.1-spcell-detector-3.tgz
> dcaegen2-services-8.0.1-spcell-detector-4.tgz
> dcaegen2-services-8.0.1-spcell-detector-5.tgz
> dcaegen2-services-8.0.1-spcell-detector-6.tgz
> dcaegen2-services-8.0.1-spcell-detector-7.tgz
> dcaegen2-services-8.0.1-spcell-detector-8.tgz
> dcaegen2-services-8.0.1-spcell-detector-new.tgz
> dcaegen2-services-8.0.1-spcell-detector.tgz
> dcaegen2-services-8.0.1.tgz
> dcaegen2-services-8.0.2.tgz
> dcaemod-7.0.0.tgz

dcaegen2-services-8.0.1.tgz

General   Chart Info   Properties

Info

Name:	dcaege
Repository Path:	tnap-he
URL to file:	https://
Module ID:	N/A
Deployed By:	sa_tnap
Size:	2.30 ME
Created:	31-08-2
Last Modified:	08-12-2
Downloads:	95
Last Downloaded By:	sa_tnap
Last Downloaded:	14-12-2
Remote Downloads:	0

☐ Filtered ?

Package Information

> aaf-cm
> aaf-fs
> aaf-gui
> aaf-hello
> aaf-locate
> aaf-oauth
> aaf-service
> aaf-sms
> aaf-sshsm
> aaf-templates
∨ 📂 aai
  > aai-9.0.0.tgz
> aai-babel
> aai-graphadmin
> aai-modelloader
> aai-resources
> aai-schema-service
> aai-sparky-be
> aai-traversal
> awx
> cassandra
> cds
> cds-blueprints-processor
> cds-command-executor

> **Since 9.0.0 with folders** 🕺

📁 aai

General   Properties

Info

Name:	a
	t
	H
Deployed By:	s
Artifact Count / Size:	S
Created:	2

Package Information

Dependency Declaration

Virtual Repository Associations

🗎 tnap-helmcharts

Included Repositories

Dependies (first try)

tnap1.yaml ⌄ Collapse source

```
 1  preconfiguredHelmRepos:
 2  - moveon
 3
 4  namespaces:
 5    infra-components:
 6    kube-system:
 7    onap:
 8
 9  apps:
10    aai:
11      namespace: onap
12      enabled: true
13      chart: moveon/aai
14      version: 7.0.0
15      priority: -99
16      valuesFiles: ["values/onap.yaml","values/
17      #dont need anything
18    aaf:
19      namespace: onap
20      enabled: true
21      chart: moveon/aaf
22      version: 7.0.0
23      priority: -99
24      valuesFiles: ["values/onap.yaml","values/
25      #dont need anything
26    a1policymanagement:
27      namespace: onap
28      enabled: true
29      chart: moveon/a1policymanagement
30      version: 7.0.0
31      valuesFiles: ["values/onap.yaml","values/
     priority: -90
```

tnap2.yaml ⌄ Collapse source

```
 1  preconfiguredHelmRepos:
 2  - moveon
 3
 4  namespaces:
 5    infra-components:
 6    kube-system:
 7    onap:
 8
 9
10  apps:
11    nbi:
12      namespace: onap
13      enabled: true
14      chart: moveon/nbi
15      version: 7.0.0
16      priority: -95
17      valuesFiles: ["values/onap.yaml","values/
18      #require AAF, AAI
19    clamp:
20      namespace: onap
21      enabled: true
22      chart: moveon/clamp
23      version: 7.0.0
24      priority: -95
25      valuesFiles: ["values/onap.yaml","values/
26      #require AAF
27    dmaap:
28      namespace: onap
29      enabled: true
30      chart: moveon/dmaap
31      version: 7.0.0
32      valuesFiles: ["values/onap.yaml","values/
```

tnap3.yaml ⌄ Collapse source

```
 1  preconfiguredHelmRepos:
 2  - moveon
 3
 4  namespaces:
 5    infra-components:
 6    kube-system:
 7    onap:
 8
 9
10  apps:
11    dcaegen2:
12      namespace: onap
13      enabled: true
14      chart: moveon/dcaegen2
15      version: 7.0.0
16      valuesFiles: ["values/onap.yaml","values/
17      #dependency on CONSUL,POLICY,SDC
18    dcaemod:
19      namespace: onap
20      enabled: true
21      chart: moveon/dcaemod
22      version: 7.0.0
23      valuesFiles: ["values/onap.yaml","values/
24    sdnc:
25      namespace: onap
26      enabled: false
27      chart: moveon/sdnc
28      version: 7.0.0
29      valuesFiles: ["values/onap.yaml","values/
30    cds:
31      namespace: onap
32      enabled: true
```

Dependencies (now In Argo)

tnap1.yaml — Collapse source

```
# ONAP1
- 90 - contrib
- 90 - platform
- 90 - aaf
- 90 - aai
- 90 - a1policy
         management
- 90 - consul
- 90 - msb
- 90 - multicloud
```

```
 1  configuredHelmRepos:
 2    - moveon
 3
 4  namespaces:
 5    infra-components:
 6    kube-system:
 7
 8  apps:
10    aai:
11    namespace: onap
12    enabled: true
13      chart: moveon/aai
14      version: 7.0.0
15    priority: -99
16    valuesFiles: ["values/onap.yaml","values/
17      #dont need anything
18
19      namespace: onap
20      enabled: true
21      chart: moveon/aaf
22      version: 7.0.0
23    priority: -99
24    valuesFiles: ["values/onap.yaml","values/
25      #dont need anything
26  a1policymanagement:
27    namespace: onap
28    enabled: true
29      chart: moveon/a1policymanagement
30      version: 7.0.0
31    valuesFiles: ["values/onap.yaml","values/
32    priority: -90
```

tnap2.yaml — Collapse source

```
# ONAP2
- 70 - nbi
- 70 - dmaap
- 70 - policy
- 70 - sdc
- 70 - so
```

```
 1  configuredHelmRepos:
 2    - moveon
 4  namespaces:
 5    infra-components:
 6    kube-system:
 7    onap:
 8
10  apps:
    nbi:
12    namespace: onap
13    enabled: true
14      chart: moveon/nbi
15      version: 7.0.0
16    priority: -95
17    valuesFiles: ["values/onap.yaml","values/
18      #require AAF, AAI
19    clamp:
```

tnap3.yaml — Collapse source

```
# ONAP3
- 50 - dcaegen2
- 50 - sdnc
- 50 - dcaegen2-servi
- 50 - dcaemod
- 50 - holmes
- 50 - cds

# API-GATEWAY (yeah)
-30 - api-gateway
```

```
 1  configuredHelmRepos:
 2    - moveon
 4  namespaces:
 5    infra-components:
 6    kube-system:
 7    onap:
 9
10  dcaegen2:
12    namespace: onap
13    enabled: true
14      chart: moveon/dcaegen2
15      version: 7.0.0
16    valuesFiles: ["values/onap.yaml","values/
         POLICY,
17
    dcaemod:
    namespace: onap
```

the thing with priority in Argo is that the higher the negative number gets, t
priority rises also, means in this case is deployed first!
- prio 2 - not important
- prio 0 - very important
- prio -1 - VERY VERY IMPORTANT
- prio -100 - SO IMPORTANT I CANNOT DESCRIBE IT!

- This is a demo (kind of), but in our Confluence… 🤔😀

Thanks!

Questions? 🤔🧐