

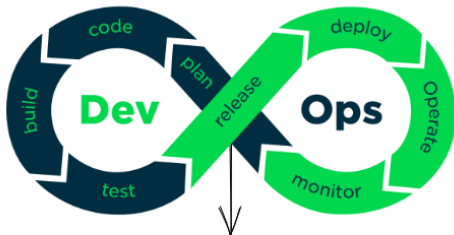
Strategies for Promoting Releases in GitOps Environments

Master Thesis

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June 21, 2023

Research Area



Problem Description



Proposed Solution



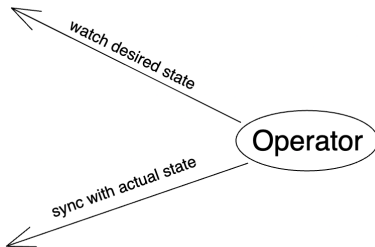
Custom Resource Definition (CRD)

```
apiVersion: goprom.io/v1
kind: Environment
metadata:
  name: dev
spec:
  path: ./envs/dev
  source:
    url: https://[ ... ]
    ref:
      branch: main
```

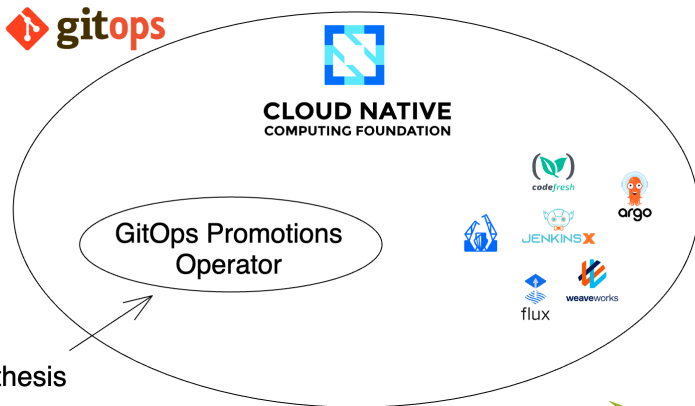
desired state



actual state

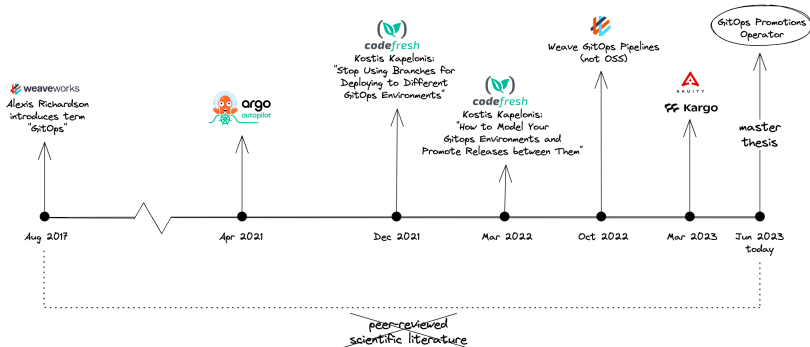


Big Picture



master thesis

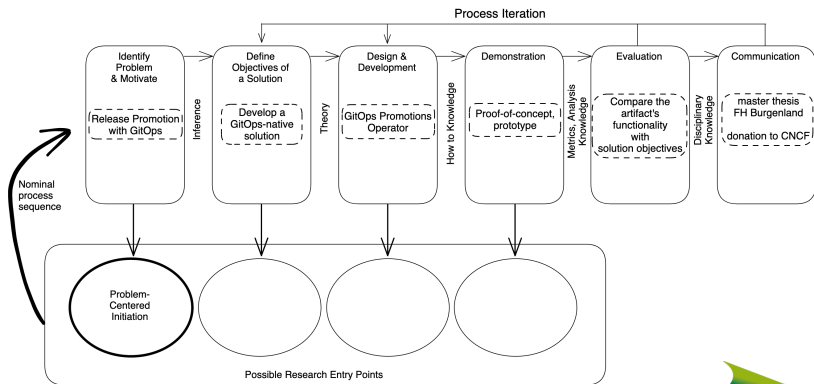
Related Work



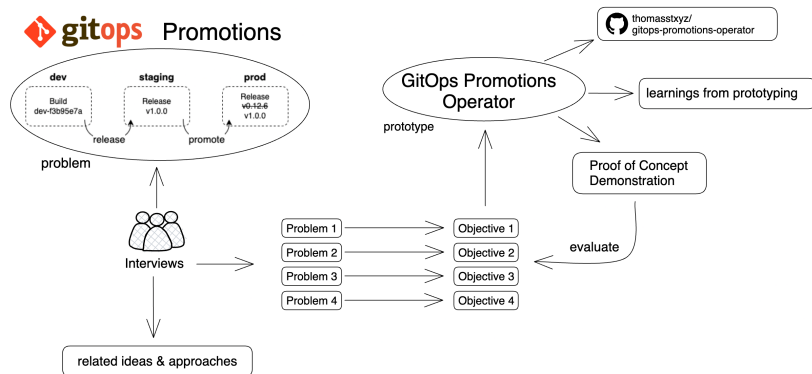
Research Question

- ▶ How can the promotion of releases in GitOps environments be designed?
 - ▶ How can deployment environments, as well as promotion processes be modeled abstractly?
 - ▶ How can the abstract models be used to implement a standardized solution for promoting releases?

design science research in information systems (Peffers et al., 2007)

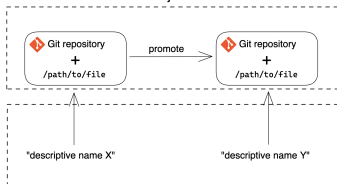


Overview & Approach

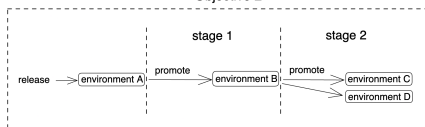


Solution Objectives

Objective 1



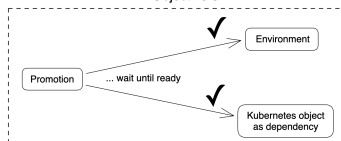
Objective 2



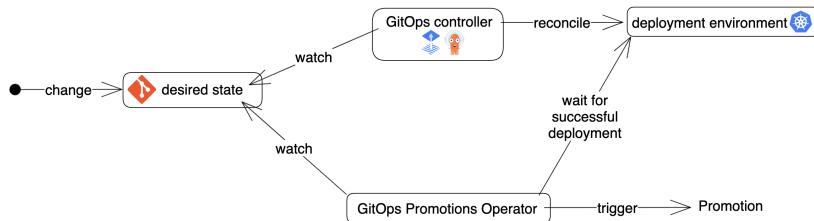
Objective 4



Objective 3



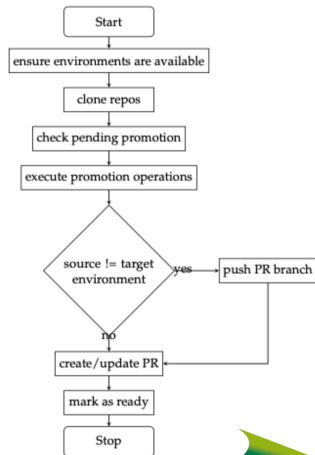
Asynchronous GitOps Deployments



Abstract Models, Custom Resources, Controllers

```
apiVersion: promotions.gitopsprom.io/v1alpha1
kind: Promotion
metadata:
  name: my-promotion
spec:
  sourceEnvironmentRef:
    name: my-source-env
  targetEnvironmentRef:
    name: my-target-env
  copy:
    - name: "Application Version"
      source: app-version
      target: app-version
    - name: "Kustomization File"
      source: ./app-version/kustomization.yaml
      target: ./app-version/
  strategy: pull-request
```

+



Demonstration

chore: promote Application Version from dev to qa #1 Edit <> Code

Open thomasstxyz wants to merge 1 commit into `main` from `promotion/dev-to-qa-2023-04-16-12-10-43`

Conversation 0 Commits 1 Checks 0 Files changed 1 +1 -1

Changes from all commits File filter Conversations Jump to Review changes

chore: promote Application Version from dev to qa
SHA in source environment: 796b06f

`promotion/dev-to-qa-2023-04-16-12-10-43` (#1)

Promotion Bot committed 8 hours ago commit 8a38a6cc43e6dc29cdf7ff73ea982e071b163b85

2 envs/qa/app-version/kustomization.yaml

@@ -2,4 +2,4 @@	apiVersion: kustomize.config.k8s.io/v1alpha1
2	2 kind: Component
3	3 images:
4	4 - name: ghcr.io/stefanprodan/podinfo
5	- newTag: 6.3.3
5	+ newTag: 6.3.4

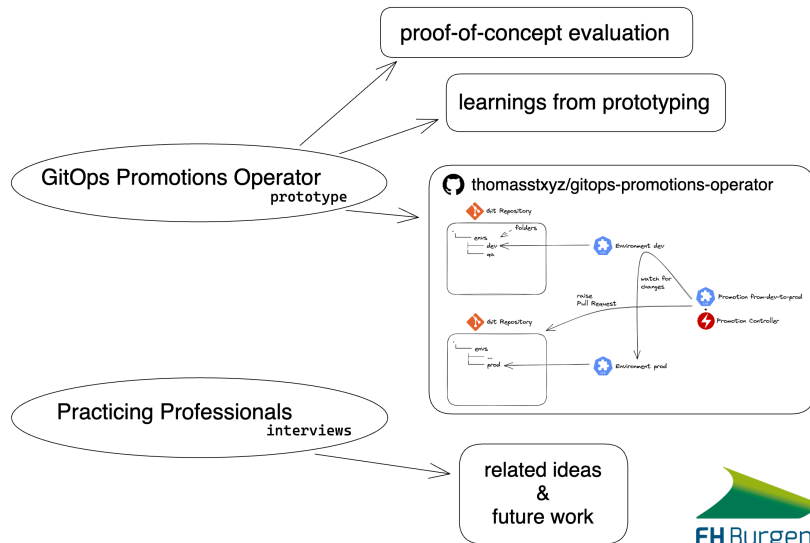
Evaluation

Does the implementation satisfy the solution objective?

- ▶ OBJ1R1 & OBJ1R2 ✓
- ▶ OBJ2R1 ✓
- ▶ OBJ3R1 ✓
- ▶ OBJ4R1 ✓

Evaluation: qualitative comparison between observed functionality in demonstration and solution objectives

Results

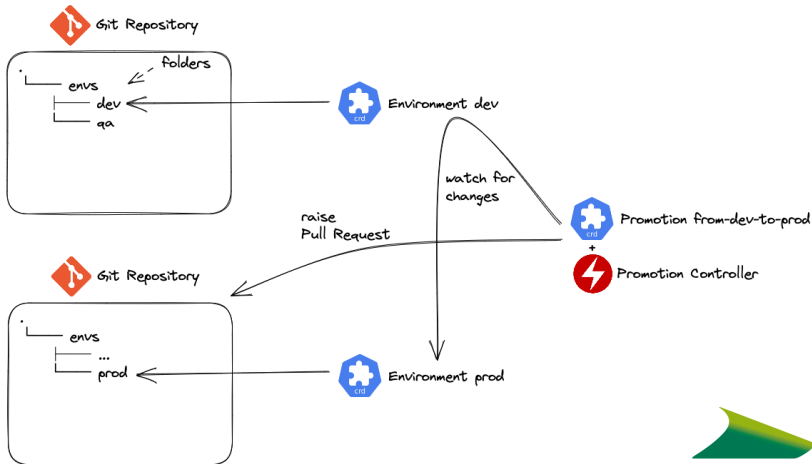


Learnings from prototyping

- ▶ integration to GitOps tools and user experience, ease of use
- ▶ security implications
- ▶ multi-cluster environments

Prototype

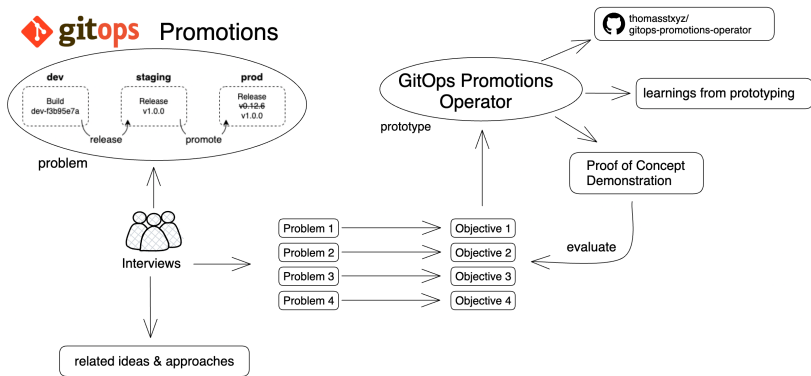
github.com/thomasstxyz/gitops-promotions-operator



Related Ideas and Approaches

- ▶ Rolling Production Environments
- ▶ Overview of GitOps Repositories

Conclusion



Future Work

