SUSE

Policy-as-code with Kubewarden

👋 there

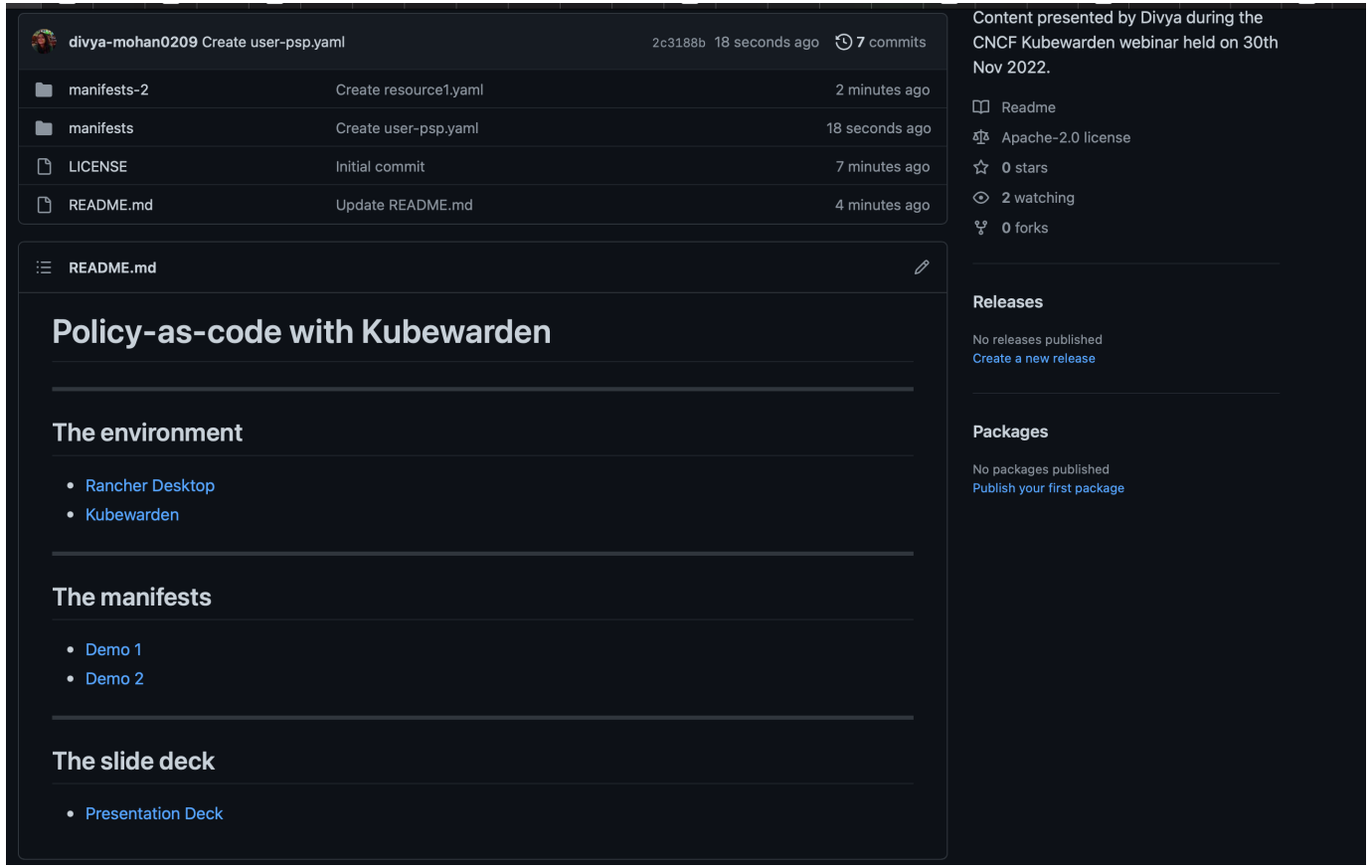
Divya Mohan

- Senior Technical Evangelist at SUSE
- Documentation maintainer @ Kubernetes
- CNCF Ambassador
- KCNA exam co-creator

Agenda

1. What is Kubewarden?
2. Architecture
3. PSP, PSA, and Kubewarden
4. Demo # 1
5. What's new in Kubewarden v1.3
6. Demo # 2

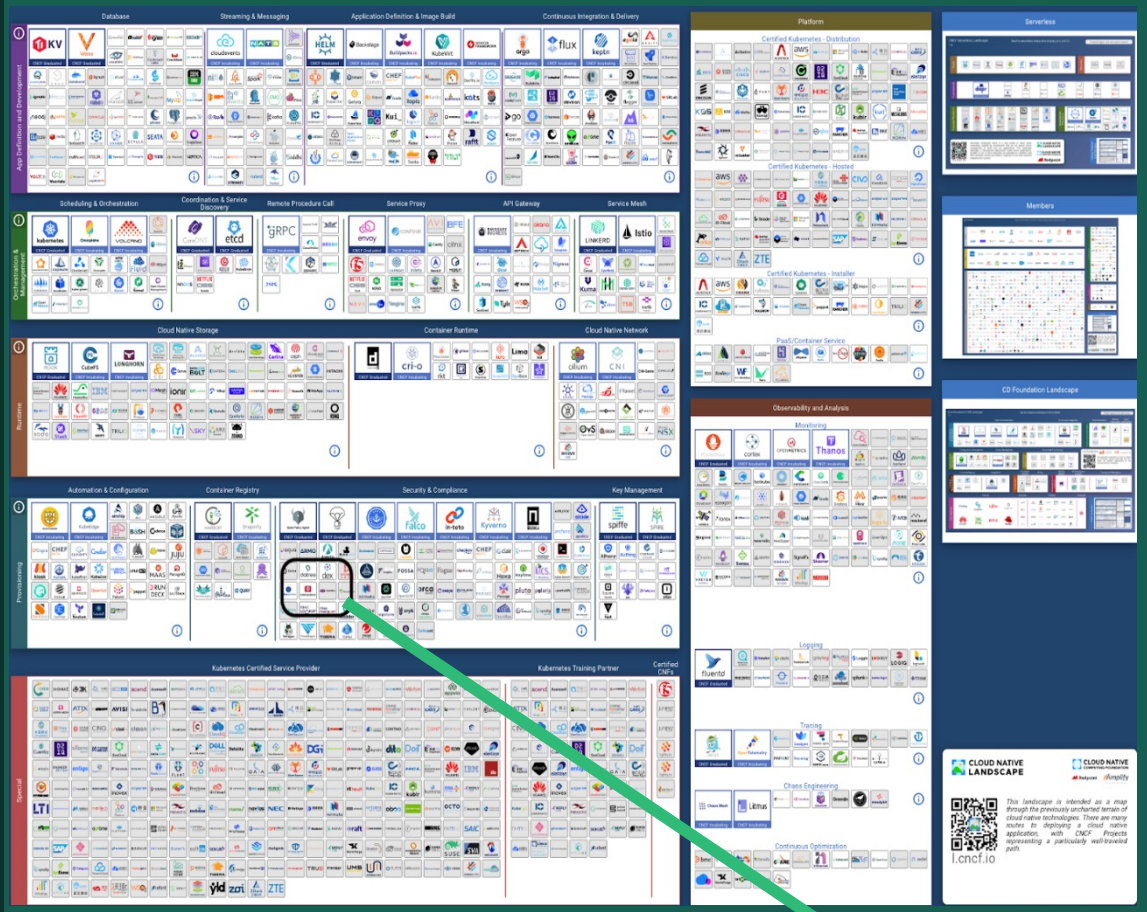
Supporting Material



https://github.com/SUSE-Rancher-Community/CNCF-kubewarden-webinar

What is Kubewarden?

Policy engine for Kubernetes to simplify policy-as-code



CNCF Sandbox project

What's the secret🔐 sauce?

- Users can write Kubernetes policies in their favorite programming language
    - Caveat: The language can compile to Wasm binaries
- Currently supports:
    - Rust
    - Go
    - Swift

What's the secret🔐 sauce?

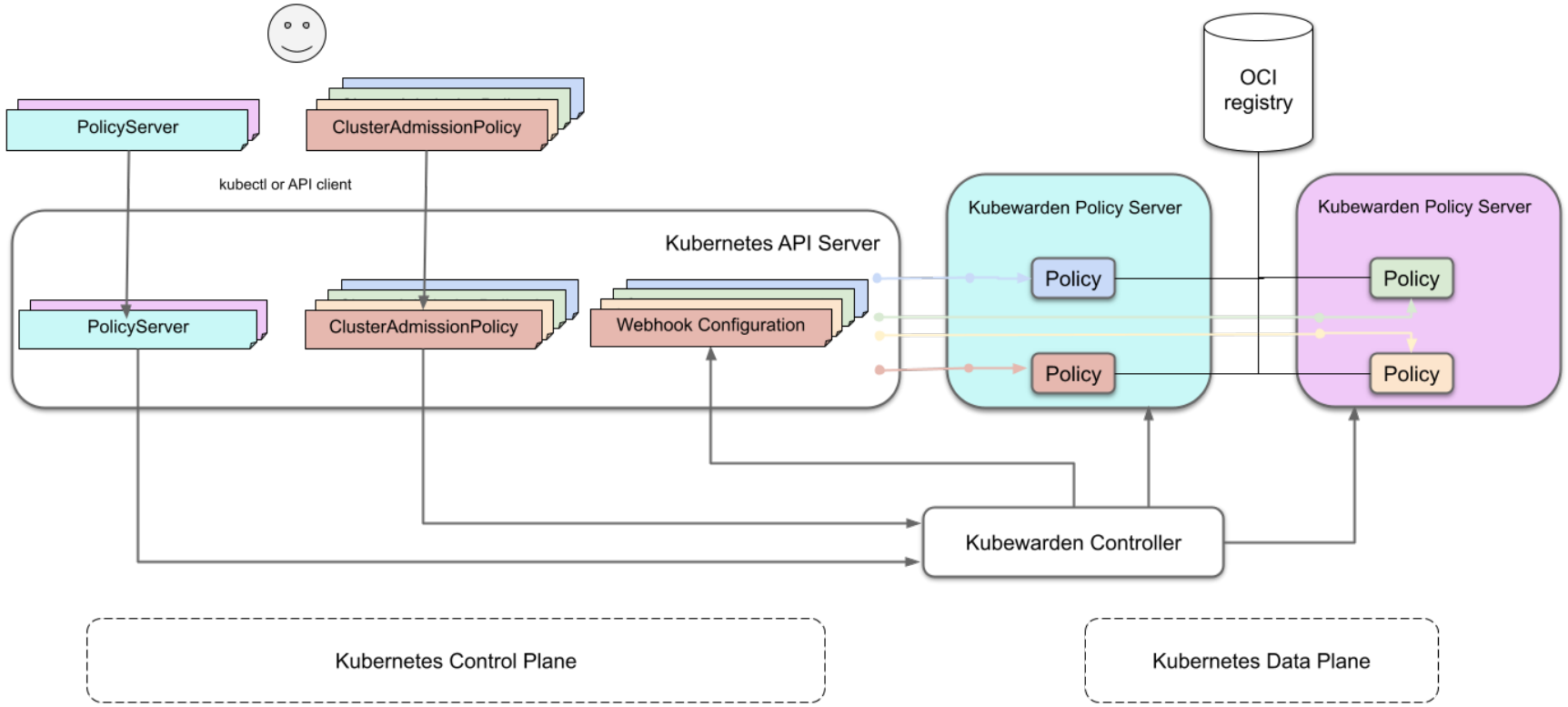
- You can also reuse (almost) all your existing **Rego** policies!
    - Some built-in functions are SDK-dependent i.e. Kubewarden has to implement them
    - Built-ins required by the majority of K8s users are supported.
- Distribution channels:
    - Served by a web server
    - Published & stored inside an OCI compliant registry as OCI artifacts

What's the secret🔐 sauce?

Dynamic admission control

Architecture

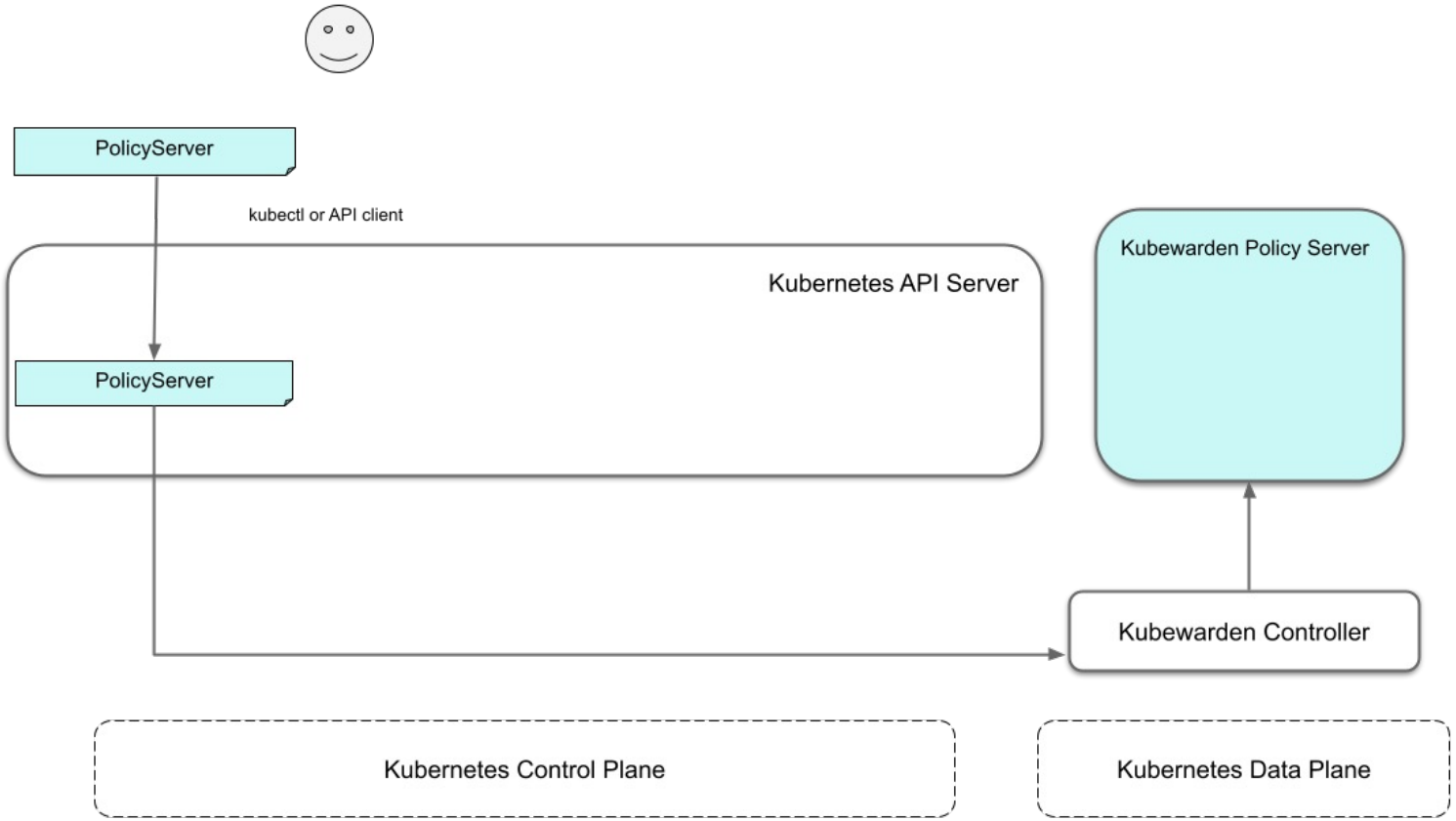
Architecture



Courtesy: https://docs.kubewarden.io

Request flow

Default policy server



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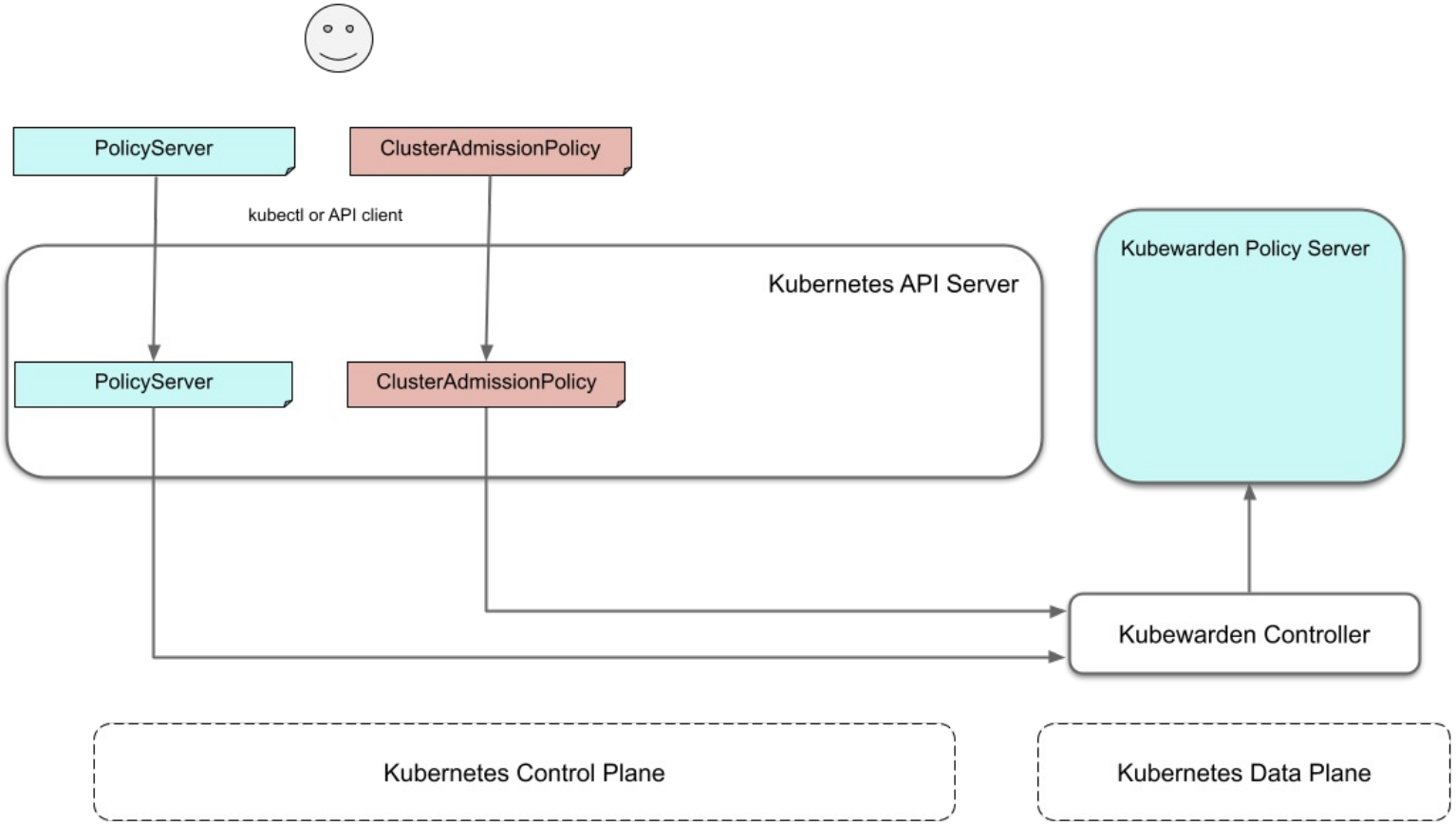
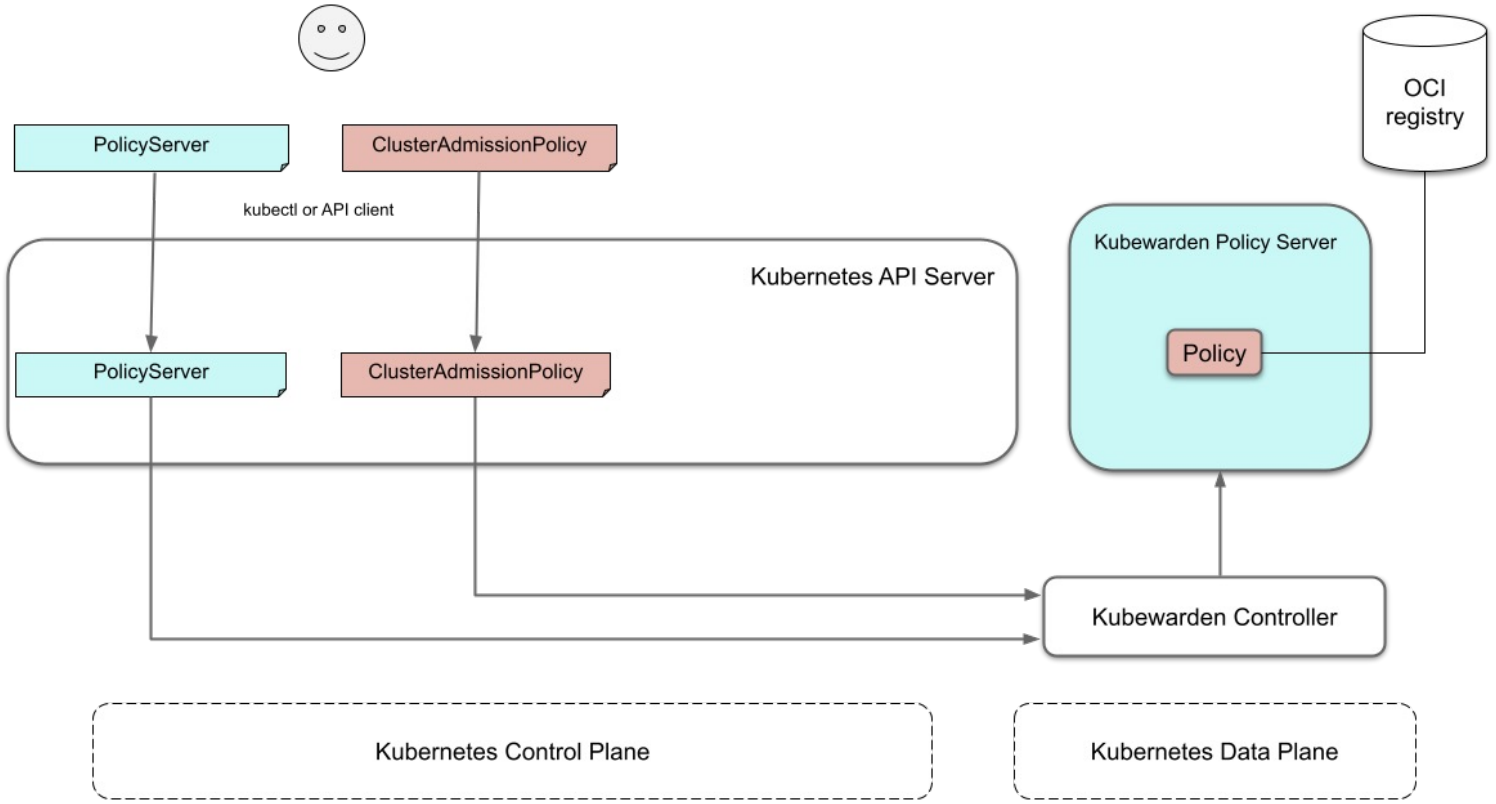
Defining your very first policy



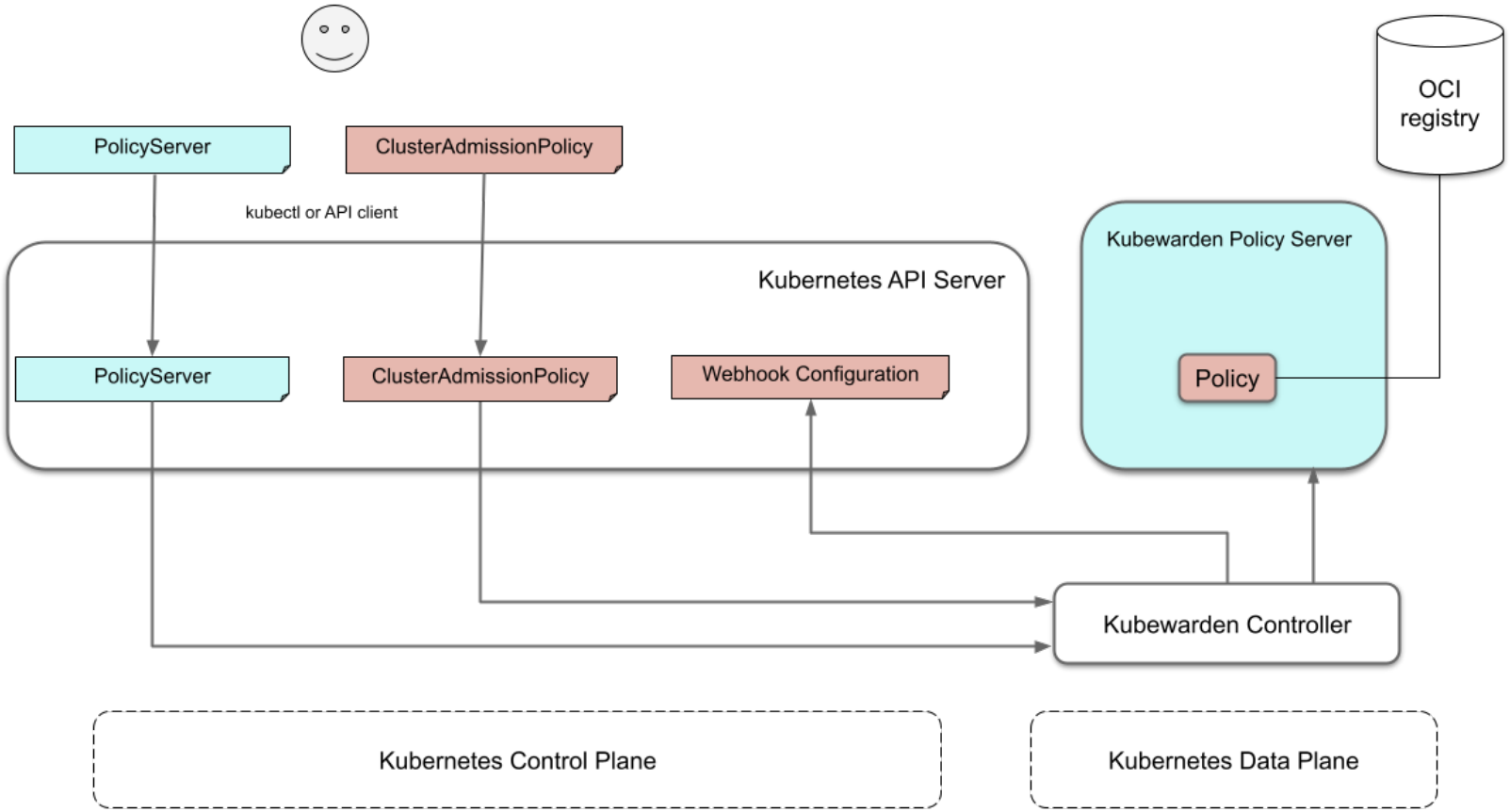
Courtesy: https://docs.kubewarden.io

Reconciliation of policy server



Courtesy: https://docs.kubewarden.io

Making Kubernetes aware of the policy server



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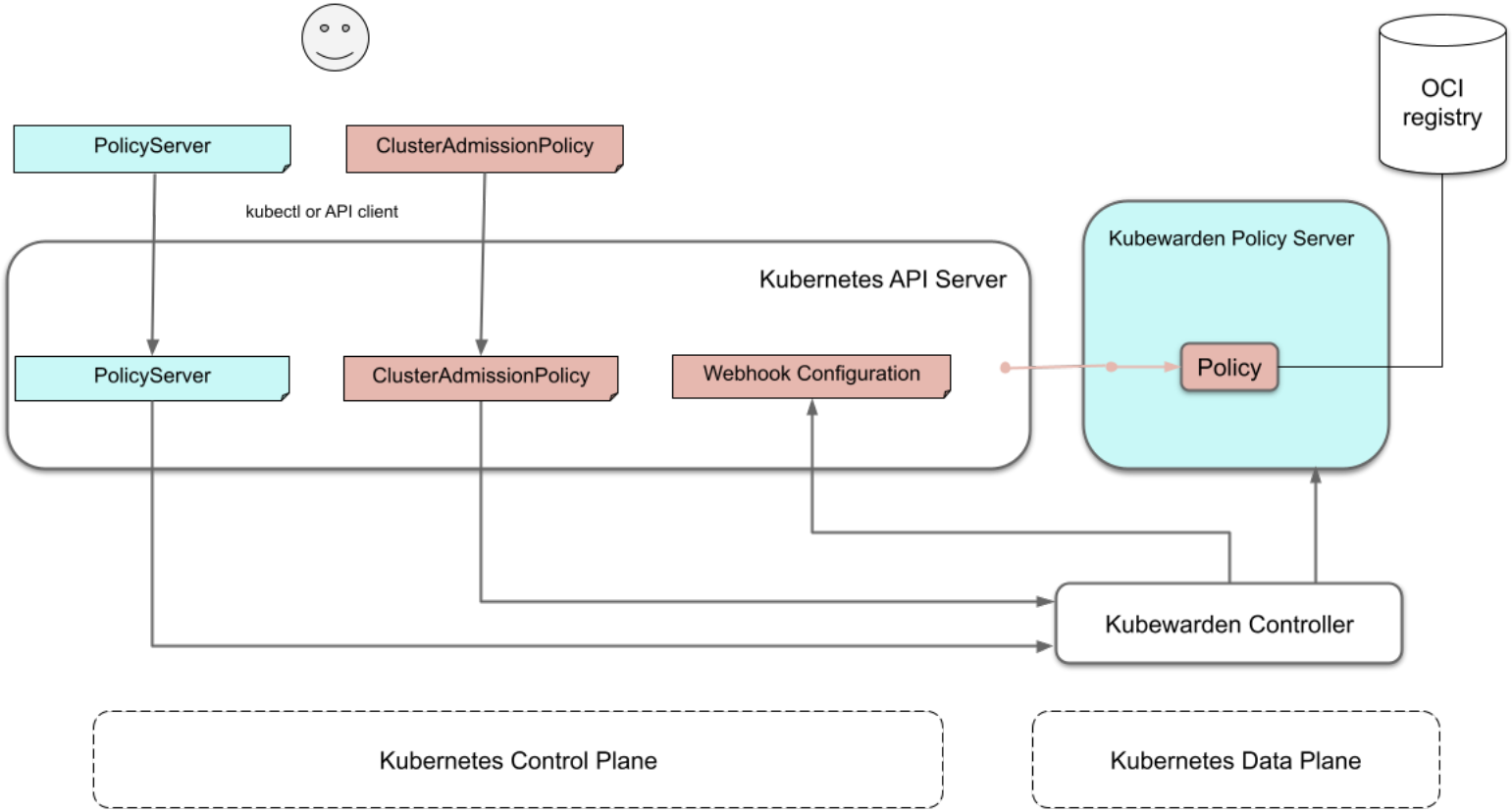
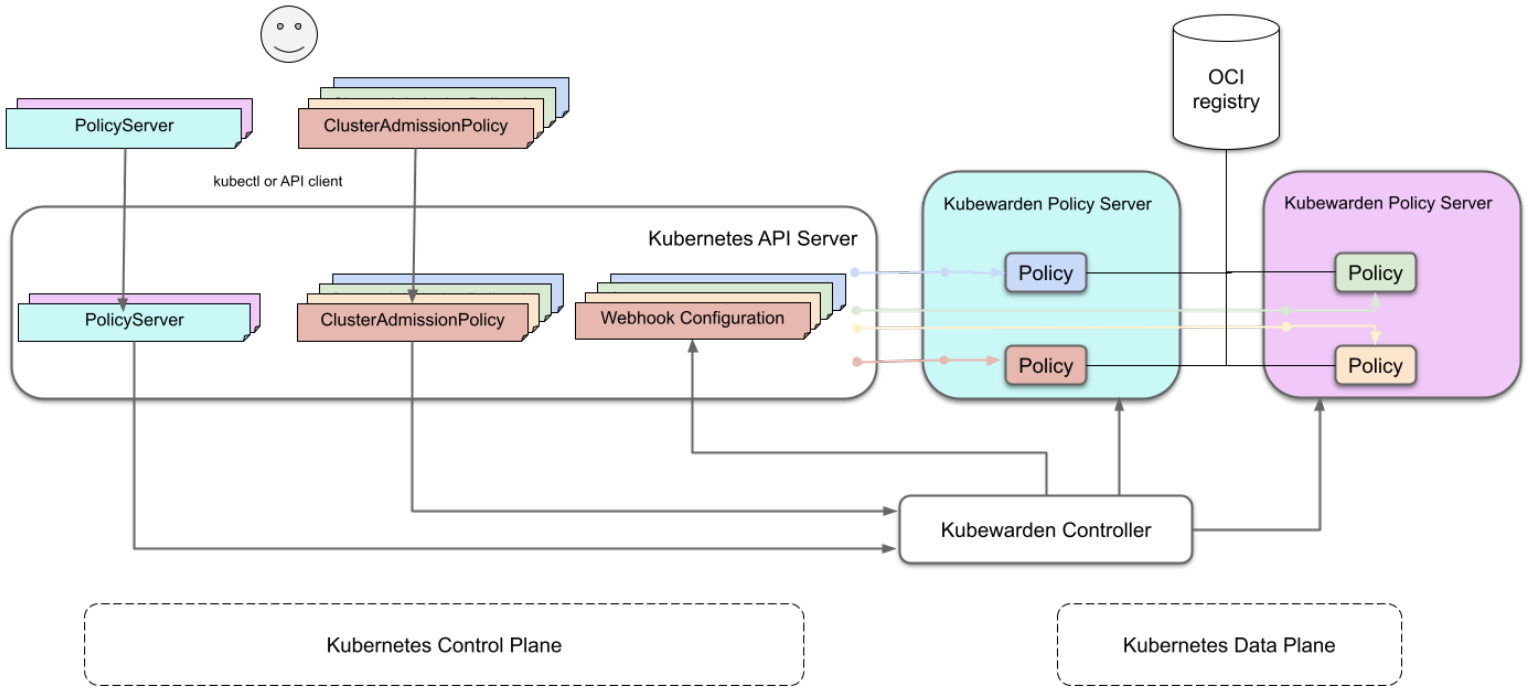
Policy in action



Courtesy: https://docs.kubewarden.io

Handling multiple policies



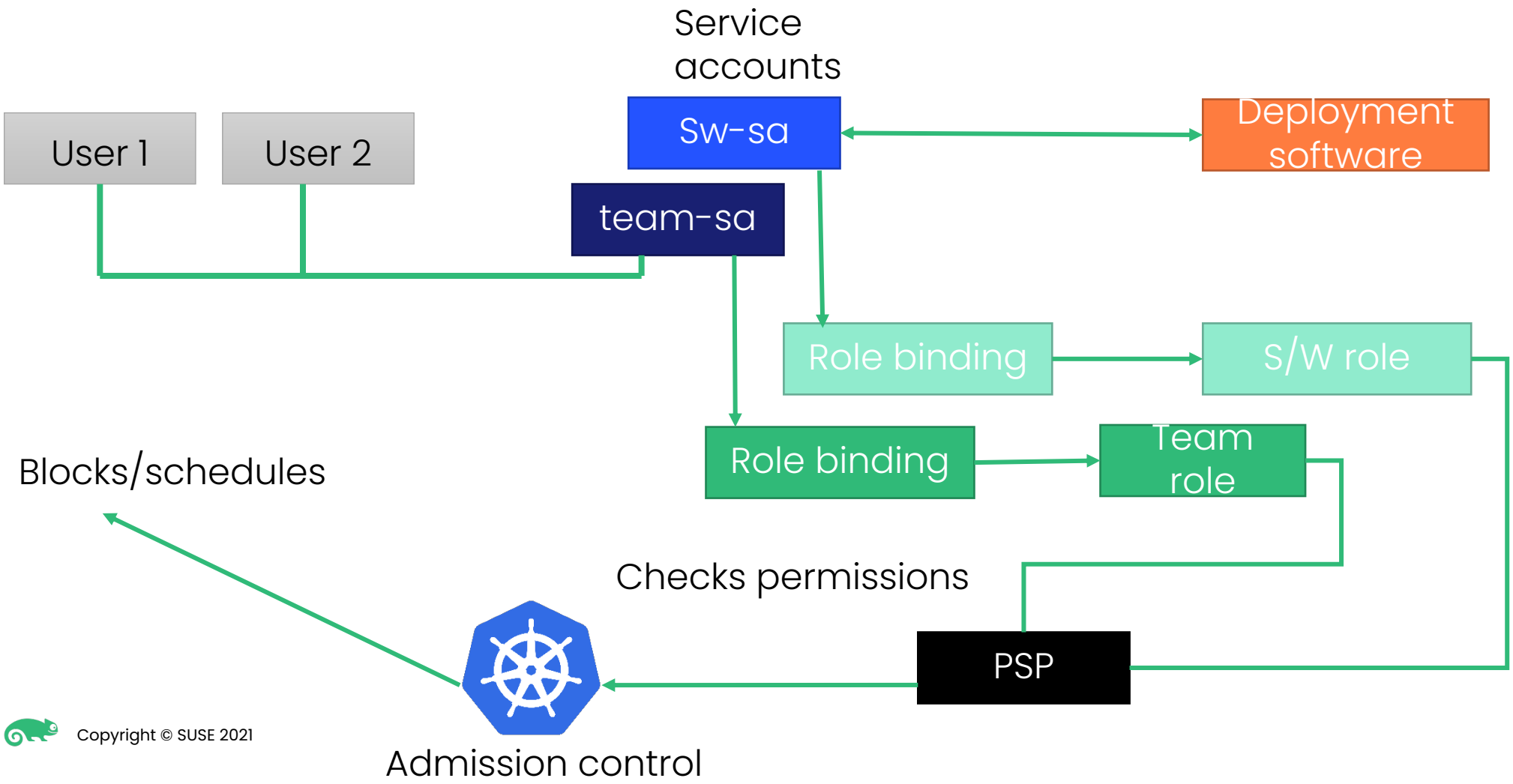
Courtesy: https://docs.kubewarden.io

PSP, PSA, and Kubewarden

PodSecurityPolicy

- Framework to ensure that Pods run only with appropriate privileges & can only access appropriate resources
- Kubernetes RBAC links PSPs to users/services through the roles they have
- Enforce the concept of least privilege

PSP in action



What was the problem with PSP?

- Easy to grant broader permissions than intended
- Difficult to determine which PSP applies in a given situation

Pod Security Admission

- Different isolation levels for Pods based on Pod Security Standards
- Applied at the namespace level
- Allows you to define the behavior of pods in a clear & consistent fashion.

What's the problem with Pod Security Admission?

- As of **Kubernetes v1.25**
  - No mutation capabilities
  - Higher level objects are evaluated ONLY when audit/warn modes are enabled.

👋 Kubewarden!

- Can be used to replace PSP
- Intended to complement Pod Security Admission
- Integrate Kubewarden into a Pod Security Admission profile to mitigate limitations

Demo #1

What’s new in Kubewarden v1.3?

What’s new in Kubewarden v1.3?

- Joined the CLO Monitor Initiative
  - Currently A-rated with a score of 97%
- Reduced startup time for Policy server
- Ability to handle Sigstore signatures produced using a PKCS11 token

What’s new in Kubewarden v1.3?

- New policies that are backward compatible!
  - Environment Variable Scanner Policy
  - Environment Variable Compliance Policy
  - volumeMounts policy
  - deprecated-api-versions policy
- Expansion of scope for some existing policies

Demo #2

Resources

- Kubernetes website
  - https://kubernetes.io/docs/reference/access-authn-authz/extensible-admission-controllers/
  - https://kubernetes.io/docs/concepts/security/pod-security-policy/
  - https://kubernetes.io/docs/concepts/security/pod-security-admission/
  - https://kubernetes.io/docs/concepts/security/pod-security-standards/
- Kubewarden website
  - https://kubewarden.io
- Artifact Hub

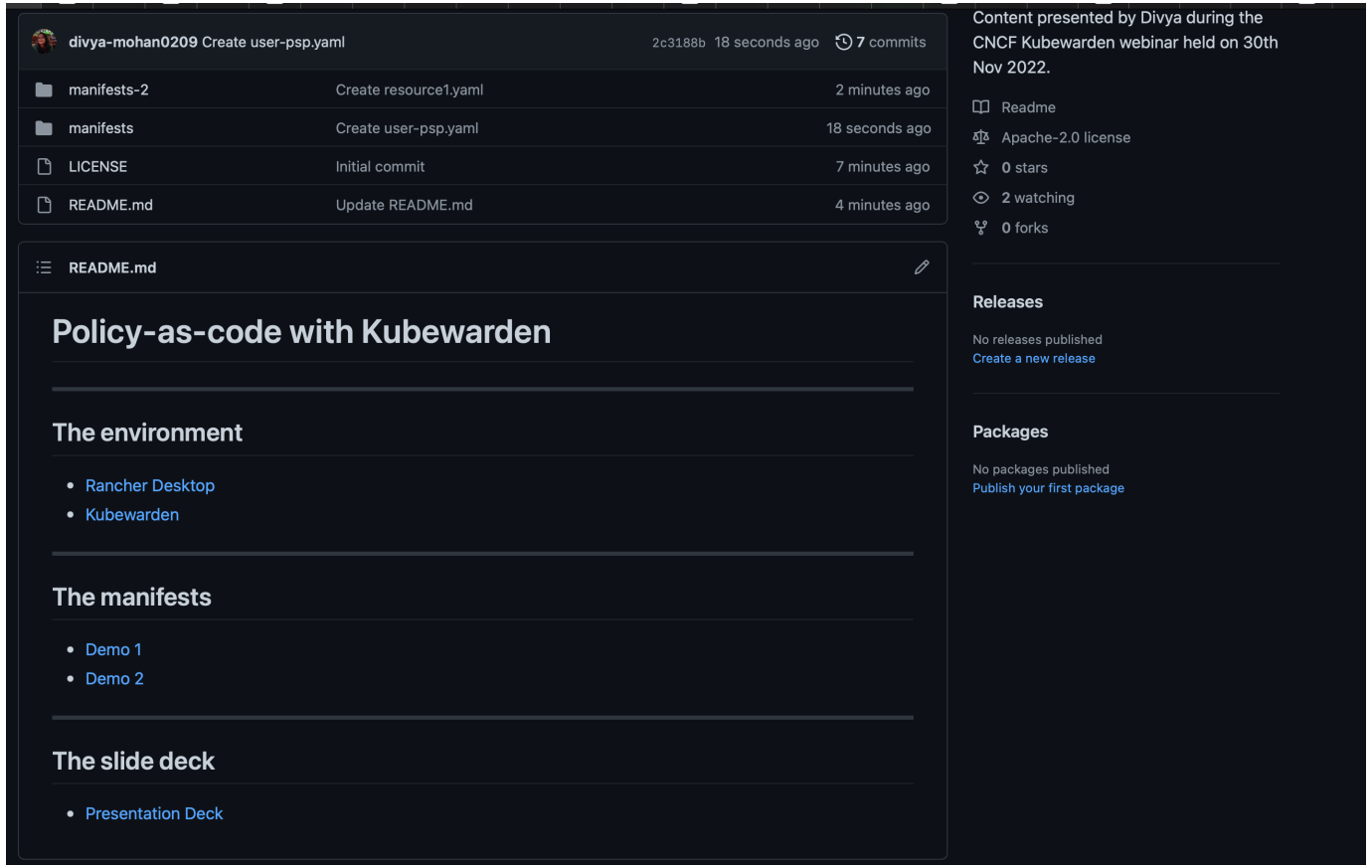
Resources

- Official Crate documentation (Provides more details about the Kubewarden Rust SDK)
- TinyGo
- Go policy project template
- Rust policy project template
- Swift policy project template
- GitHub issue for builtin functions

Where can you find us?

- Kubernetes slack (#kubewarden channel)
- Twitter
- YouTube channel

Supporting Material



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Q&A

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Thank You