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North America 2018

Using Prow for Testing outside of K8s

Matt Landis – Amazon EKS



What is Prow?



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What is Prow?



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- Prow is a Kubernetes-based CI/CD system.

What is Prow?



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- Prow is a Kubernetes-based CI/CD system.
- At its core it responds to events to run jobs, and reports the status of the jobs to other services.

What is Prow?



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- Prow is a Kubernetes-based CI/CD system.
- At its core it responds to events to run jobs, and reports the status of the jobs to other services.
- Microservices architecture provides the core components that you need and allows for extendability and replacement.

What is Prow?

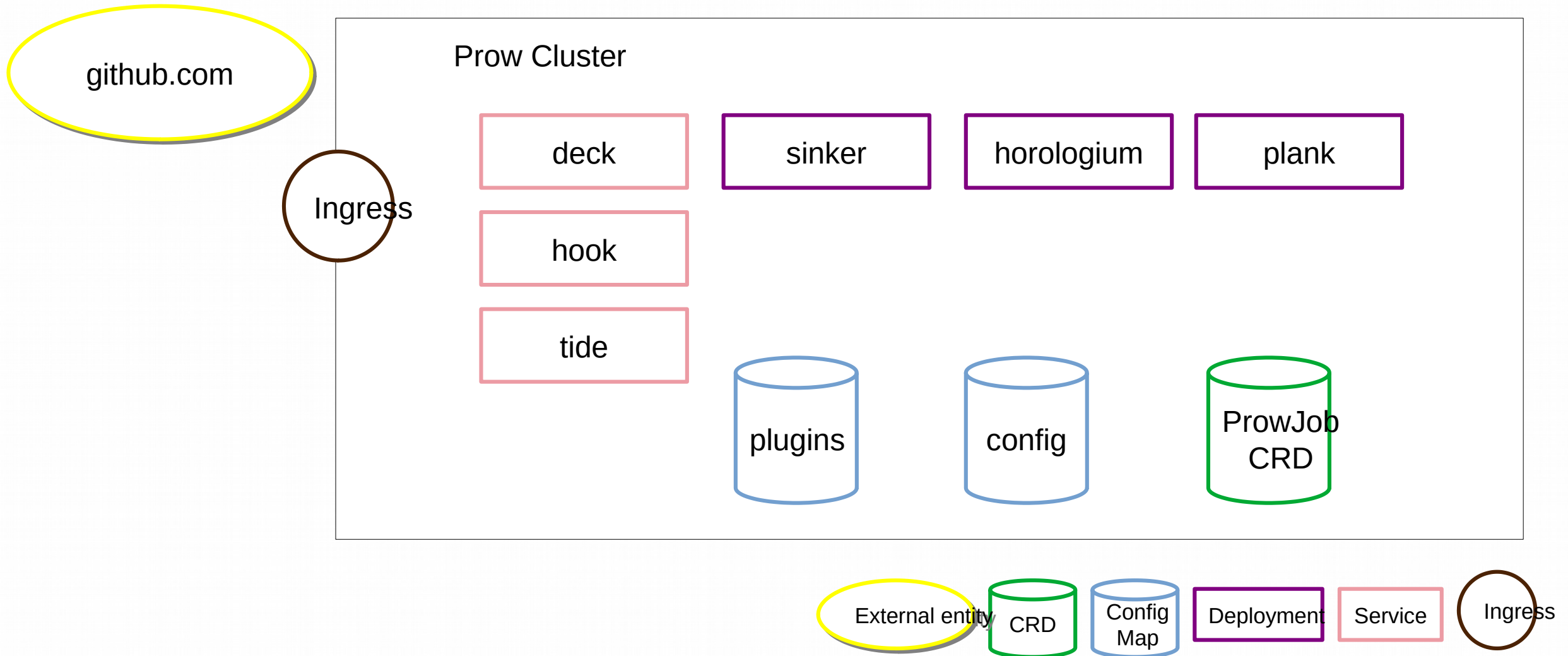


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What is Prow?

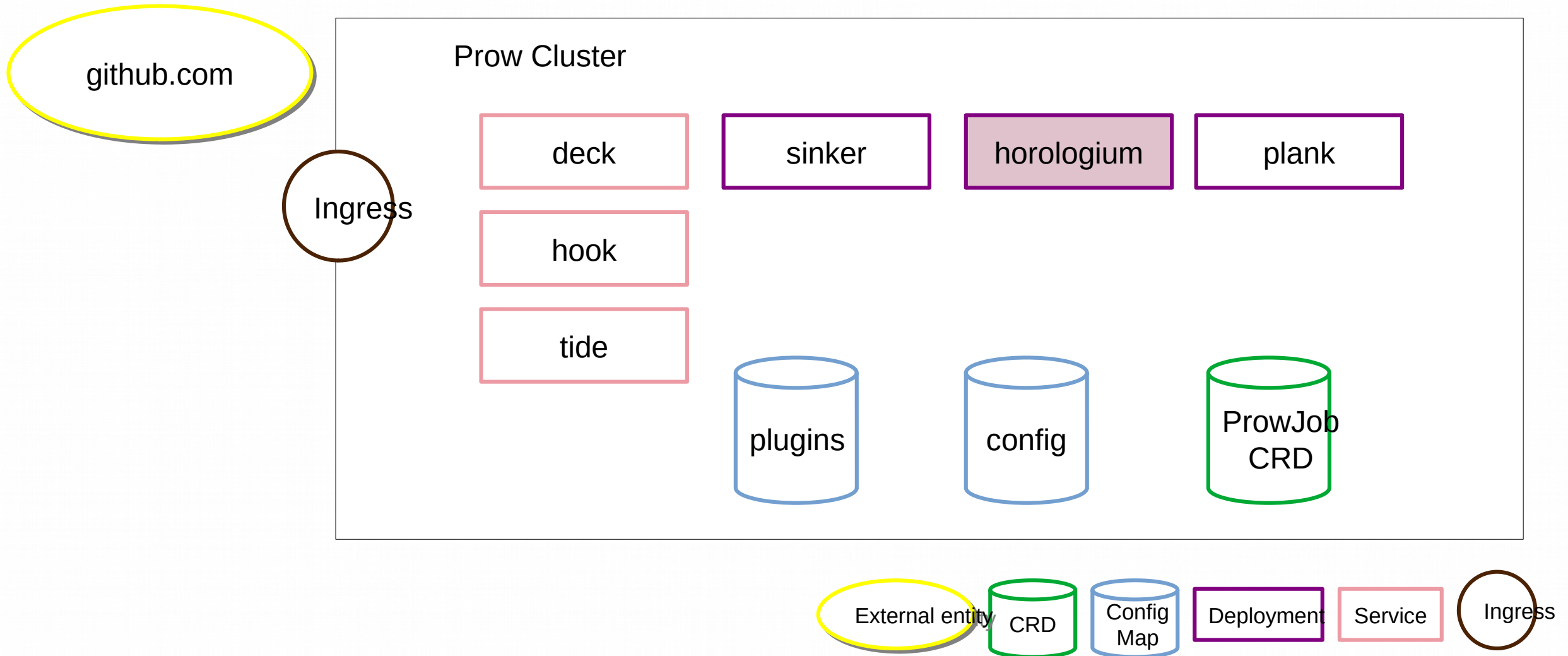


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What is Prow?



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horologium

- Responsible for scheduling Periodic jobs

What is Prow?



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horologium

```
kind: ConfigMap
metadata:
  name: config
data:
  config.yaml: |
    periodics:
    - interval: 10m
      agent: kubernetes
      name: echo-test
    spec:
      containers:
      - image: alpine
        command: ["/bin/date"]
```

```
kind: Deployment
metadata:
  name: horologium
spec:
  template:
    spec:
      containers:
      - name: horologium
        image: gcr.io/k8s-prow/horologium:v20181207-201eb76
        volumeMounts:
        - name: config
          mountPath: /etc/config
          readOnly: true
      volumes:
      - name: config
        configMap:
          name: config
```

What is Prow?

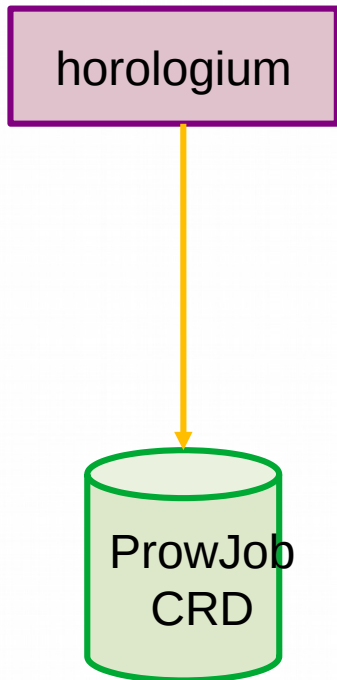


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```
kind: ProwJob
metadata:
  creationTimestamp: 2018-12-07T17:46:48Z
  labels:
    created-by-prow: "true"
    prow.k8s.io/id: 127d3098-fa48-11e8-989c-d2633fc8b3e9
    prow.k8s.io/job: echo-test
    prow.k8s.io/type: periodic
  name: 127d3098-fa48-11e8-989c-d2633fc8b3e9
  namespace: default
spec:
  agent: kubernetes
  cluster: default
  job: echo-test
  pod_spec:
    containers:
      - command:
          - /bin/date
        image: alpine
        name: ""
        resources: {}
  type: periodic
status:
  state: triggered
```

What is Prow?

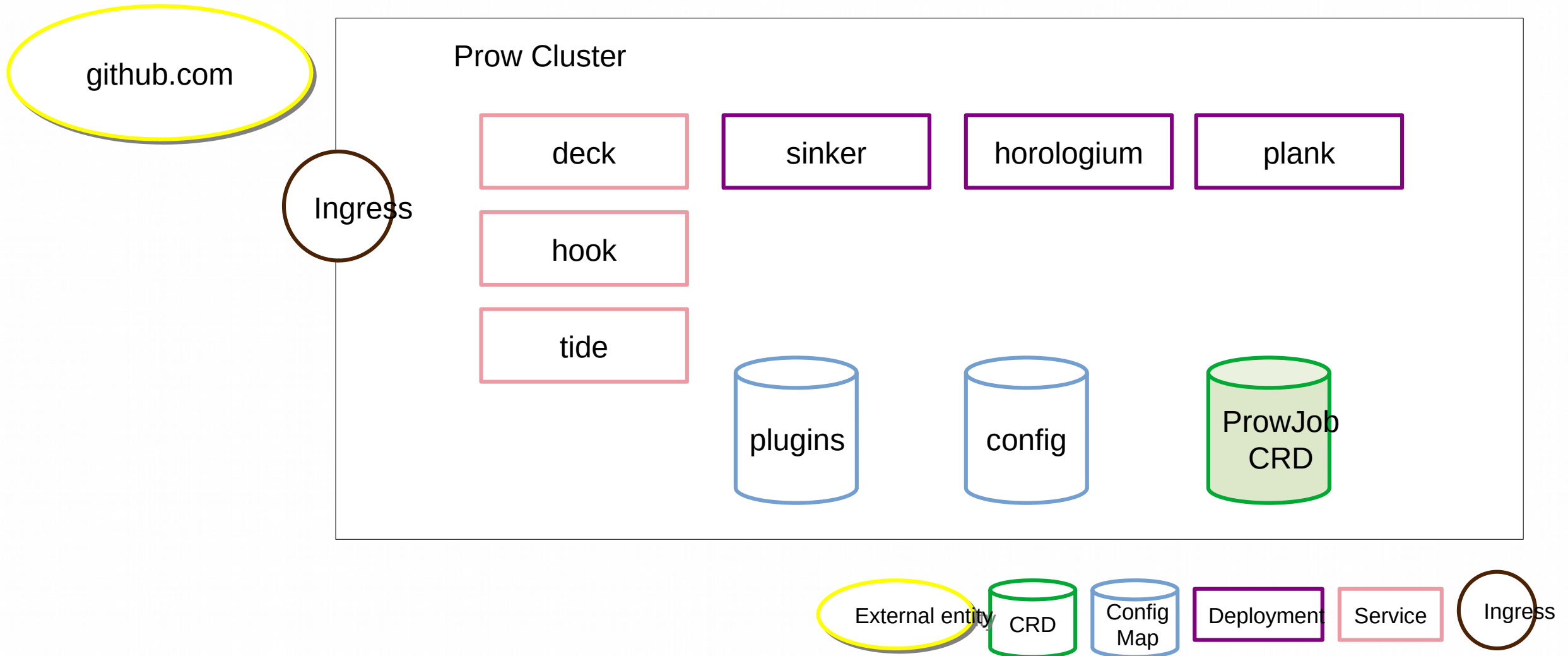


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What is Prow?

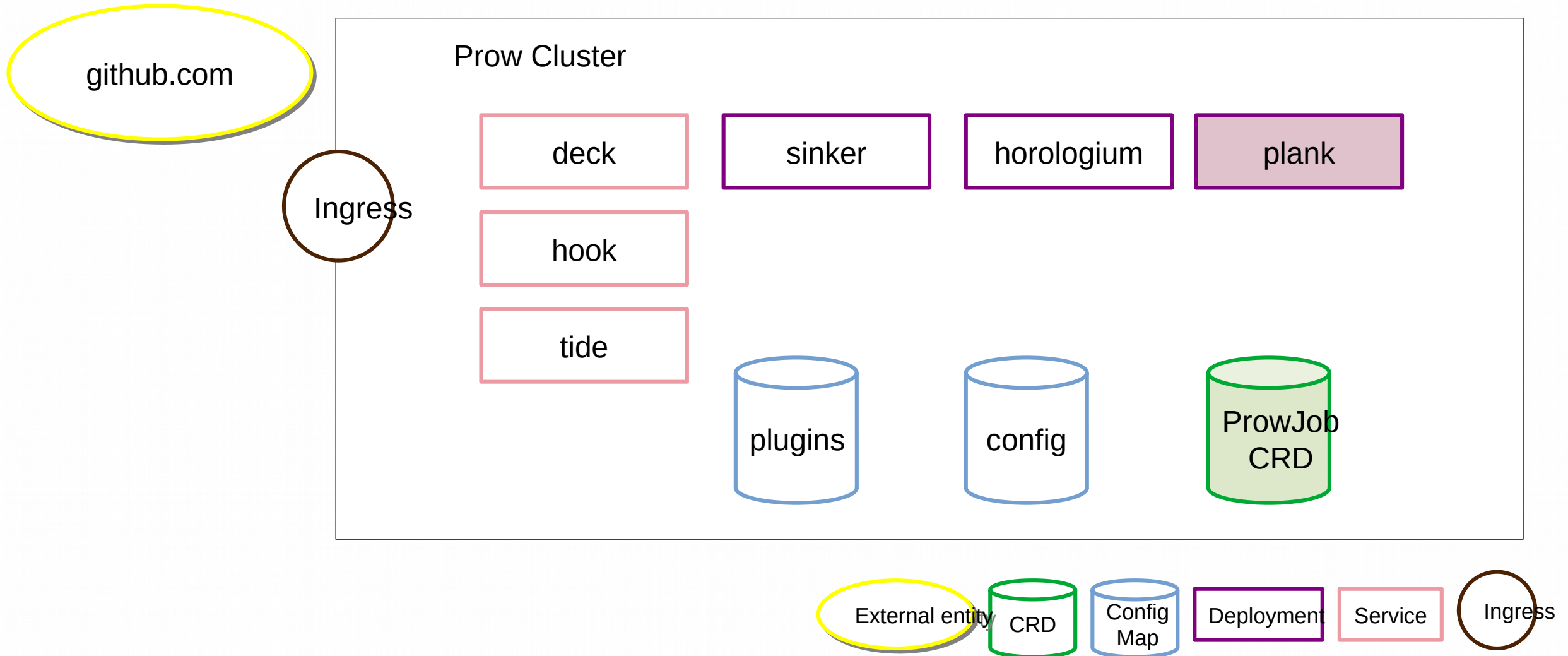


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What is Prow?



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plank

- Controller that manages job execution and lifecycle of kubernetes jobs
- Looks for jobs created by prow with agent Kubernetes
- Starts the jobs
- Updates jobs state
- Terminates duplicate presubmit jobs

What is Prow?



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plank

```
kind: ProwJob
metadata:
  creationTimestamp: 2018-12-07T17:46:48Z
  labels:
    created-by-prow: "true"
    prow.k8s.io/id: 127d3098-fa48-11e8-989c-d2633fc8b3e9
    prow.k8s.io/job: echo-test
    prow.k8s.io/type: periodic
  name: 127d3098-fa48-11e8-989c-d2633fc8b3e9
  namespace: default
spec:
  agent: kubernetes
  cluster: default
  job: echo-test
  pod_spec:
    containers:
      - command:
          - /bin/date
        image: alpine
        name: ""
      resources: {}
    type: periodic
  status:
    build_id: "1071098755383562241"
    description: Job triggered.
    pod_name: 127d3098-fa48-11e8-989c-d2633fc8b3e9
    startTime: 2018-12-07T17:46:48Z
    state: pending
```

```
apiVersion: v1
kind: Pod
metadata:
  annotations:
    prow.k8s.io/job: echo-test
  creationTimestamp: 2018-12-07T17:46:57Z
  labels:
    created-by-prow: "true"
    prow.k8s.io/id: 127d3098-fa48-11e8-989c-d2633fc8b3e9
    prow.k8s.io/job: echo-test
    prow.k8s.io/type: periodic
  name: 127d3098-fa48-11e8-989c-d2633fc8b3e9
spec:
  containers:
    - command:
        - /bin/sleep
        - "600"
      env:
        - name: BUILD_ID
          value: "1071098755383562241"
        - name: BUILD_NUMBER
          value: "1071098755383562241"
        - name: JOB_NAME
          value: echo-test
        - name: JOB_SPEC
          value: '{"type":"periodic","job":"echo-test",
            "buildid":"1071098755383562241",
            "prowjobid":"127d3098-fa48-11e8-989c-d2633fc8b3e9","refs":{}}'
        - name: JOB_TYPE
          value: periodic
        - name: PROW_JOB_ID
          value: 127d3098-fa48-11e8-989c-d2633fc8b3e9
      image: alpine
    ...
```

What is Prow?

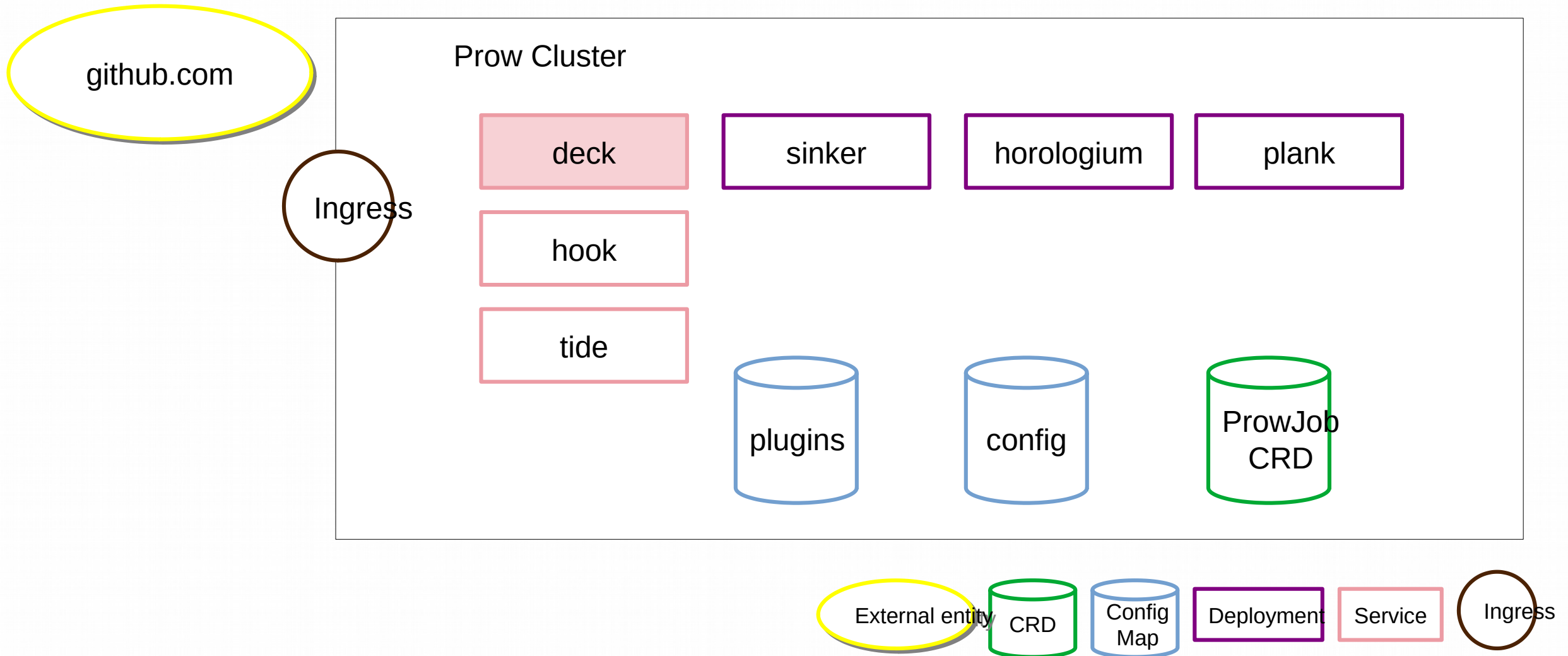


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What is Prow?



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deck

- Provides a view of recent prow jobs
- Help on plugins and commands (more on these later)
- Status of merge automation (tide)
- Dashboard for PR authors

What is Prow?



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deck

Proton Status

Filter all job types all repositories >> all pull requests all authors
Search job name all states Showing 500/17689 jobs

17681 8

	Repository	Revision	Job	Started	Duration
  			echo-test	12:17:49	
  			echo-test	12:16:48	40s
  			echo-test	12:15:48	40s
  			echo-test	12:14:48	40s
  			echo-test	12:13:48	39s

What is Prow?

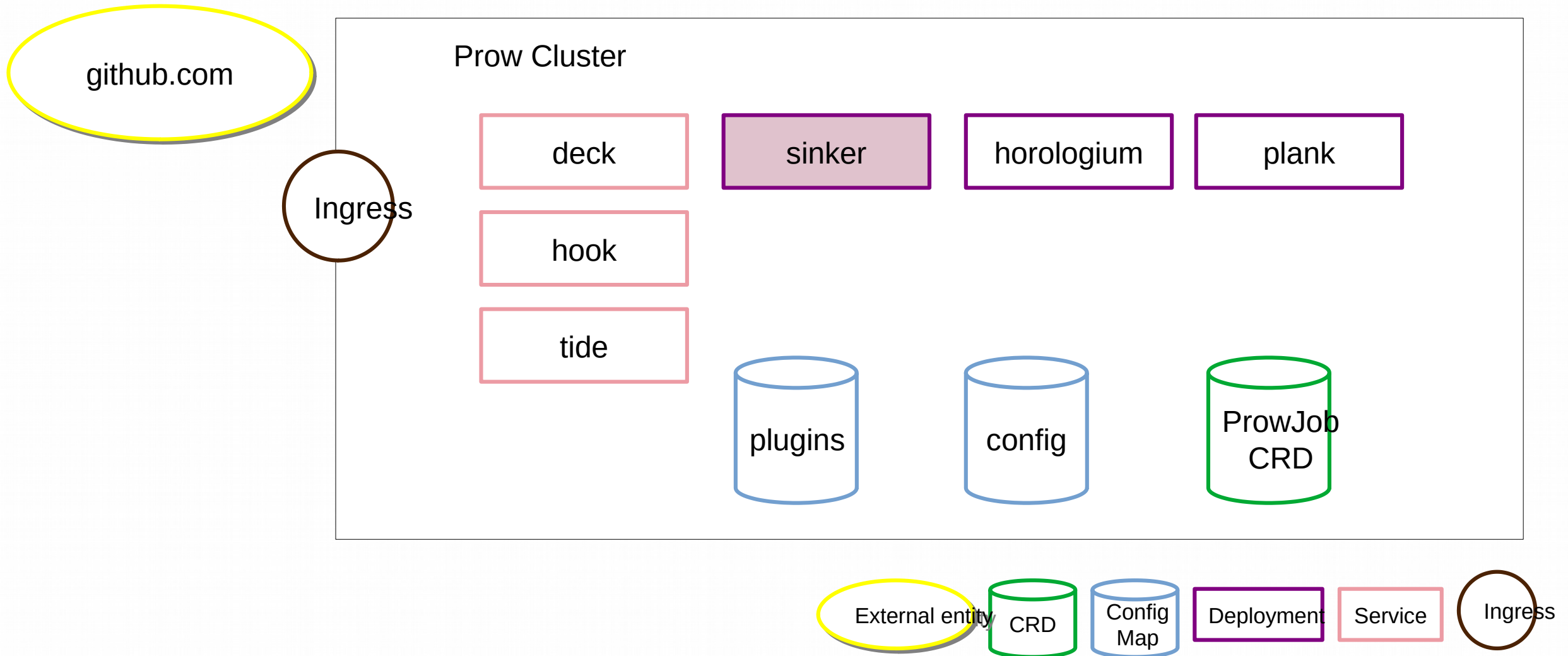


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What is Prow?



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sinker

- Cleans up
- Deletes completed prow jobs
- ... ensuring to keep most recent complete periodic job around
- Removes old completed pods

What is Prow?

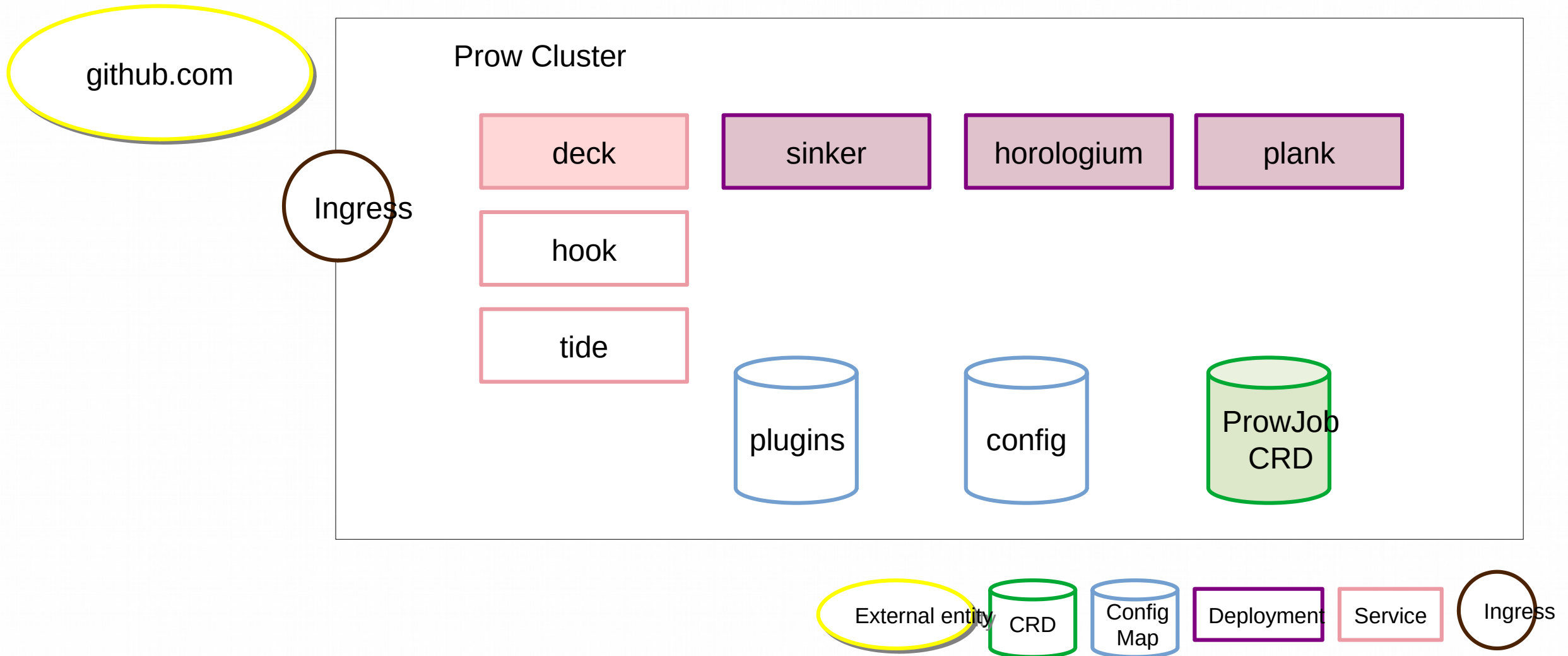


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What is Prow?

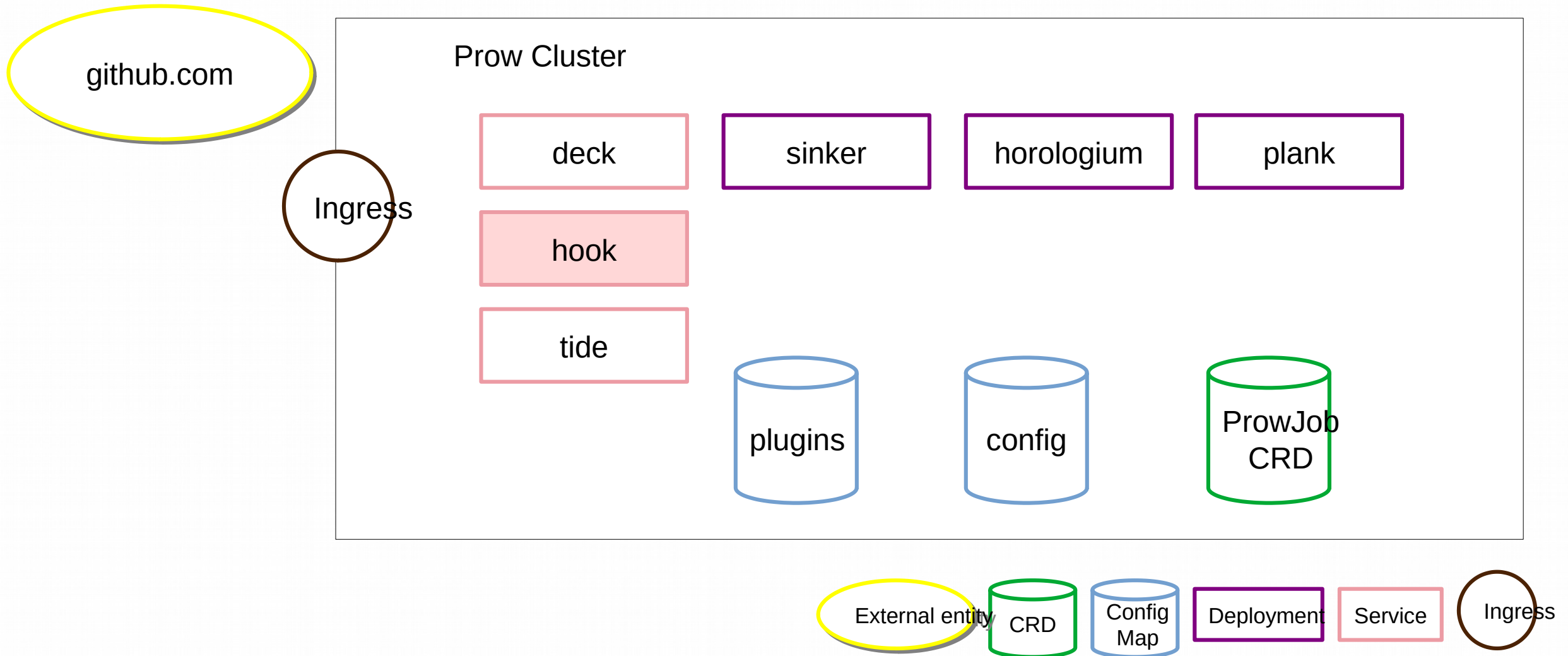


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What is Prow?



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hook

- Responds to github events and dispatches them to plugins
- Plugins provide a great amount of extensibility
- Support for external plugins

What is Prow?



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hook

plugins.yaml

kubernetes:

- approve
- assign
- blunderbuss
- cat
- cla
- dog
- golint
- heart
- help
- hold
- label
- lgtm
- lifecycle
- shrug
- sigmentation
- size
- skip
- slackevents
- verify-owners
- wip
- yuks

What is Prow?



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hook

plugins.yaml

kubernetes:

- approve
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- label
- lgtm
- lifecycle
- shrug
- sigmentation
- size
- skip
- slackevents
- verify-owners
- wip
- yuks

kubernetes/cloud-provider-aws:

- milestone
- milestonestatus
- owners-label
- release-note
- require-matching-label
- welcome
- trigger

What is Prow?

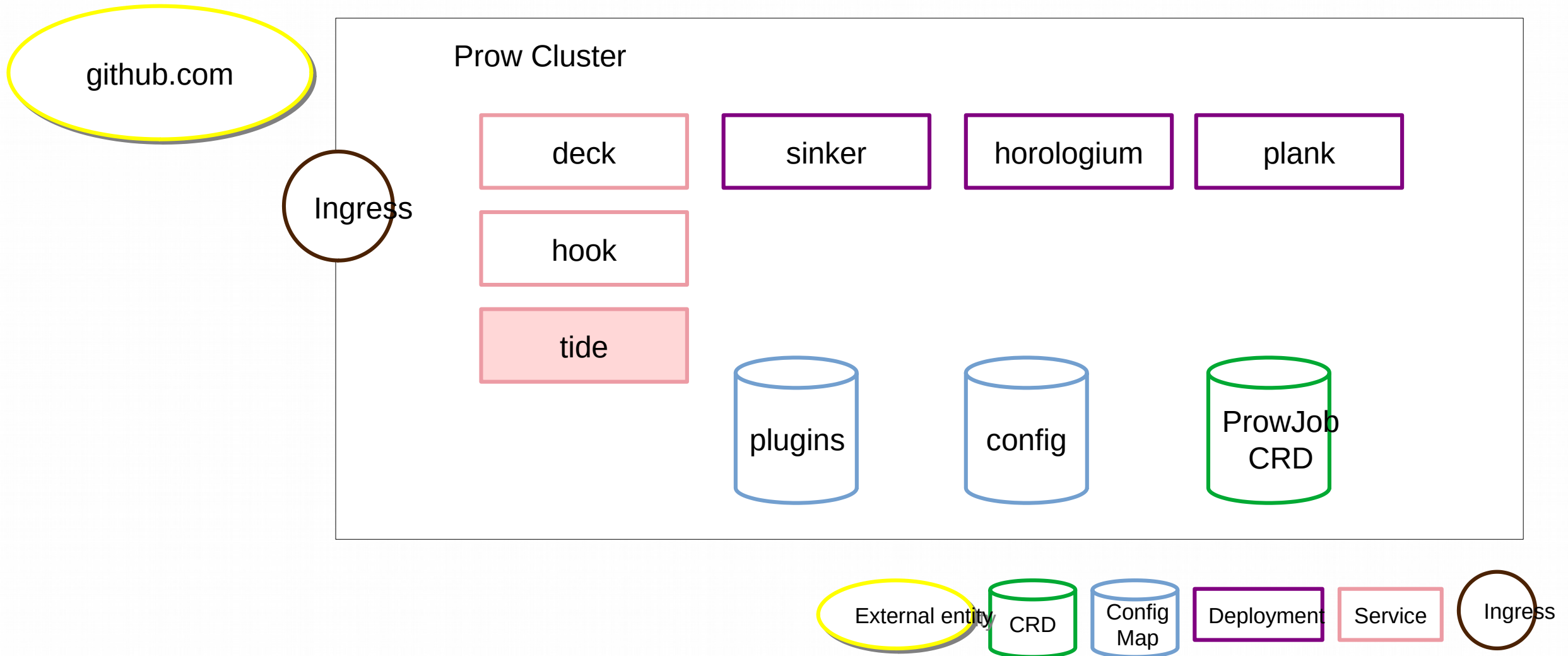


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What is Prow?



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tide

- Merge automation

What is Prow?



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tide

- Merge automation
- Batches and retests a group of PRs against latest HEAD

What is Prow?



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tide

- Merge automation
- Batches and retests a group of PRs against latest HEAD
- Merges the changes

What is Prow?

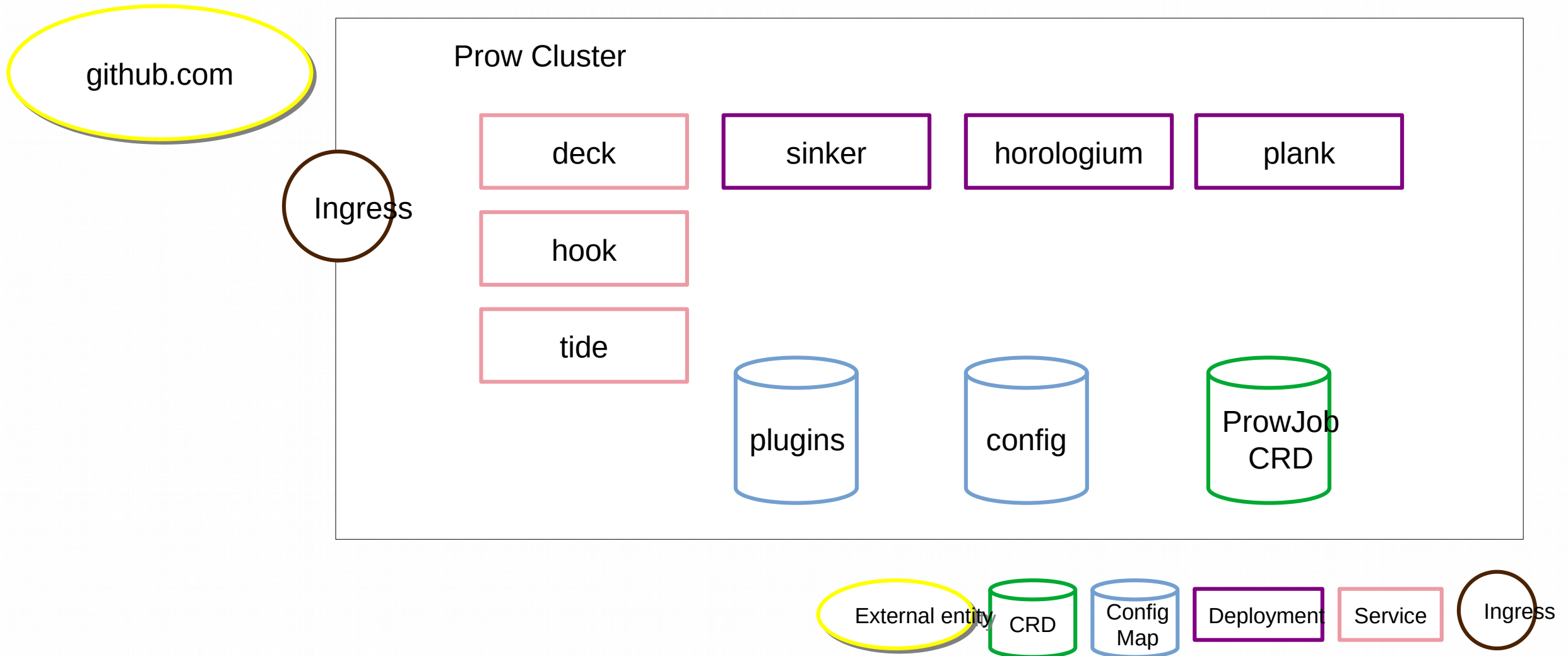


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EKS & Prow



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In the beginning

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In the beginning

- Only one periodic job, running every 2 hours
 - eks-beta-conformance

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Still early...

- Two periodic jobs
 - eks-beta-conformance
 - eks-beta-conformance-fast



Before launch

- 6 periodic jobs
 - eks-beta-conformance
 - eks-beta-conformance-fast
 - eks-prod-us-west-2-conformance
 - eks-prod-us-west-2-conformance-fast
 - eks-prod-us-east-1-conformance
 - eks-prod-us-east-1-conformance-fast



GPU support testing

- 9 periodic jobs
 - eks-beta-conformance
 - eks-beta-conformance-fast
 - eks-beta-gpu
 - eks-prod-us-west-2-conformance
 - eks-prod-us-west-2-conformance-fast
 - eks-prod-us-west-2-gpu
 - eks-prod-us-east-1-conformance
 - eks-prod-us-east-1-conformance-fast
 - eks-prod-us-east-1-gpu



HPA support testing

- 12 periodic jobs
 - eks-beta-conformance
 - eks-beta-conformance-fast
 - eks-beta-gpu
 - eks-beta-hpa
 - eks-prod-us-west-2-conformance
 - eks-prod-us-west-2-conformance-fast
 - eks-prod-us-west-2-gpu
 - eks-prod-us-west-2-hpa
 - eks-prod-us-east-1-conformance
 - eks-prod-us-east-1-conformance-fast
 - eks-prod-us-east-1-gpu
 - eks-prod-us-east-1-hpa

EKS & Prow



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eu-west-1 launch

- 16 periodic jobs
 - eks-beta-conformance
 - eks-beta-conformance-fast
 - eks-beta-gpu
 - eks-beta-hpa
 - eks-prod-us-west-2-conformance
 - eks-prod-us-west-2-conformance-fast
 - eks-prod-us-west-2-gpu
 - eks-prod-us-west-2-hpa
 - eks-prod-us-east-1-conformance
 - eks-prod-us-east-1-conformance-fast
 - eks-prod-us-east-1-gpu
 - eks-prod-us-east-1-hpa
 - eks-prod-eu-west-1-conformance
 - eks-prod-eu-west-1-conformance-fast
 - ...

EKS & Prow



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Using helm to render config

- 4 periodic job templates
 - eks-{{stage}}-{{region}}-conformance
 - eks-{{stage}}-{{region}}-conformance-fast
 - eks-{{stage}}-{{region}}-gpu
 - eks-{{stage}}-{{region}}-hpa
- 2 stages
 - beta
 - prod
- 3 regions
 - us-east-1, us-west-2, eu-west-1

EKS & Prow



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us-east-2 launch

- 4 periodic job templates
 - eks-{{stage}}-{{region}}-conformance
 - eks-{{stage}}-{{region}}-conformance-fast
 - eks-{{stage}}-{{region}}-gpu
 - eks-{{stage}}-{{region}}-hpa
- 2 stages
 - beta
 - prod
- 4 regions
 - us-east-1, us-west-2, eu-west-1, us-east-2



More frequent fast jobs

- 4 periodic job templates
 - eks-{{stage}}-{{region}}-conformance
 - eks-{{stage}}-{{region}}-conformance-fast-{1,4}
 - eks-{{stage}}-{{region}}-gpu
 - eks-{{stage}}-{{region}}-hpa
- 2 stages
 - beta
 - prod
- 4 regions
 - us-east-1, us-west-2, eu-west-1, us-east-2

EKS & Prow



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- Allowing concurrent periodic cron jobs
- eks-{{stage}}-{{region}}-conformance-fast
- `- cron: @every 10m`
- Allow concurrent cron job execution:
<https://github.com/kubernetes/test-infra/pull/10183>



What's Next

- CodeCommit integration
- Integration with internal pipelines & code review systems?
- Leverage more of the test-infra components (spyglass, testgrid)

Prow & Other projects



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Amazon VPC CNI

- <https://github.com/aws/amazon-vpc-cni-k8s> (in progress)

Prow & Other projects



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AWS IAM Authenticator

- <https://github.com/kubernetes-sigs/aws-iam-authenticator>
(move build & tests from travis)

Prow & Other projects



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AWS EKS AMI

- <https://github.com/awslabs/amazon-eks-ami>

EKS Roadmap



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AWS Container Roadmap

- <https://github.com/AWS/containers-roadmap>

The screenshot shows the GitHub repository for the AWS Containers Roadmap. The page is organized into three columns of project cards:

- We're Working On It (10 items):**
 - EKS Control Plane Logs (#26)
 - EKS Kubernetes 1.12 (#24)
 - EKS IAM Roles for Pods (#23)
 - EKS PrivateLink Support (#22)
 - ECR CloudWatch events for push/delete image (#18)
 - ECR Image vulnerability scanning (#17)
 - ECS CloudWatch events for Services (#19)
- Coming Soon (15 items):**
 - New EKS region: Seoul (#37)
 - New EKS region: Tokyo (#36)
 - New EKS region: Singapore (#35)
 - New EKS region: Sydney (#34)
 - New EKS region: Frankfurt (#33)
 - EKS Kubernetes 1.11 (#29)
 - EKS CNI Plugin 1.3 (#25)
- Just Shipped (6 items):**
 - ECR Console v2 (#4)
 - Support for containers delivery method in AWS Marketplace (#14)
 - CodeDeploy Integration for ECS & Fargate (Blue/Green) (#5)
 - Tagging & Cost Allocation (#15)
 - EKS ALB ingress controller 1.0.0 (#16)
 - ECS integration with AWS Cloud Map (#6)

We're Hiring



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https://www.amazon.jobs/en/search?base_query=kubernetes&loc_query=

Thank You



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