

Develop and release kubectl who-can plugin

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Agenda

- kubectl plugins & krew
- Kubernetes RBAC
- kubectl who-can plugin
- Fake *Clientset & ReactionFunc
- testify mock.Mock
- In-process integration test
- Code coverage with codecov.io
- Release with GoReleaser

kubectl plugins & krew

```
zsh: command not found: kubectlc
dpacak@dpacak-imac:~/go/src/github.com/aquasecurity/kubectl-who-can
⇒ kubectl krew info who-can
NAME: who-can
URI: https://github.com/aquasecurity/kubectl-who-can/releases/download/v0.1.0-beta.2/kubectl-who-can_darwin_x86_64.tar.gz
SHA256: 40452e4bbe3d93ecb0ff100079cf5922cba7c65c06c0b2b3de9c73a11be4a2f7
VERSION: v0.1.0-beta.2
HOMEPAGE: https://github.com/aquasecurity/kubectl-who-can
DESCRIPTION:
Shows which subjects have RBAC permissions to VERB [TYPE | TYPE/NAME | NONRESOURCEURL]

VERB is a logical Kubernetes API verb like 'get', 'list', 'watch', 'delete', etc.
TYPE is a Kubernetes resource. Shortcuts and API groups will be resolved, e.g. 'po' or 'pod.metrics.k8s.io'.
NAME is the name of a particular Kubernetes resource.
NONRESOURCEURL is a partial URL that starts with "/".

For example, if you want to find all subjects who have permission to
delete pods in a particular namespace, or to delete nodes in the cluster
(dangerous!) you could run the following commands:

$ kubectl who-can delete pods --namespace foo
$ kubectl who-can delete nodes

CAVEATS:
 \
| The plugin requires the rights to list (Cluster)Role and (Cluster)RoleBindings.
|
| For usage or examples, run:
|
| $ kubectl who-can -h
/
dpacak@dpacak-imac:~/go/src/github.com/aquasecurity/kubectl-who-can|golang_warsaw_meetup⚡
```

Kubernetes RBAC

- Role-based access control is a method of regulating access to (K8S) resources through API server based on the roles assigned to subjects
- Can <subject> <verb> <resource> ?
- Can <subject> <verb> <resource> in <namespace> ?
- Can <Bob> <create> <deployments> in <myapp> namespace?

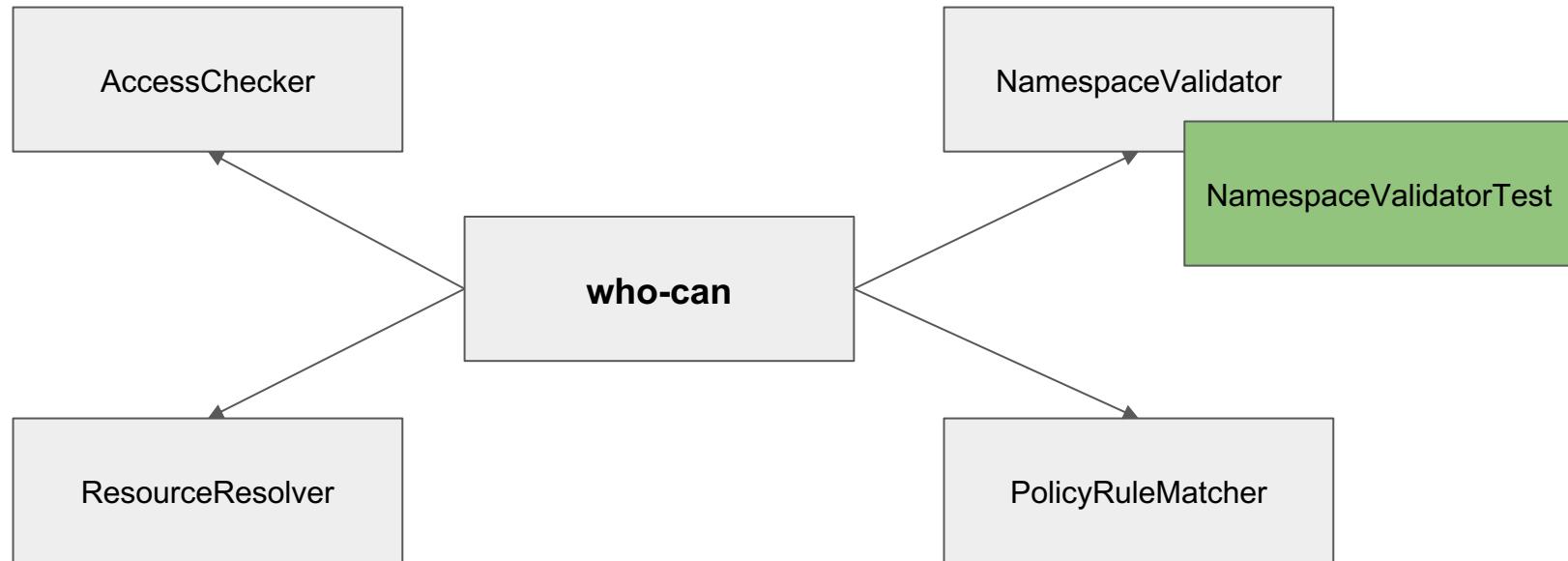
kubectl who-can plugin

```
dpacak@dpacak-imac: ~/go/src/github.com/aquasecurity/kubectl-who-can ⌂⌘$1
⇒ kubectl who-can delete pods -A
No subjects found with permissions to delete pods assigned through RoleBindings

CLUSTERROLEBINDING           SUBJECT          TYPE      SA-NAMESPACE
cluster-admin                 system:masters   Group
kubernetes-dashboard          kubernetes-dashboard   ServiceAccount  kubernetes-dashboard
minikube-rbac                 default          ServiceAccount  kube-system
system:controller:cronjob-controller cronjob-controller  ServiceAccount  kube-system
system:controller:daemon-set-controller daemon-set-controller  ServiceAccount  kube-system
system:controller:generic-garbage-collector generic-garbage-collector  ServiceAccount  kube-system
system:controller:job-controller job-controller    ServiceAccount  kube-system
system:controller:namespace-controller namespace-controller  ServiceAccount  kube-system
system:controller:node-controller node-controller    ServiceAccount  kube-system
system:controller:persistent-volume-binder persistent-volume-binder  ServiceAccount  kube-system
system:controller:pod-garbage-collector pod-garbage-collector  ServiceAccount  kube-system
system:controller:replicaset-controller replicaset-controller  ServiceAccount  kube-system
system:controller:replication-controller replication-controller  ServiceAccount  kube-system
system:controller:statefulset-controller statefulset-controller  ServiceAccount  kube-system
system:kube-scheduler           system:kube-scheduler User

dpacak@dpacak-imac:~/go/src/github.com/aquasecurity/kubectl-who-can lolang_warsaw_meetup⚡
⇒
```

kubectl who-can plugin architecture



NamespaceValidator

```
14  // Returns nil if it exists, an error otherwise.
15  type NamespaceValidator interface {
16      Validate(name string) error
17  }
18
19  type namespaceValidator struct {...}
20
21  // NewNamespaceValidator constructs the default NamespaceValidator.
22  func NewNamespaceValidator(client clientcore.NamespaceInterface) NamespaceValidator {...}
23
24  func (w *namespaceValidator) Validate(name string) error {
25      if name == core.NamespaceAll {
26          return nil
27      }
28
29      ns, err := w.client.Get(name, meta.GetOptions{})
30      if err != nil {
31          if statusErr, ok := err.(*errors.StatusError); ok &&
32              statusErr.Status().Reason == meta.StatusReasonNotFound {
33              return fmt.Errorf("%s not found", name)
34          }
35          return fmt.Errorf("getting namespace: %v", err)
36      }
37      if ns.Status.Phase != core.NamespaceActive {
38          return fmt.Errorf("invalid status: %v", ns.Status.Phase)
39      }
40      return nil
41 }
```

Fake *Clientset & ReactionFunc

```
100 ►  func TestLearningFakeClientset(t *testing.T) {
101     client := fake.NewSimpleClientset()
102     client.Fake.PrependReactor("get", "namespaces", func(action k8stesting.Action) (bool, runtime.Object, error) {
103         return true, &v1.Namespace{
104             Status: v1.NamespaceStatus{
105                 Phase: v1.NamespaceTerminating,
106             },
107         },
108     }, nil)
109 }
110
111     ns, err := client.CoreV1().Namespaces().Get(name: "default", metav1.GetOptions{})
112     require.NoError(t, err)
113     assert.Equal(t, &v1.Namespace{
114         Status: v1.NamespaceStatus{
115             Phase: v1.NamespaceTerminating,
116         },
117     }, ns)
118 }
```

testify mock.Mock

```
40 ► func TestLearningMocks(t *testing.T) {
41     validator := namespaceValidatorMock{}
42     validator.On("Validate", "default").Return(errors.New("not found"))
43
44     err := validator.Validate("default")
45     assert.NoError(t, err, "not found")
46
47     validator.AssertExpectations(t)
48 }
49
50 }
```

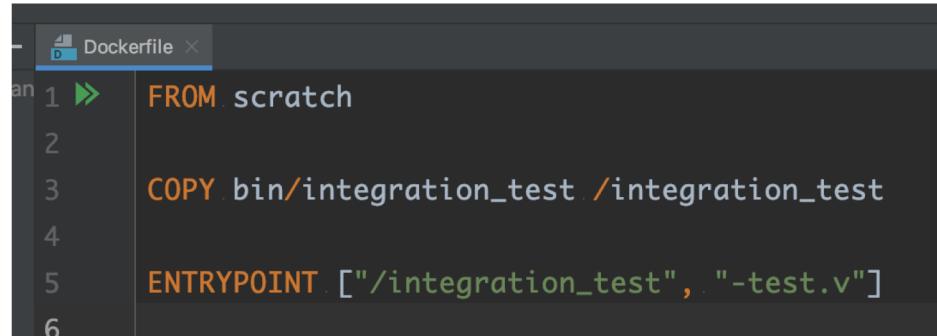
In-process integration test

```
22 ► func TestIntegration(t *testing.T) {
23   if testing.Short() {
24     t.Skip("Integration test")
25   }
26
27   // TODO Wait for KUBECONFIG <- Contributions welcomed :-)
28   time.Sleep(10 * time.Second)
29
30   config, err := clientcmd.BuildConfigFromFlags("", os.Getenv(key: "KUBECONFIG"))
31   require.NoError(t, err)
32
33   coreClient, err := client.NewForConfig(config)
34   require.NoError(t, err)
35
36   extClient, err := clientext.NewForConfig(config)
37   require.NoError(t, err)
38
39   createCRDs(t, extClient.CustomResourceDefinitions())
40   configureRBAC(t, coreClient)
41
42   testCases := []struct {
43     name  string
44     args  []string
45     output []string
46   }{
47     {
48       name: "Should print who can create configmaps",
49       args: []string{"create", "cm"},
50       output: []string{...},
51     },
52   }
53 }
```

```
can 1   version: '3'
2 ► services:
3 ►   kube:
4     network_mode: host
5     image: rancher/k3s:v0.5.0
6     command: server --disable-agent
7     ports:
8       - 6443:6443
9     environment:
10    - K3S_CLUSTER_SECRET=somethingtotallyrandom
11    - K3S_KUBECONFIG_OUTPUT=/output/kubeconfig.yaml
12    - K3S_KUBECONFIG_MODE=666
13     volumes:
14       - kube-data:/var/lib/rancher/k3s
15       - kube-data:/tmp
16       - shared-data:/output
17 ►   test:
18     network_mode: host
19     build: .
20     environment:
21       - KUBECONFIG=/output/kubeconfig.yaml
22     volumes:
23       - shared-data:/output
24     depends_on:
25       - kube
26     volumes: kube-data, shared-data
27
28
29
```

In-process integration test

```
12 integration-tests: $(SOURCES)
13 └─▶ GODEBUG=modlist GOOS=linux CGO_ENABLED=0 go test -v -c -o test/bin/integration_test test/integration_test.go
14 └─▶ @docker-compose -f test/docker-compose.yaml build --no-cache --force-rm
15 └─▶ @docker-compose -f test/docker-compose.yaml up --abort-on-container-exit --exit-code-from test
16
```



A screenshot of a code editor showing a Dockerfile. The file contains the following code:

```
1 FROM scratch
2
3 COPY bin/integration_test ./integration_test
4
5 ENTRYPOINT ["/integration_test", "-test.v"]
```

Code coverage with [codecov.io](#)

Showing min per day coverage for the last 6 months

COVERAGE CHART

Line Coverage

100%

80%

60%

40%

20%

0%

COVERAGE SUNBURST

ALL RECENT COMMITS

- gpjacobs** 2 days ago `#50` `eca2c9a` CI Passed
Adding links, help, and fixing typo in Readme.md [Browse Report](#)
- raghavdhingra** 5 days ago `#49` `ef71c2d` CI Passed
Update README.md [Browse Report](#)
- imnotjames** 5 days ago `master` `e4f3e53` CI Passed
add some improved usage documentation (#45) [Browse Report](#)

tests: \$(SOURCES)

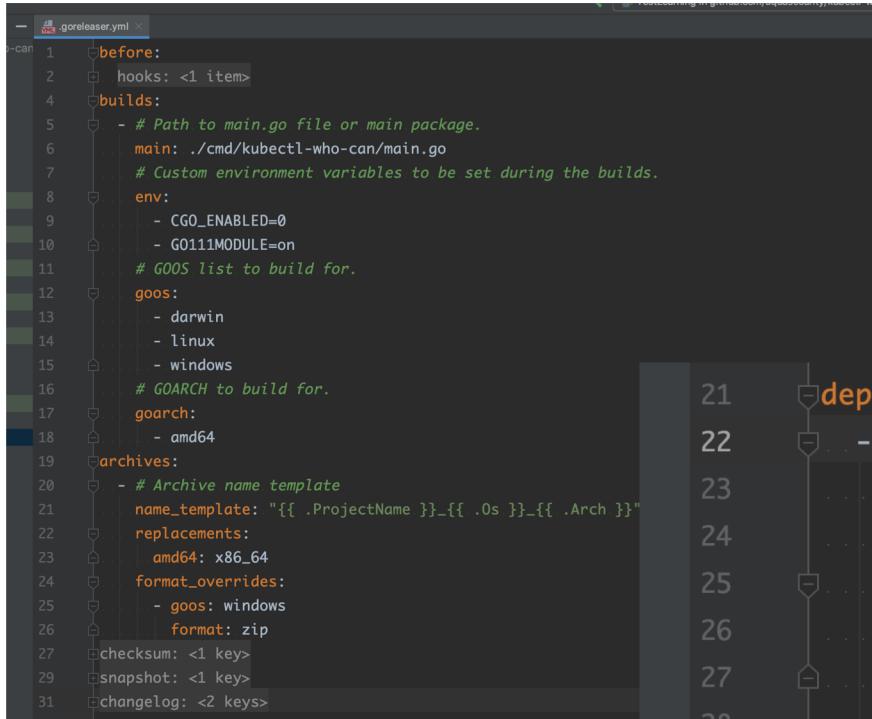
→ G0111MODULE=on go test -v -short -race -timeout 30s -coverprofile=coverage.txt -covermode=atomic ./...

chore: ignore directory cache files (#446)
sidhyatikku 7 days ago `master` `fcb03d4` CI Passed [Browse Report](#)

/

View all recent commits

Releases with GoReleaser



```
1 before:
2   hooks: <1 item>
3 builds:
4   - # Path to main.go file or main package.
5     main: ./cmd/kubectl-who-can/main.go
6     # Custom environment variables to be set during the builds.
7     env:
8       - CGO_ENABLED=0
9       - GO111MODULE=on
10      # GOOS list to build for.
11      goos:
12        - darwin
13        - linux
14        - windows
15      # GOARCH to build for.
16      goarch:
17        - amd64
18      archives:
19        - # Archive name template
20        name_template: "{{ .ProjectName }}_{{ .Os }}_{{ .Arch }}"
21      replacements:
22        amd64: x86_64
23      format_overrides:
24        - goos: windows
25        format: zip
26      checksum: <1 key>
27      snapshot: <1 key>
28      changelog: <2 keys>
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```

Updating krew-index

Branch: master ▾ krew-index / plugins / who-can.yaml

Find file Copy path

 danielpacak chore: Bump up who-can to v0.1.0-beta.2 (#211) 7a5060f on 21 Aug

1 contributor

61 lines (55 sloc) | 2.25 KB

Raw Blame History

```
1 apiVersion: krew.googlecontainertools.github.com/v1alpha2
2 kind: Plugin
3 metadata:
4   name: who-can
5 spec:
6   version: "v0.1.0-beta.2"
7   homepage: https://github.com/aquasecurity/kubectl-who-can
8   shortDescription: |
9     Shows who has RBAC permissions to access Kubernetes resources
10  description: |+2
11    Shows which subjects have RBAC permissions to VERB [TYPE | TYPE/NAME | NONRESOURCEURL]
12
13    VERB is a logical Kubernetes API verb like 'get', 'list', 'watch', 'delete', etc.
14    TYPE is a Kubernetes resource. Shortcuts and API groups will be resolved, e.g. 'po' or 'pod.metrics.k8s.io'.
15    NAME is the name of a particular Kubernetes resource.
16    NONRESOURCEURL is a partial URL that starts with "/".
17
18    For example, if you want to find all subjects who have permission to
19    delete pods in a particular namespace, or to delete nodes in the cluster
20    (dangerous!) you could run the following commands:
21
22    $ kubectl who-can delete pods --namespace foo
23    $ kubectl who-can delete nodes
24  caveats: |
25    The plugin requires the rights to list (Cluster)Role and (Cluster)RoleBindings.
```

Thank you!

<https://github.com/aquasecurity/kubectl-who-can>