State of the UI: Leveraging Kubernetes Dashboard and Shaping its Future

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Talk Goals

1. What Dashboard is and why you should be using it

2. Research findings and the future of Dashboard

3. Where to learn more and how to get involved
About Kubernetes Dashboard
Overview

Workloads

Workloads Statuses

Deployments

- my-app
  - Labels: app: my-app
  - Pods: 1 / 1
  - Age: 5 months
  - Images: nginx

- kubernetes-dashboard
  - Labels: k8s-app: kubernetes-dashboard
  - Pods: 1 / 1
  - Age: 6 months
  - Images: kubernetes-dashboard:dev/kubernetes

- oss-ui
  - Labels: app: oss-ui
  - Pods: 1 / 1
  - Age: 6 months
  - Images: kubernetes-dashboard:dev/kubernetes

Pods

- Name
- Node
- Status
- Restarts
- Age
- CPU (cores)
- Memory (bytes)
Dashboard 1.0 launched in 2016
<table>
<thead>
<tr>
<th>Branch</th>
<th>Latest commit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>master</td>
<td>2 days ago</td>
<td>Fix typos (#3269)</td>
</tr>
<tr>
<td>build</td>
<td>6 days ago</td>
<td>Update docs and add macieczszczek to sig-ul-leads (#3269)</td>
</tr>
<tr>
<td>reuse</td>
<td>9 days ago</td>
<td>Change typos (#3269)</td>
</tr>
<tr>
<td>hooks</td>
<td>1 year ago</td>
<td>Replace gofmt code formatting tool with golangfmt (#32712)</td>
</tr>
<tr>
<td>fix</td>
<td>2 months ago</td>
<td>Update Korean translation for pod (#9156)</td>
</tr>
<tr>
<td>sro</td>
<td>2 days ago</td>
<td>Fix typos (#3269)</td>
</tr>
<tr>
<td>vendor</td>
<td>2 months ago</td>
<td>chore: update go dependencies (#9157)</td>
</tr>
<tr>
<td>.hlintc</td>
<td>6 months ago</td>
<td>Fix: namespace param should be checked in onEnter hook (#9275)</td>
</tr>
<tr>
<td>clang-format</td>
<td>3 years ago</td>
<td>Enforce clang-formatting on all .c files</td>
</tr>
<tr>
<td>dockerignore</td>
<td>11 months ago</td>
<td>Introduce global settings (#92532)</td>
</tr>
<tr>
<td>editorconfig</td>
<td>10 months ago</td>
<td>Add editorconfig file (#92728)</td>
</tr>
<tr>
<td>aslint</td>
<td>8 months ago</td>
<td>Update aslint (#9321)</td>
</tr>
<tr>
<td>.gitignore</td>
<td>a year ago</td>
<td>Fix high cpu usage (#9429)</td>
</tr>
<tr>
<td>.sass-intl.yml</td>
<td>2 years ago</td>
<td>Left nav progress version 2 (#9741)</td>
</tr>
<tr>
<td>travcyml</td>
<td>11 months ago</td>
<td>Fix master build (#95734)</td>
</tr>
<tr>
<td>Goog-lc</td>
<td>2 months ago</td>
<td>chore: update go dependencies (#9157)</td>
</tr>
<tr>
<td>Goog-toml</td>
<td>2 months ago</td>
<td>chore: update go dependencies (#9157)</td>
</tr>
</tbody>
</table>
SIG-UI Team

Piotr Bryk, Google
Peng Xiao, Alauda
Sebastian Florek (co-lead), Loodse
Jeffrey Sica, University of Michigan
Jim Angel, General Motors
Marcin Maciaszczyk, Loodse
Why a UI?
60% of survey takers use a UI to monitor or manage their resources in Kubernetes

https://github.com/kubernetes/dashboard/issues/3256#issuecomment-437199403
UIs help you understand what’s going on with your cluster, fast.

<table>
<thead>
<tr>
<th>Name</th>
<th>Node</th>
<th>Status</th>
<th>Restarts</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>test-app-7b694cf576-npsqj</td>
<td>docker-for-desktop</td>
<td>Running</td>
<td>0</td>
<td>4 days</td>
</tr>
<tr>
<td>test-app-7b694cf576-7qdrj</td>
<td>docker-for-desktop</td>
<td>Running</td>
<td>0</td>
<td>4 days</td>
</tr>
<tr>
<td>test-app-7b694cf576-hhg9f</td>
<td>docker-for-desktop</td>
<td>Waiting: ErrImagePull</td>
<td>0</td>
<td>4 days</td>
</tr>
<tr>
<td>dromlein-app-5f5d97d86b-hmht</td>
<td>docker-for-desktop</td>
<td>Running</td>
<td>0</td>
<td>4 days</td>
</tr>
<tr>
<td>dromlein-app-5f5d97d86b-nsvcq</td>
<td>docker-for-desktop</td>
<td>Running</td>
<td>0</td>
<td>4 days</td>
</tr>
<tr>
<td>dromlein-app-5f5d97d86b-qb2h9</td>
<td>docker-for-desktop</td>
<td>Running</td>
<td>0</td>
<td>4 days</td>
</tr>
<tr>
<td>dromlein-app-5f5d97d86b-8t2sr</td>
<td>docker-for-desktop</td>
<td>Running</td>
<td>0</td>
<td>4 days</td>
</tr>
</tbody>
</table>
NAME | LABELS | STATUS
--- | --- | ---
gke-n3c8-7d9f8163-node-dol5 | kubernetes.io/hostname=gke-n3c8-7d9f8163-node-dol5,node=1 | Ready
gke-n3c8-7d9f8163-node-hmbh | kubernetes.io/hostname=gke-n3c8-7d9f8163-node-hmbh,node=2 | Ready
gke-n3c8-7d9f8163-node-kdc4 | kubernetes.io/hostname=gke-n3c8-7d9f8163-node-kdc4,node=2 | Ready

$ cat rc.yaml
apiVersion: v1
kind: ReplicationController
metadata:
  name: nginx
spec:
  replicas: 8
  selector:
    app: nginx
template:
  metadata:
    labels:
      app: nginx
  spec:
    nodeSelector:
      node: "1"
    containers:
      - name: nginx
        image: nginx

$ kubectl get pod -o wide
NAME  READY  STATUS  RESTARTS  AGE  NODE
nginx-8ondm  1/1  Running  0  10m  gke-n3c8-7d9f8163-node-dol5
nginx-gyjd9  1/1  Running  0  10m  gke-n3c8-7d9f8163-node-dol5
nginx-nc4ys  1/1  Running  0  10m  gke-n3c8-7d9f8163-node-dol5
nginx-nwqlk  1/1  Running  0  10m  gke-n3c8-7d9f8163-node-dol5
nginx-tvnmj  1/1  Running  0  10m  gke-n3c8-7d9f8163-node-dol5
nginx-vjfiw  1/1  Running  0  10m  gke-n3c8-7d9f8163-node-dol5
nginx-x3h2i  1/1  Running  0  10m  gke-n3c8-7d9f8163-node-dol5
nginx-y59wf  1/1  Running  0  10m  gke-n3c8-7d9f8163-node-dol5

$
Dashboard Strengths:
- Providing an overview
- Monitoring & troubleshooting
- Sharing with non-technical stakeholders
- Infrequent tasks
- Onboarding new K8s users / learning

Kubectl Strengths:
- In-Terminal workflows
- Frequently-repeated tasks
- Scripting & automation
- Sharing workflows / reproducibility
- Customization
Onboarding new K8s users
Q12 - How useful is the Kubernetes Dashboard for learning Kubernetes?
Over 50% of survey takers said that Dashboard is very useful or extremely useful for learning Kubernetes.

https://github.com/kubernetes/dashboard/issues/3256#issuecomment-437199403
“At the start it was great to be able to visually see the resources and understand how they are grouped. This helped someone like me with a hands-on but visual learning style.”

→ Survey response
→ Developer, running Kubernetes in AWS, Azure, and on-prem
Dashboard as a K8s learning tool

Details
- Name: test-app-7b694cf576
- Namespace: default
- Labels: k8s-app: test-app, pod-template-hash: 3625079132
- Annotations: deployment.kubernetes.io/desired-replicas: 3, deployment.kubernetes.io/max-replicas: 4

Creation Time: 2018-10-25T19:54 UTC
- Selector: k8s-app: test-app, pod-template-hash: 3625079132
- Images: nginx

Pods
- Name: test-app-7b694cf576-7qdrj, Node: docker-for-desktop, Status: Running, Restarts: 0, Age: 2 minutes
- Name: test-app-7b694cf576-hhy9f, Node: docker-for-desktop, Status: Running, Restarts: 0, Age: 2 minutes
- Name: test-app-7b694cf576-rpsqj, Node: docker-for-desktop, Status: Running, Restarts: 0, Age: 2 minutes

Services
- Name: test-app, Labels: k8s-app: test-app, Cluster IP: 10.99.83.3
  - Internal endpoints: test-app:80 TCP
  - External endpoints: test-app:31385 TCP, Age: 2 minutes
Create, read, update, delete resources.
Recent and upcoming features
Features since 2016 KubeCon update

- Exec into pod
- Global search
- Login mechanism
- Settings page
- Support for Cron Jobs
- Redesigned resource creation
- ...and much much more.

[github.com/kubernetes/dashboard/releases](https://github.com/kubernetes/dashboard/releases)
In-progress work

- Migrating from ng1 to ng2 (#3152)
- Migrating metrics from Heapster to Kubernetes Metrics API (#2986)
- Apps list page (#2980)
K8s Store

Search:  
Entire Site  
Find

Categories
- Men
- Woman
- Children
- Hot Deals

Cost
- Min
- Max

Size
- Small
- Medium
- Large
- Large-X

All items

- Trucker hat $30
  - Add to Cart
  - Compare Item

- Track jacket $100
  - Add to Cart
  - Compare Item

- Water bottle $25
  - Add to Cart
  - Compare Item

- Moleskine $30
  - Add to Cart
  - Compare Item

- Tote bag $15
  - Add to Cart
  - Compare Item

- Coffee mug $20
  - Add to Cart
  - Compare Item

Compare items by selecting the appropriate checkbox. When you are finished, click here.

Skip to Page 1 2 3 4 5 6 7 8

Items 1 - 9 of 67 Total

Ordering Help:  
- Track Your Orders
- Purchasing About Your Order

Shipping & Returns Help:  
- Shipping Costs & Times
- Our Return Policy

Store Help:  
- Find a Store

Still Have Questions?  
- Online Customer Service
- Product Recall Info

Security & Privacy | Sign Up for More Values | Terms of Use
K8s Store

Categories
- Men
- Women
- Children
- Hot Deals

Price Filter
- $1 to $1000

Sizes
- Small
- Medium
- Large
- X Large

- Trucker hat
  - $30

- Track jacket
  - $100

- Water bottle
  - $25

- Moleskine
  - $30

- Tote bag
  - $15

- Coffee mug
  - $20
Demo
Future of Dashboard
How do people use Dashboard today, and want to use it tomorrow?
How would you rate your knowledge of Kubernetes?

163 Responses

https://github.com/kubernetes/dashboard/issues/3256#issuecomment-437199403
Top requested changes

1. Third-party plugins or integrations
   集成第三方插件

2. Feature parity with kubectl
   功能与kubectl保持一致

3. Multi-cluster management
   多集群管理

4. Improved security
   提高安全性
1. Third-party plugins or integrations
集成第三方插件

Which **third-party plugins or integrations** would you like to see supported in the Kubernetes Dashboard?

https://github.com/kubernetes/dashboard/issues/3256#issuecomment-437199403
“Extensibility, modularity, API for libraries to integrate with Dashboard ... it should follow philosophy of K8s, and should be [the foundation] on which we can build our custom command center.”

→ Survey response
→ Cluster Operator, running Kubernetes on-prem and in the cloud
2. Feature parity with kubectl
3. Multi-cluster management

Most survey takers said that it is very or extremely important to see resources from multiple clusters in one place.

https://github.com/kubernetes/dashboard/issues/3256#issuecomment-437199403
“During the week of June 1st, 2018, [researchers] discovered more than 21,000 publicly facing container orchestration platforms. ... Kubernetes represented more than 78% of all open IP's.”

→ Lacework: Container Security Research
4. Improved security

Securely running Dashboard is possible!

bit.ly/securing-dashboard
“We operate a cluster with multiple end-user groups. Many of them would find the Dashboard extremely useful, but if we could ... have them [log in] with the same creds used to log into the cluster to only see their resources, that would be a huge win.”

→ Survey response
→ Cluster Operator, running Kubernetes in GCP and on-prem
### Additional feature requests

- Custom Resource Definitions support
- Service topology view
- Mobile device support
- Cost estimates
- CI/CD pipelines
- ...and more!
Get involved
Try out Dashboard

github.com/kubernetes/dashboard

github.com/kubernetes/minikube
Connect with us

#sig-ui

@danielromlein

github.com/kubernetes/community/tree/master/sig-ui
Thank you!