Exploring our user-base challenges: Getting insight from StackOverflow

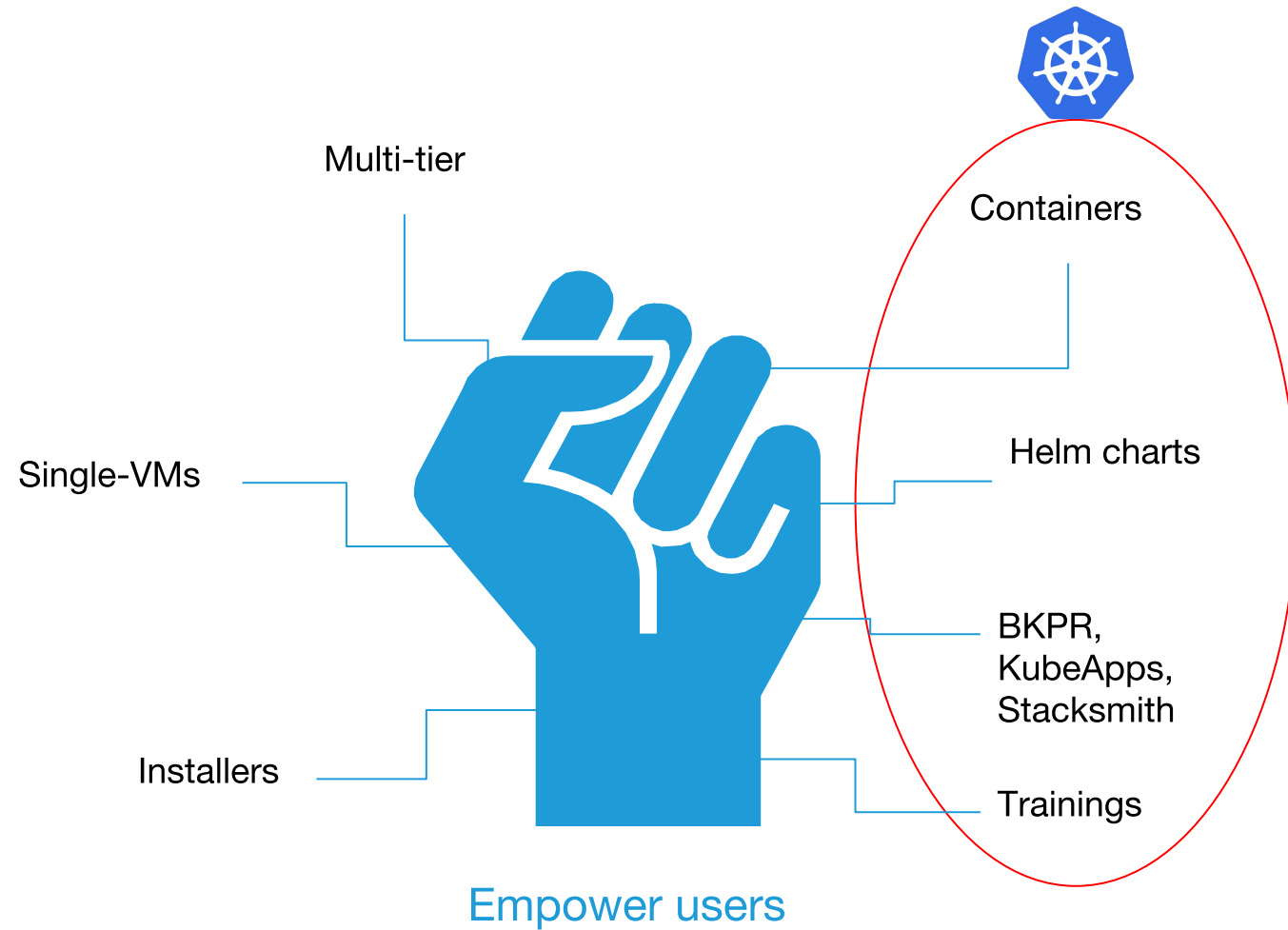KubeCon | CloudNativeCon

Europe 2018

bitnami

What do we want?

Bitnami core value

Multi-tier

Single-VMs

Installers

Containers

Helm charts

BKPR,
KubeApps,
Stacksmith

Trainings

Empower users

How?

We have a plan! (I)

The golden rule:

Listen to what users have to say

For Kubernetes, we want to find out

- What do people struggle with the most?

- How do people use Kubernetes?

- What applications they normally use?

Most importantly: What can we do to improve the overall user experience

Where?

We have a plan! (II)

StackOverflow: The essential Q&A for developers

- Almost 10 million visits per day

- 7000 questions per day about different topics

- Wide variety of profiles:

  - Frontend, backend, full-stack developers
  - DevOps
  - System Administrators
  - Students
  - ...

Invaluable information to extract!
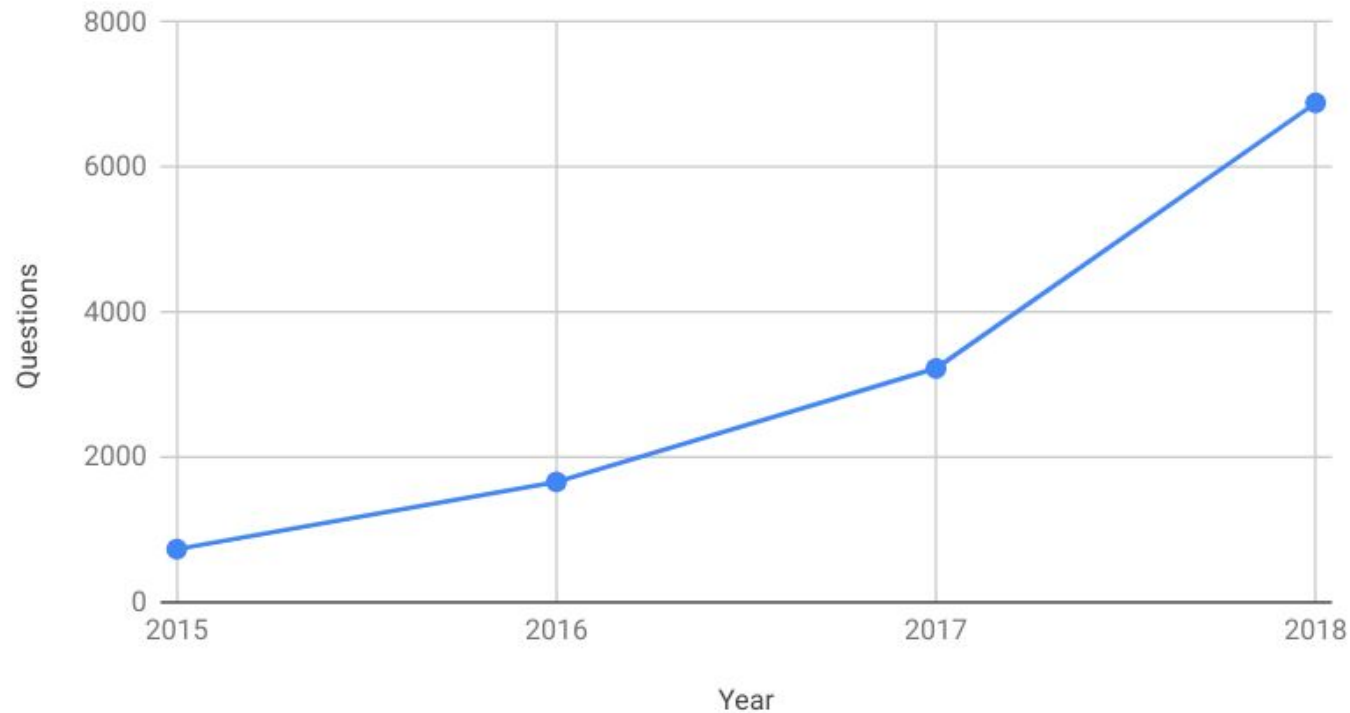
We have a plan! (III)

2018 in review

- Analyzed around 1000 questions created in 2018

- Selected those with more views

- Attempted to extract

  - Type of issue

  - Cause of the issue

  - Platform they were using

  - Application they were deploying (if applicable)

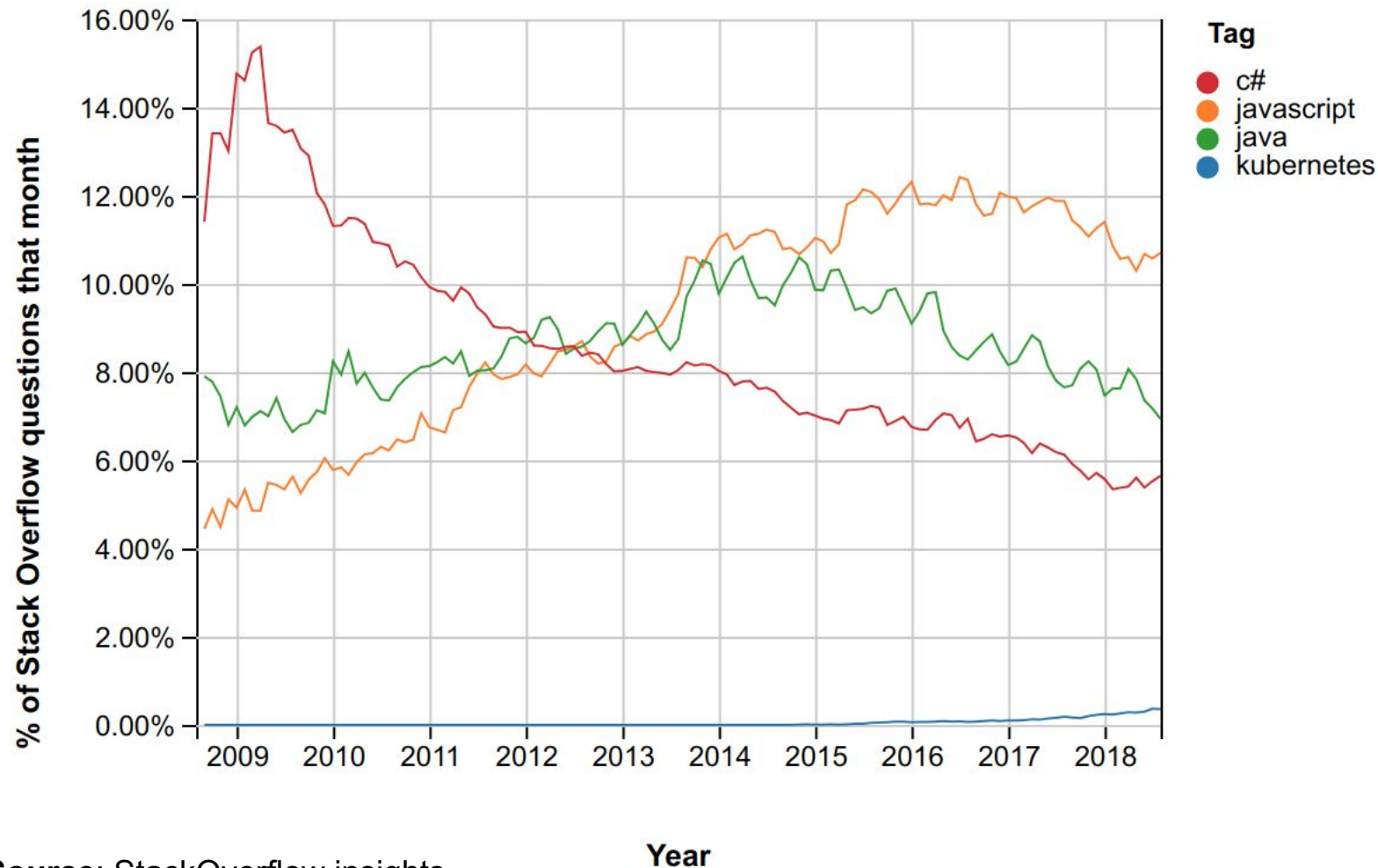# Question 1: How relevant is Kubernetes becoming?

Number of Kubernetes Questions per Year

- Kubernetes questions doubles every year

- New use cases, user experience issues and concepts not fully understood

Question 1: How relevant is Kubernetes becoming? (II)

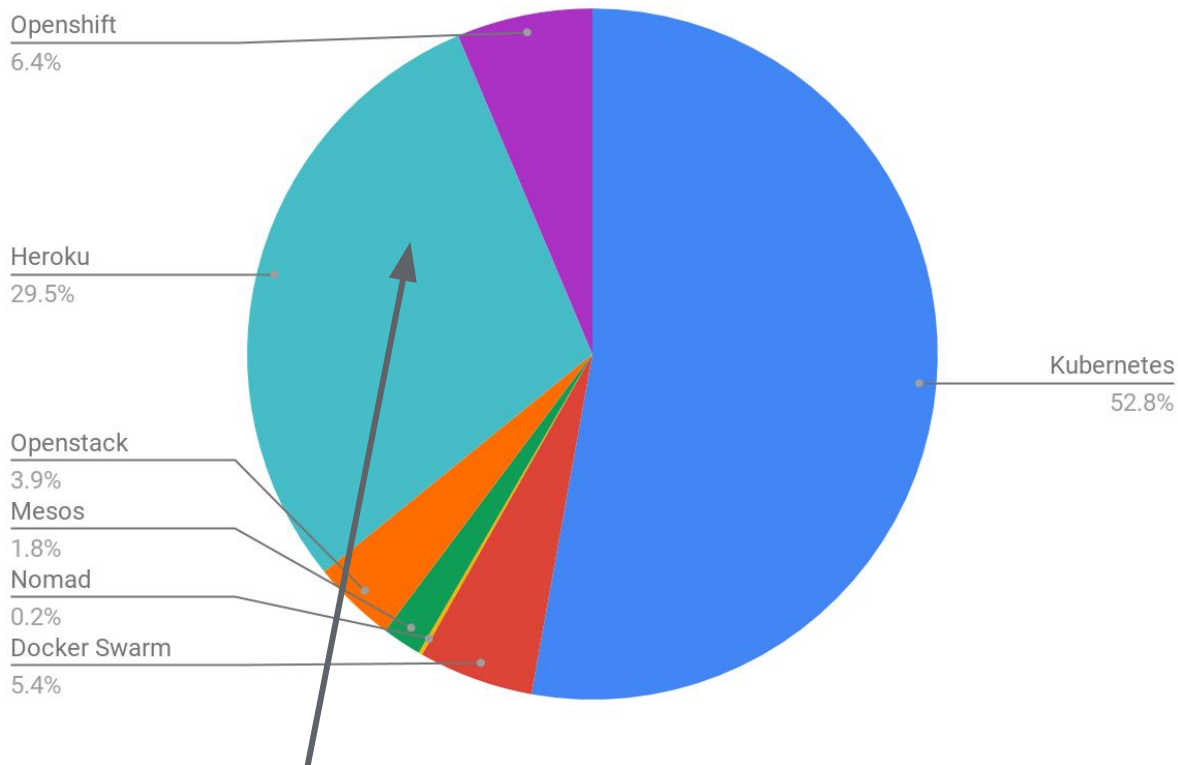- How does it compare to the top categories in StackOverflow?
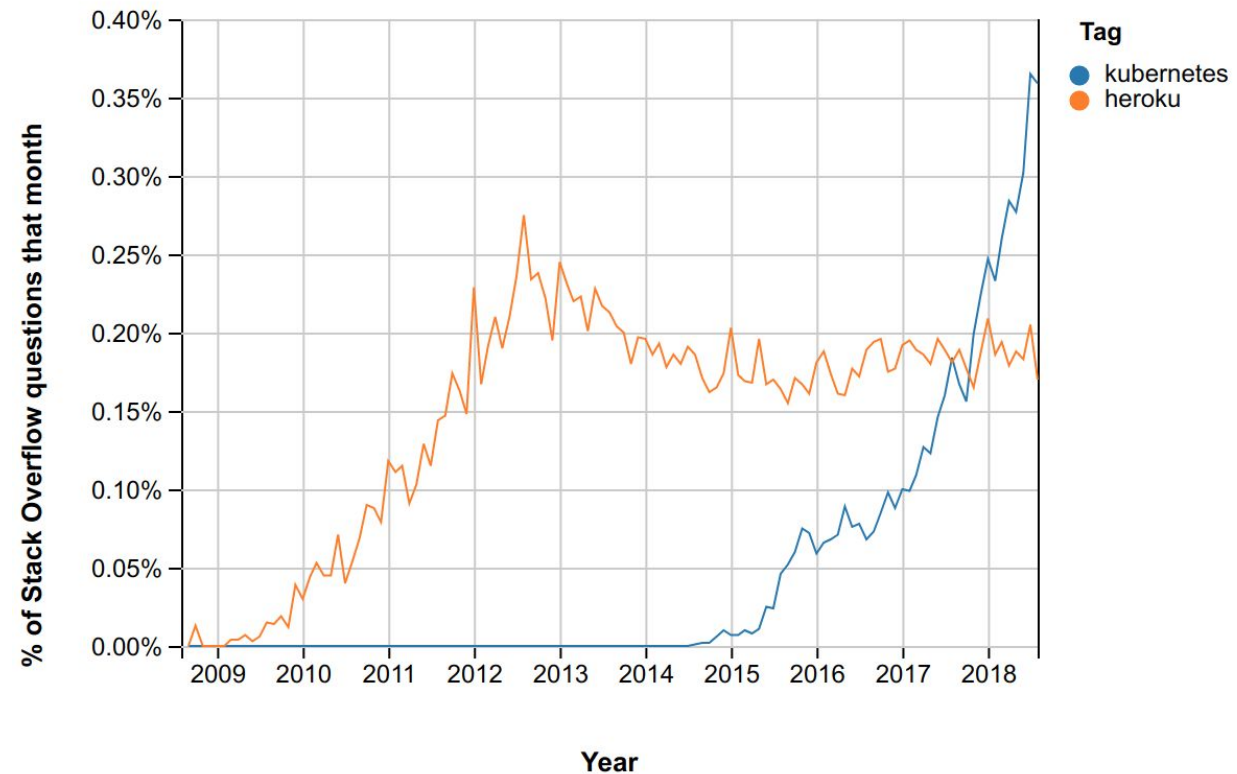

Source: StackOverflow insights

Question 1: How relevant is Kubernetes becoming? (III)

- How does it compare to other application "orchestration" solutions?
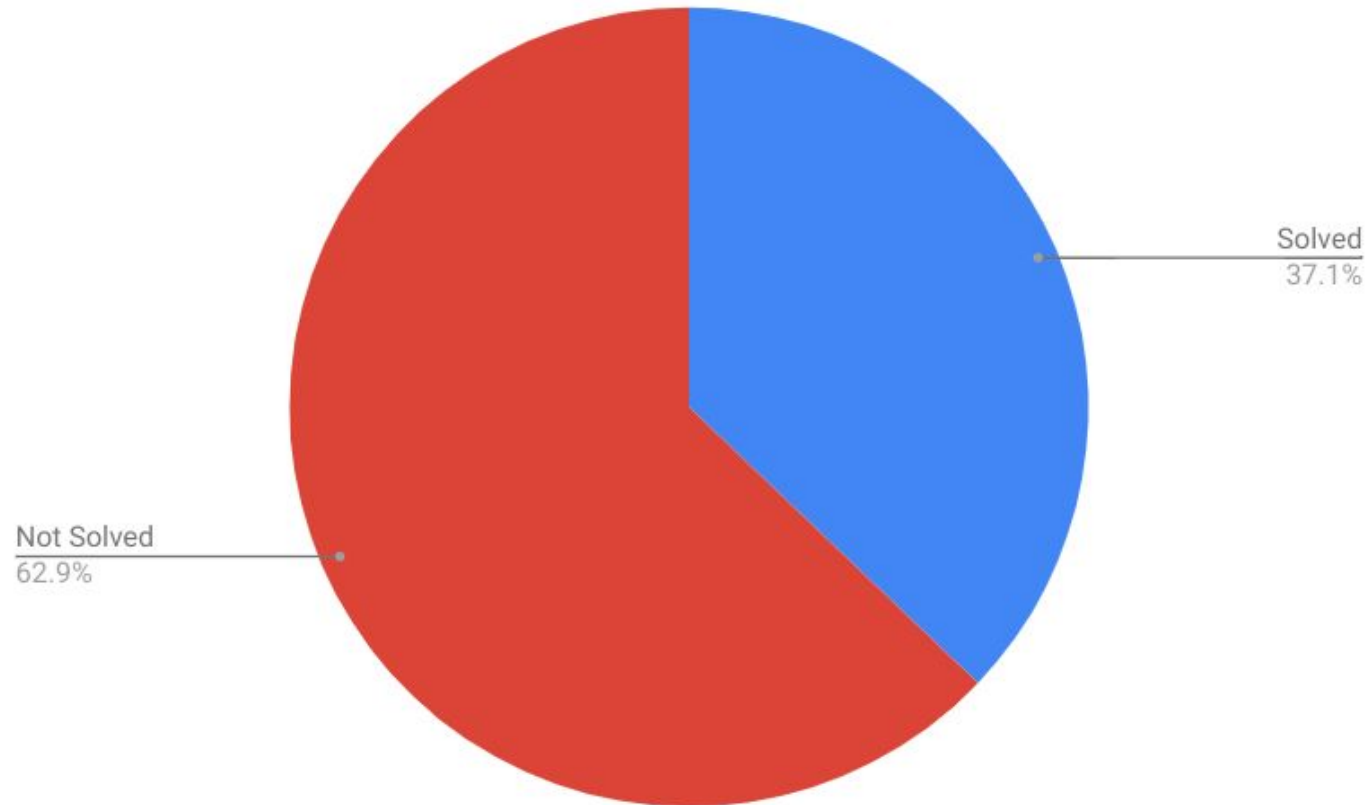
Percentage of questions in 2018

Openshift
6.4%

Heroku
29.5%

Openstack
3.9%

Mesos
1.8%

Nomad
0.2%

Docker Swarm
5.4%

Kubernetes
52.8%

Heroku still has a fair share

Question 1: How relevant is Kubernetes becoming? (IV)

● Are users finding solutions to their issues?

Solved
37.1%

Not Solved
62.9%

Question 2: Which kind of questions users have?

Two profiles: Kubernetes Application Developer and Kubernetes Administrator

- Kubernetes Application Developer (CKAD) -   Can design, build, configure, and expose cloud native applications for Kubernetes ([Source](#)):

  - Deployments, Service, Persistent Volumes, Ingress rules, Secrets, ConfigMaps, StatefulSets

  - Pod Patterns

  - Upgrades

  - Kubernetes API usage

  - Deployment troubleshooting

  - Container development

  - ...

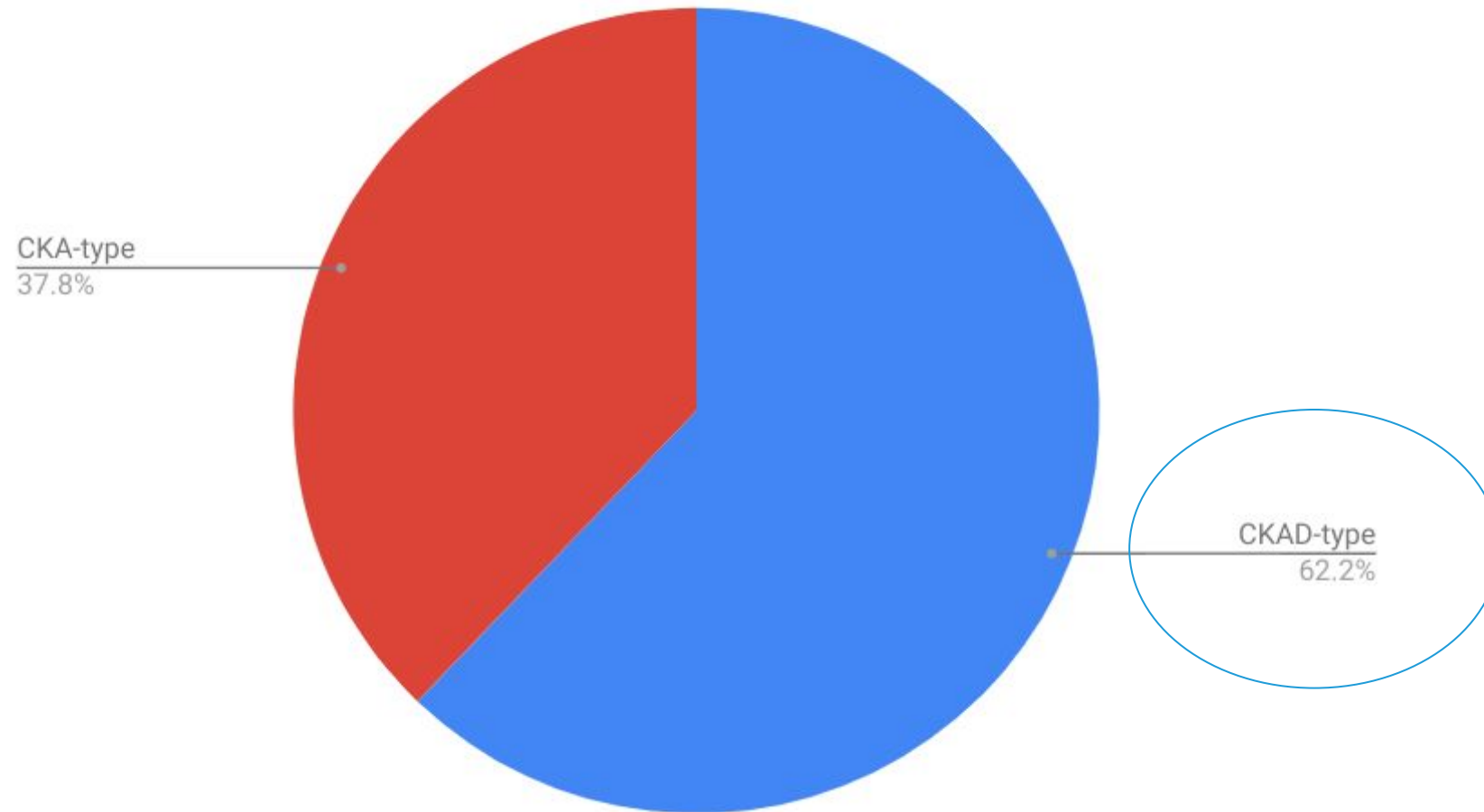# Question 2: Which kind of questions users have?

Two profiles: Kubernetes Application Developer and Kubernetes Administrator

- Kubernetes Administrator (CKA) - Can build, administer, monitor, secure and maintain Kubernetes clusters:

  - Cluster creation

  - Scheduling

  - Logging/Monitoring

  - Cluster maintenance and upgrade

  - RBAC and authorization

  - Cluster controllers and backends

  - ...

Question 2: Which kind of questions users have?
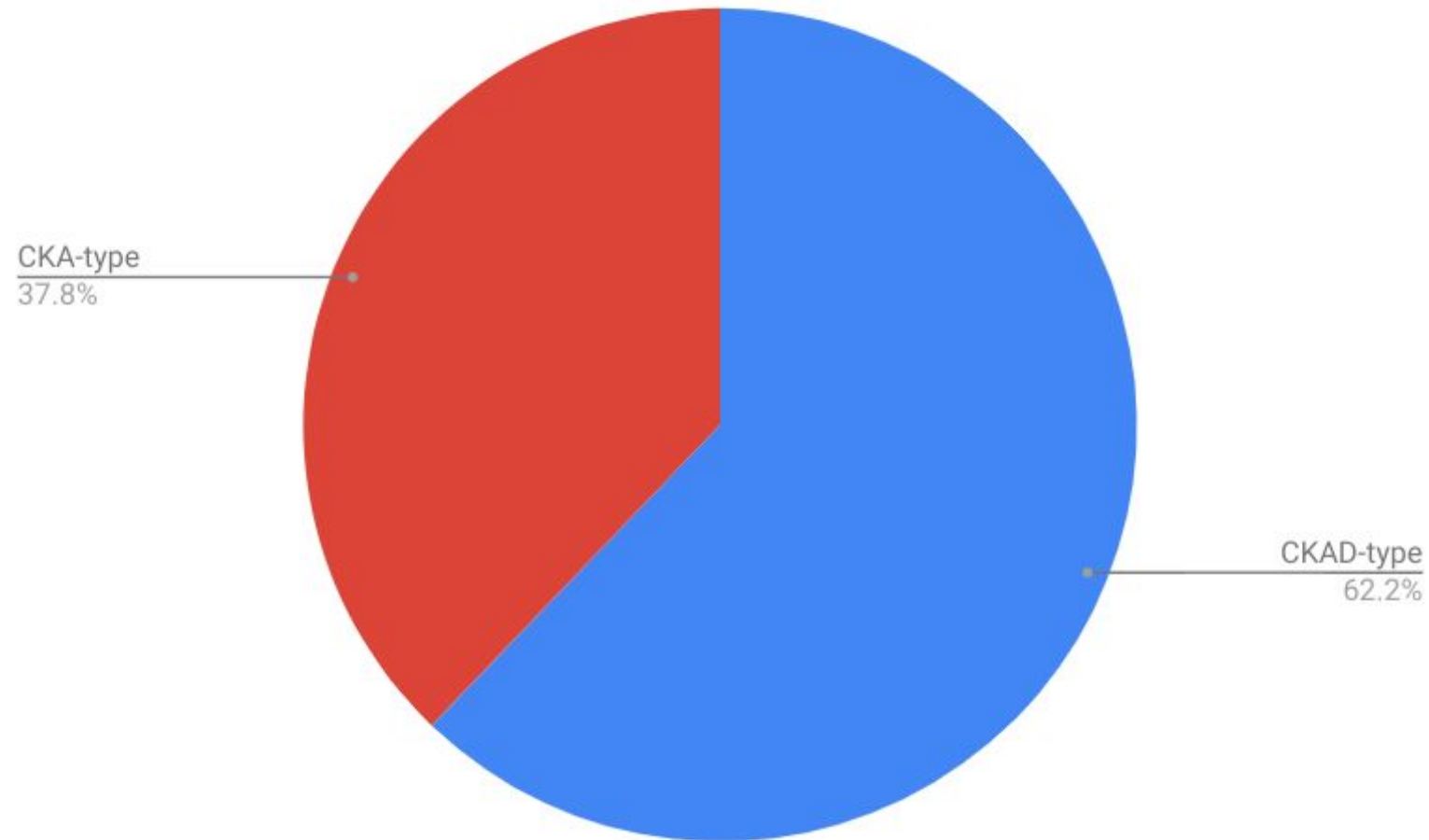
CKA-type
37.8%

CKAD-type
62.2%

Question 2: Which kind of questions users have?

CKA-type
37.8%

CKAD-type
62.2%

Question 3: Which kind of questions users have? (CKAD)

Four main categories:

- Deployment creation

  - Issues creating Pods, Deployments, StatefulSets

  - Upgrade issues

  - How to use environment variables

  - Liveness/Readiness Checks

  - Concept issues: How pods work?

  - Cron Jobs

  - Container registries

Highlights:

Upgrades in StatefulSets

Pod Dependency

Private registries

Question 3: Which kind of questions users have? (CKAD)

Four main categories:

- Communication: mainly Services and Ingress

  - Services not working

  - LoadBalancer issues

  - Advanced Ingress operations (i.e. url rewriting)

  - HTTPS

  - Cloud Provider issues

  - Headless Services

Highlights:

[HTTPS issues](#)

[Incorrect selectors](#)

[Non-HTTP traffic](#)

Question 3: Which kind of questions users have? (CKAD)

Four main categories:

- Persistence: Adding external data to the deployment (Volumes, ConfigMaps and Secrets)

  - Volume creation issues (esp. cloud providers)

  - Mount issues

  - Permission issues

  - How to debug errors

  - Concept issues (e.g. PV vs PVC)

Highlights:

How to debug mounting errors

Update ConfigMaps/Secrets

Question 3: Which kind of questions users have? (CKAD)

Four main categories:

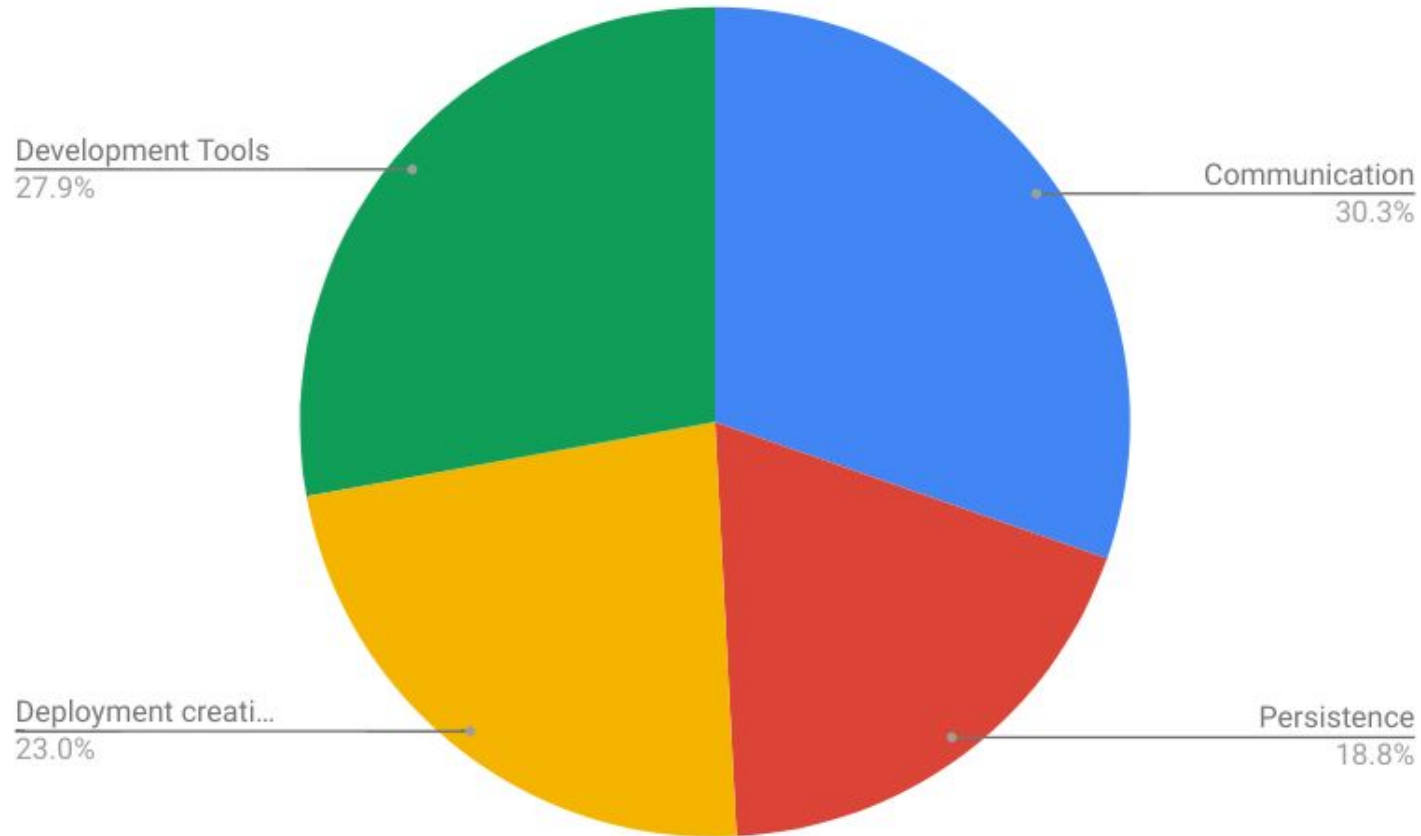- Development Tools: Tools to create containers or deployments

  - Helm usage and issues

  - CI/CD integration

  - Container good practices

Highlights:

How to design helm charts

Jenkins CI/CD
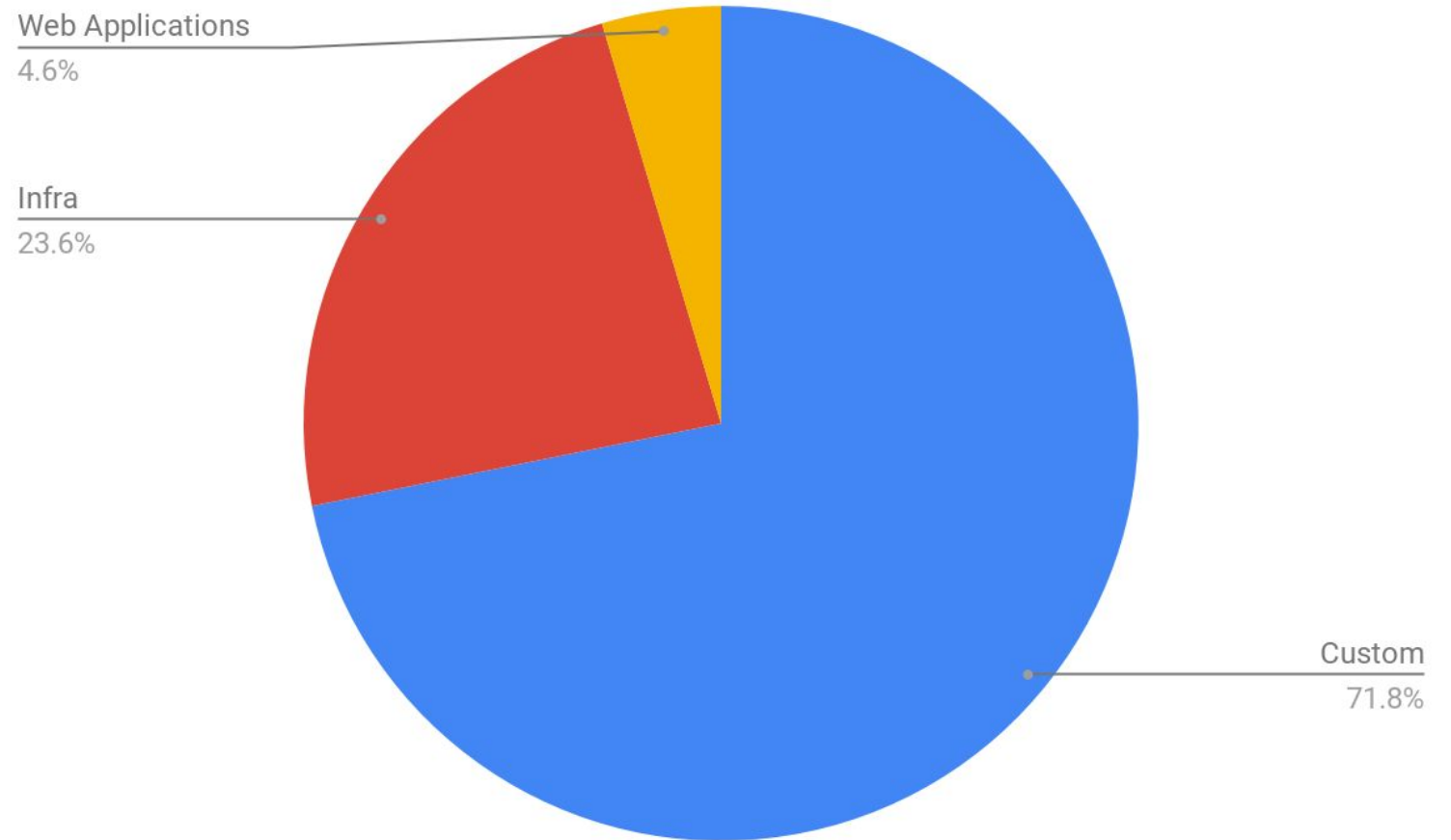
Question 3: Which kind of questions users have? (CKAD)

Development Tools
27.9%

Communication
30.3%

Deployment creati...
23.0%

Persistence
18.8%

Question 4: Which applications are commonly deployed?

3 Groups:

- Custom Applications

- Infrastructure applications (3rd party)

- Web applications (3rd party)

Web Applications
4.6%

Infra
23.6%

Custom
71.8%

Question 4: Which applications are commonly deployed?

Infrastructure: Top 10

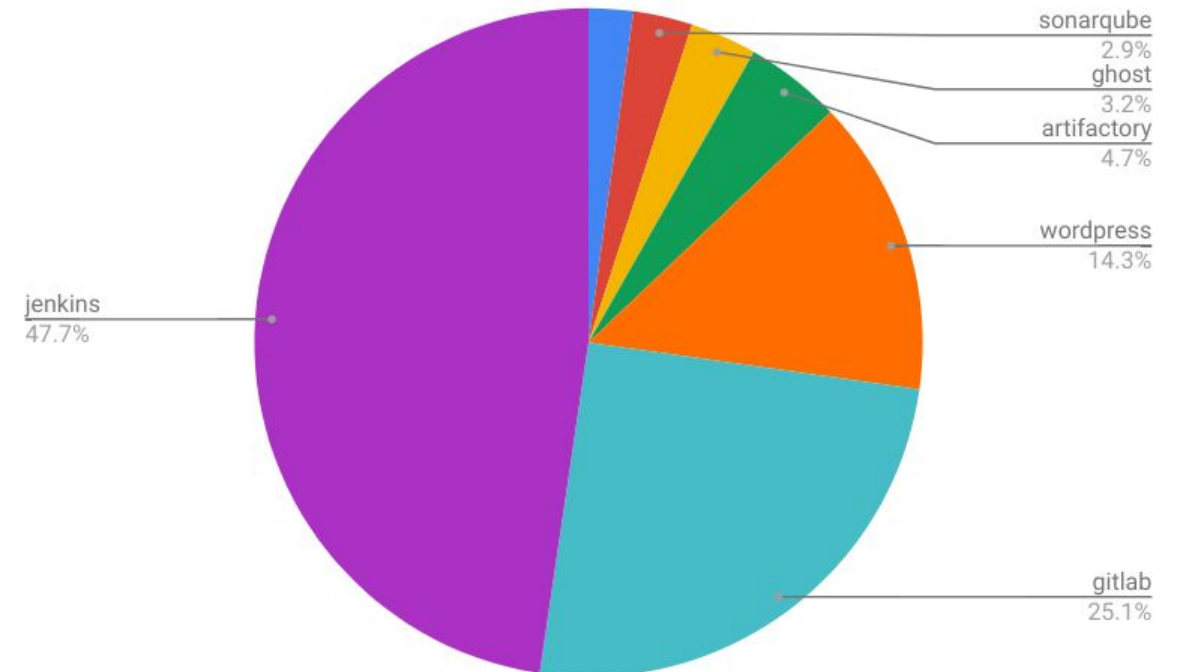- **etcd**
- **Prometheus**
- **MySQL**
- **MongoDB**
- **PostgreSQL**
- **Redis**
- **Elasticsearch**
- **Kafka**
- **Fluentd**
- **Spark**

etcd 15.7%
Others 22.8%
prometheus 9.0%
spark 4.6%
mysql 8.8%
fluentd 5.2%
mongo 7.5%
kafka 5.8%
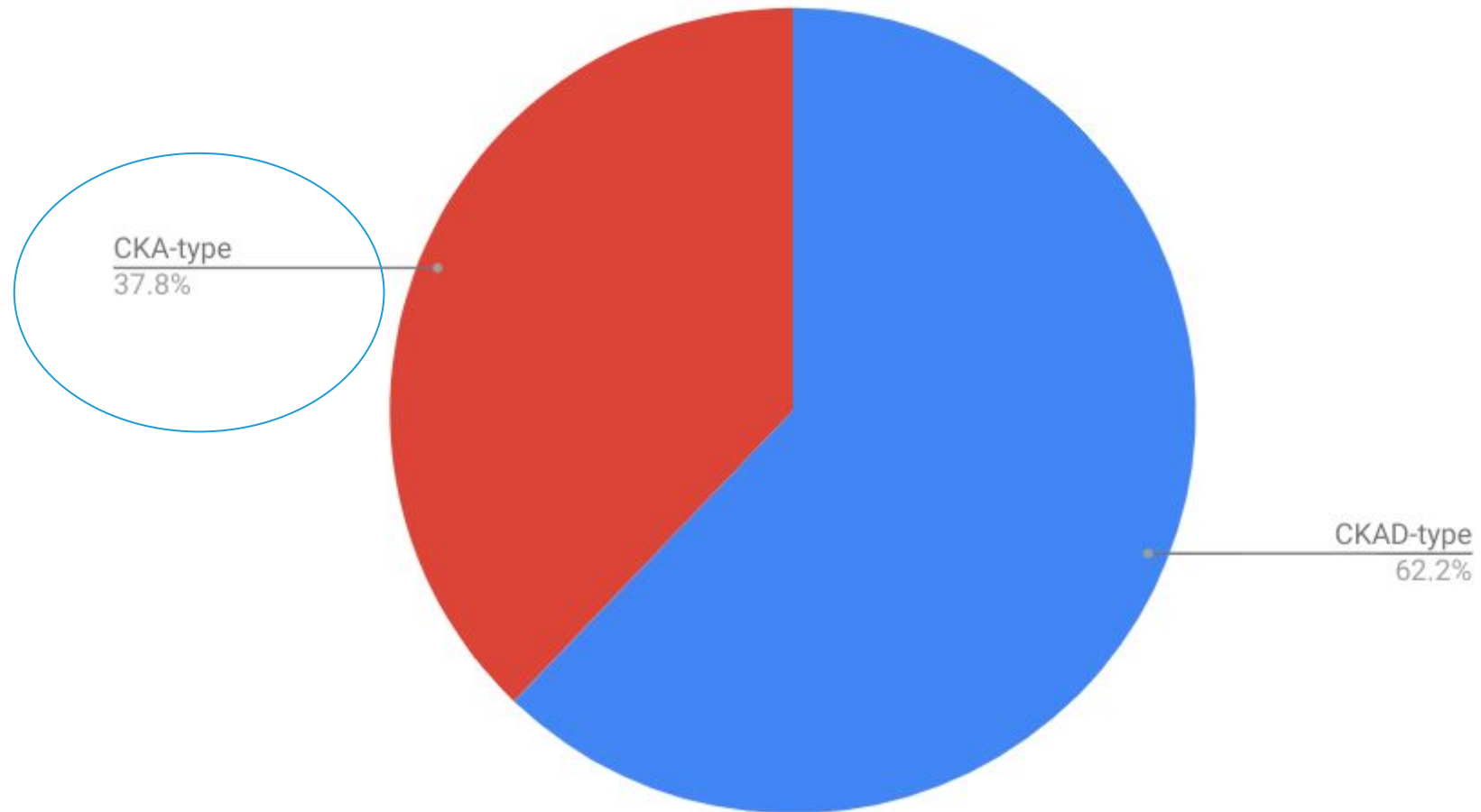postgres 7.5%
elasticsearch 6.5%
redis 6.6%
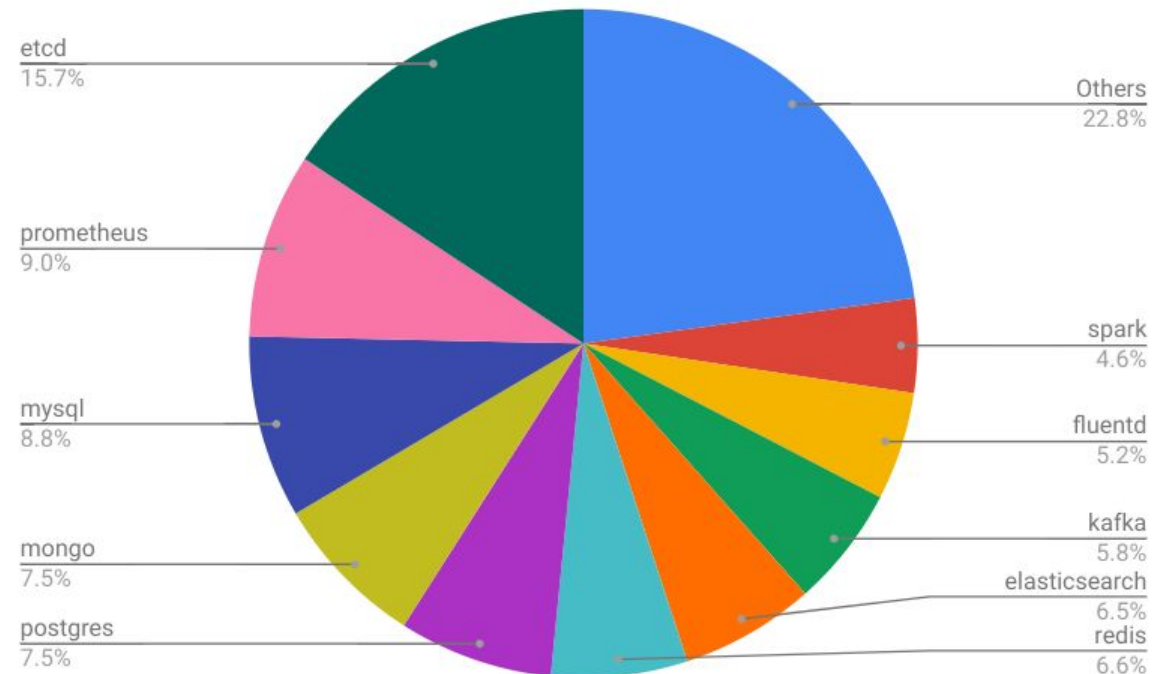
Question 4: Which applications are commonly deployed?

Web Applications: Top 6

- **Jenkins**

- **Gitlab**

- **WordPress**

- **Artifactory**

- **Ghost**

- **Sonarqube**

Question 5: Which kind of questions users have?

CKA-type
37.8%

CKAD-type
62.2%

Question 5: Which kind of questions users have? (CKA)

Three main categories:

- Cluster Installation:

  - From scratch

  - Using automation tools like Kubeadm, KOPS

  - Container Runtime issues

  - Networking

  - DNS

  - Components like Kubelet

Highlights:

Container networking

Kubernetes Dashboard

Minikube issues

Question 5: Which kind of questions users have? (CKA)

Three main categories:

● Cluster maintenance:

    ○ Debugging component issues

    ○ Node maintenance

    ○ Cluster Upgrade

    ○ Restart components

    ○ How to access nodes (especially in cloud provider solutions)

Highlights:

Force removal of pods

Cluster upgrade

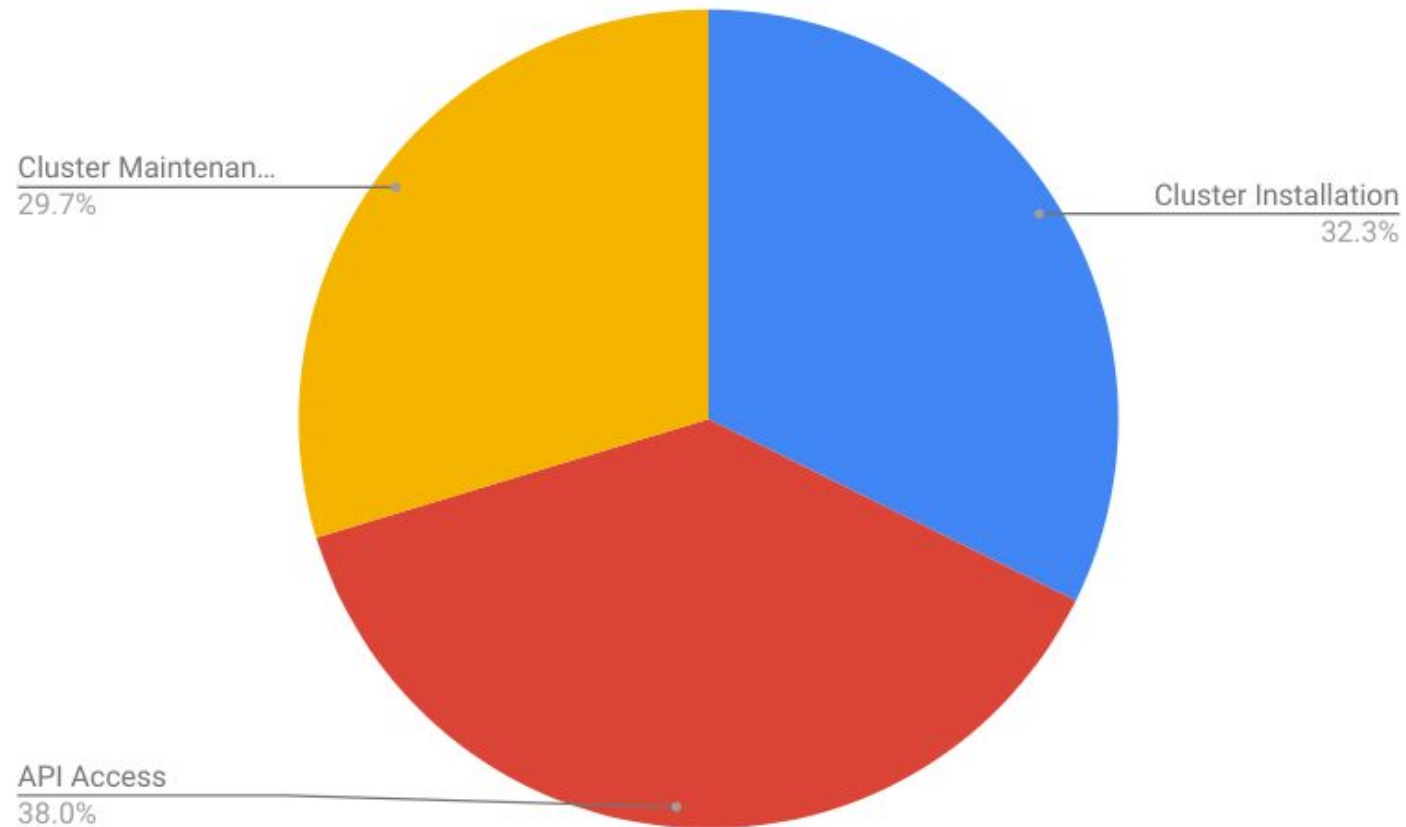# Question 5: Which kind of questions users have? (CKA)

Three main categories:

Highlights:

- API access:

  - RBAC rules
  Configure client in EKS

  - Client configuration

  - User creation
  Debug RBAC errors

Question 5: Which kind of questions users have? (CKA)

Cluster Maintenan...
29.7%

Cluster Installation
32.3%

API Access
38.0%

Question 6: Which platforms are more commonly used?

minikube
29.8%

kubeadm
26.9%

eks
5.6%

gke
13.6%

kops
13.5%

aks
10.5%
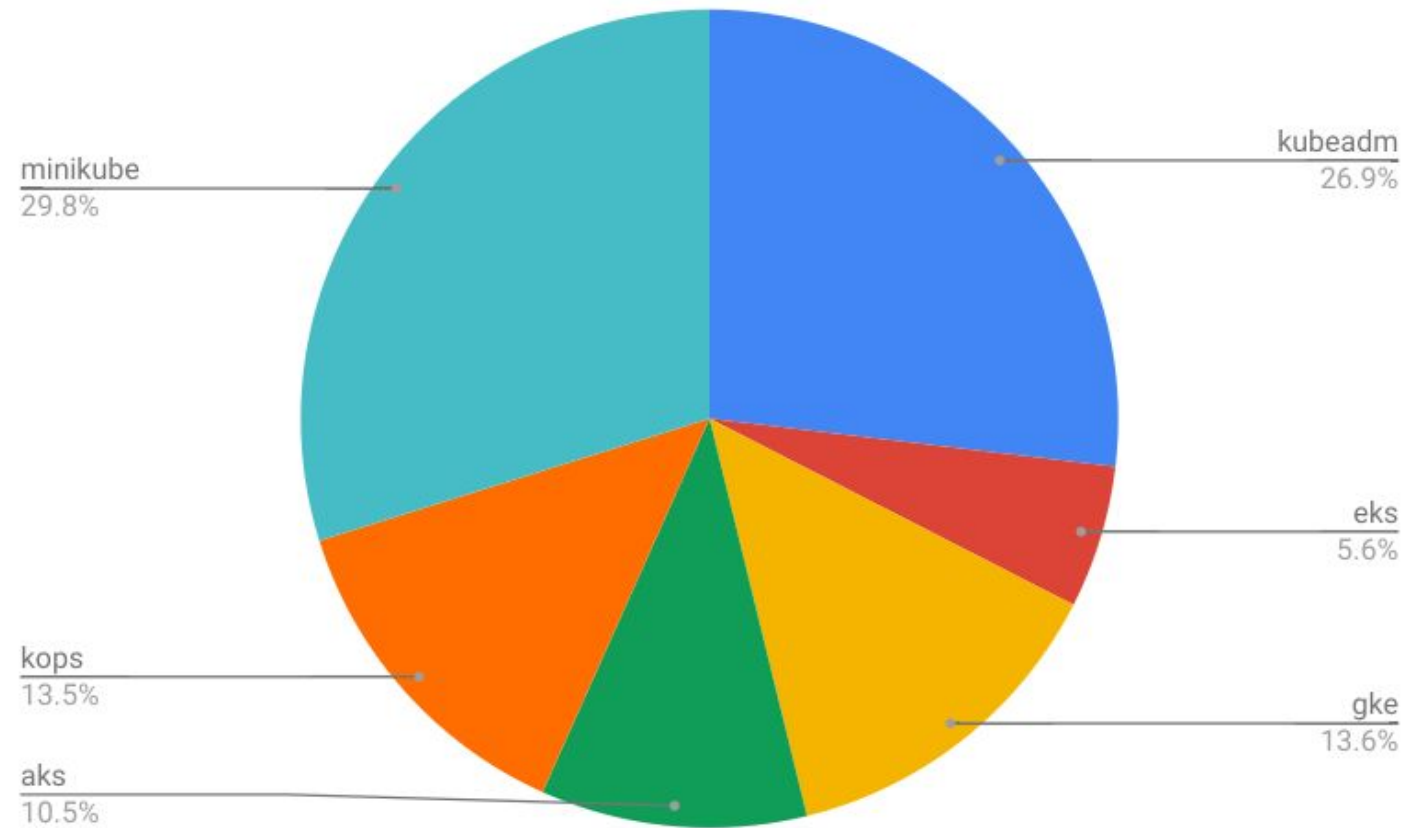
Discussion

- How can we make the creation of deployments easier?

  - Automated validation?

  - Visual tools?

- The interest in Kubernetes is growing but, does the data show that Kubernetes is still in a testing phase?

  - Lots of cases of people trying to learn (minikube, kubeadm…)

- A proper UX is essential for a more satisfactory Kubernetes adaptation

  - Call to action: Special Interest Group in User Experience?