botkube

K8s Troubleshooting Demystified

Five Best Practices to level up your troubleshooting workflow

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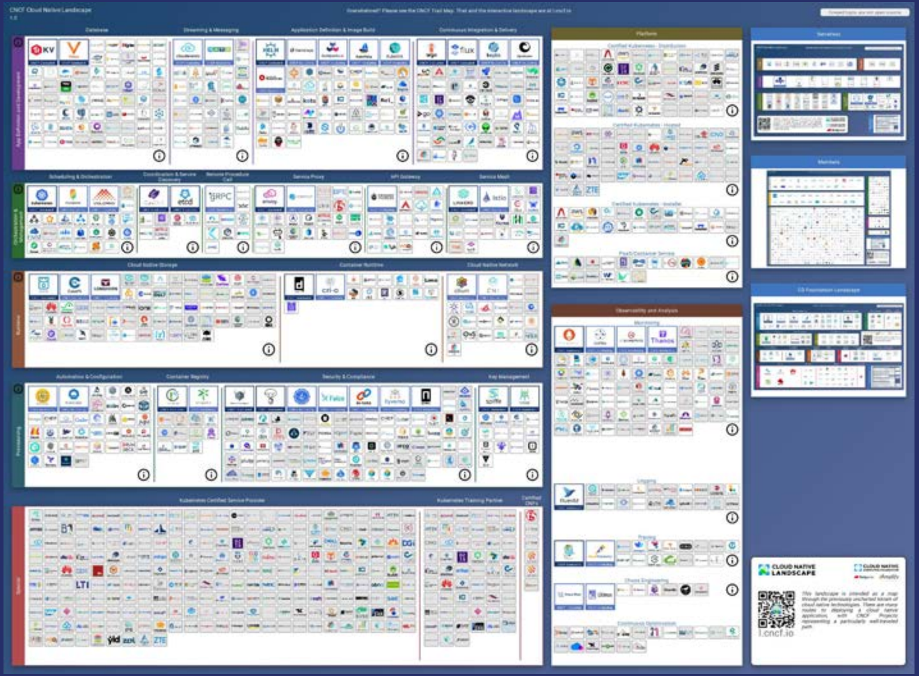
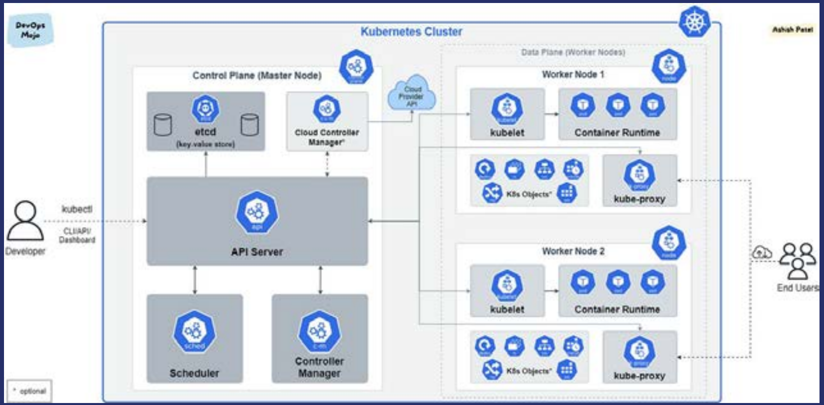
Kubeshop™

About me

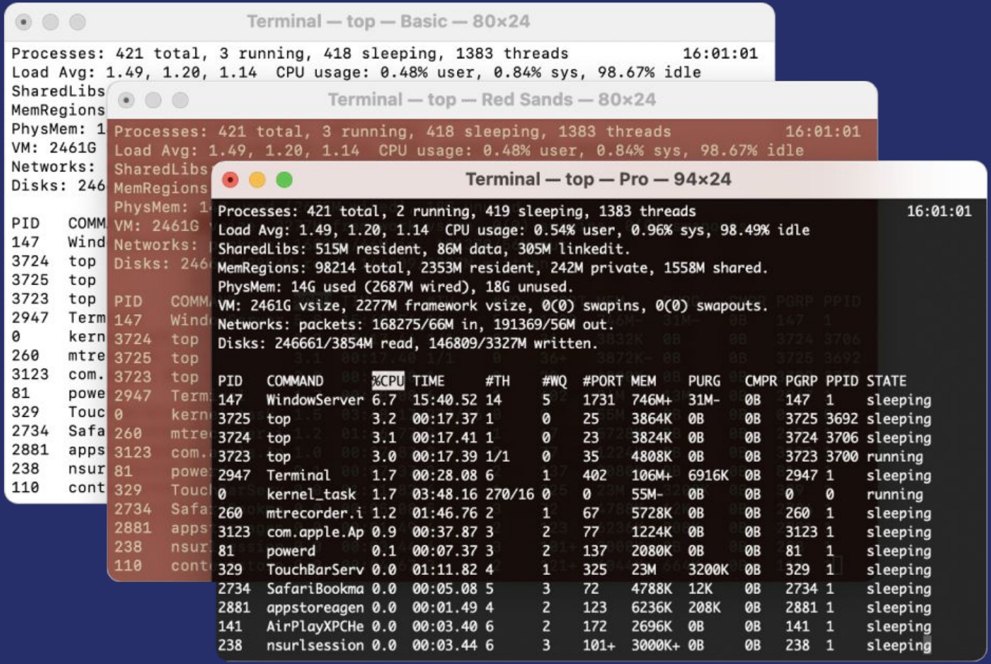
- Devrel @ Kubeshop
- Industrial and Systems Engineer
- Background: Developer Relations and Software Engineering
- I have a dog named Malcolm

The Kubernetes Space is Complex





Troubleshooting is Challenging



Terminal — top — Basic — 80x24
Terminal — top — Red Sands — 80x24
Terminal — top — Pro — 94x24

```
Processes: 421 total, 3 running, 418 sleeping, 1383 threads            16:01:01
Load Avg: 1.49, 1.20, 1.14  CPU usage: 0.48% user, 0.84% sys, 98.67% idle
SharedLibs
MemRegions
PhysMem: 1
VM: 2461G
Networks:
Disks: 246

PID   COMM
147   Wind
3724  top
3725  top
3723  top
2947  Term
0     kern
260   mtre
3123  com.
81    powe
329   Touc
2734  Safa
2881  apps
238   nsur
110   cont
```

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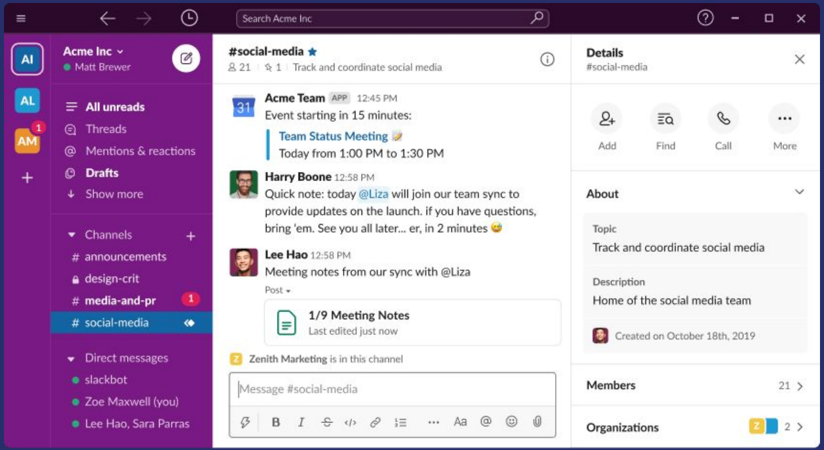
110   cont
```

```
Processes: 421 total, 2 running, 419 sleeping, 1383 threads                          16:01:01
Load Avg: 1.49, 1.20, 1.14  CPU usage: 0.54% user, 0.96% sys, 98.49% idle
SharedLibs: 515M resident, 86M data, 305M linkedit.
MemRegions: 98214 total, 2353M resident, 242M private, 1558M shared.
PhysMem: 14G used (2687M wired), 18G unused.
VM: 2461G vsize, 2277M framework vsize, 0(0) swapins, 0(0) swapouts.
Networks: packets: 168275/66M in, 191369/56M out.
Disks: 246661/3854M read, 146809/3327M written.

PID  COMMAND      %CPU TIME     #TH    #WQ  #PORT MEM    PURG   CMPR PGRP PPID STATE
147  WindowServer 6.7  15:40.52 14     5    1731  746M+  31M-   0B   147  1    sleeping
3725 top          3.2  00:17.37 1      0    25    3864K  0B     0B   3725 3692 sleeping
3724 top          3.1  00:17.41 1      0    23    3824K  0B     0B   3724 3706 sleeping
3723 top          3.0  00:17.39 1/1    0    35    4808K  0B     0B   3723 3700 running
2947 Terminal     1.7  00:28.08 6      1    402   106M+  6916K  0B   2947 1    sleeping
0    kernel_task  1.7  03:48.16 270/16 0    0     55M-   0B     0B   0    0    running
260  mtrecorder.i 1.2  01:46.76 2      1    67    5728K  0B     0B   260  1    sleeping
3123 com.apple.Ap 0.9  00:37.87 3      2    77    1224K  0B     0B   3123 1    sleeping
81   powerd       0.1  00:07.37 3      2    137   2080K  0B     0B   81   1    sleeping
329  TouchBarServ 0.0  01:11.82 4      1    325   23M    3200K  0B   329  1    sleeping
2734 SafariBookma 0.0  00:05.08 5      3    72    4788K  12K    0B   2734 1    sleeping
2881 appstoreagen 0.0  00:01.49 4      2    123   6236K  208K   0B   2881 1    sleeping
141  AirPlayXPCHe 0.0  00:03.40 6      2    172   2696K  0B     0B   141  1    sleeping
238  nsurlsession 0.0  00:03.44 6      3    101+  3000K+ 0B     0B   238  1    sleeping
```



#social-media
21 | 1 | Track and coordinate social media

Acme Team APP 12:45 PM
Event starting in 15 minutes:
Team Status Meeting
Today from 1:00 PM to 1:30 PM

Harry Boone 12:58 PM
Quick note: today @Liza will join our team sync to provide updates on the launch. if you have questions, bring 'em. See you all later... er, in 2 minutes

Lee Hao 12:58 PM
Meeting notes from our sync with @Liza
Post
1/9 Meeting Notes
Last edited just now

Zenith Marketing is in this channel

Message #social-media

Details
#social-media

About
Topic
Track and coordinate social media
Description
Home of the social media team
Created on October 18th, 2019

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What is Kubernetes Troubleshooting?

- Process of identifying and resolving issues in a Kubernetes cluster
- Solving problems related to deployment, resource allocation, and more...

An example: of a K8s troubleshooting scenario

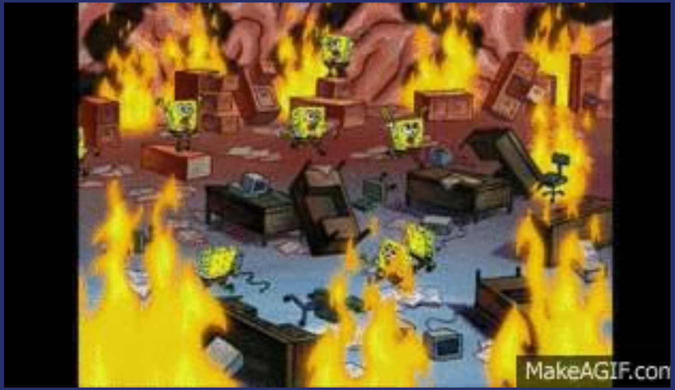
OOMKilled

"Hello, this is your Kernel speaking. I regret to inform you that several containers caused exesssive weight. They have been terminated. Have a nice day."

1. Identify the container or pod that was terminated.
2. Check the memory usage of the container or pod.
3. Look for any errors in the container or pod logs.
4. Update the container or pod image.
5. Increase the memory limit for the container or pod.

Challenges in Troubleshooting Multiple K8s Clusters

- Large-scale production environments decrease visibility and make it difficult to identify root causes
- Requires multiple tools for data gathering and resolution
- Collaboration and responsibility allocation becomes more difficult



Top 5 K8s Troubleshooting Best Practices

- Centralize Monitoring and Observability
- Incident Response and Collaboration
- Establish a Feedback Loop
- Streamline Command Execution
- Automate Observability and Delivery Processes

What is Botkube and how does it help teams follow troubleshooting best practices?

What is Botkube?

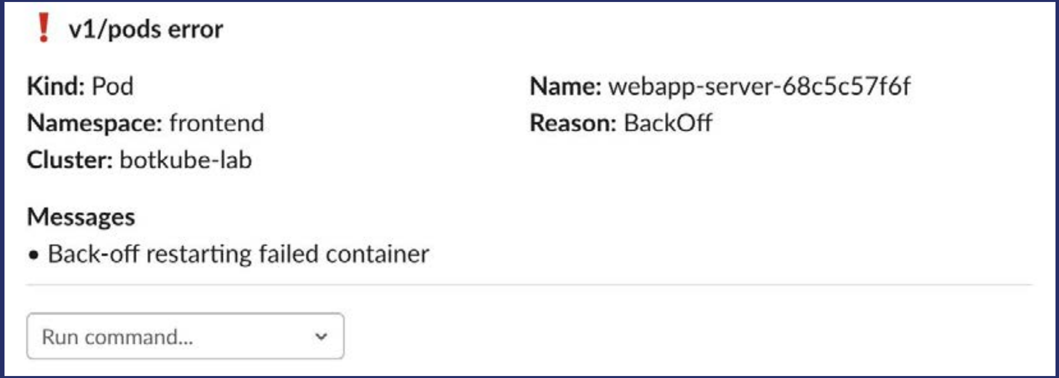
- Open source collaborative k8 troubleshooting tool
- Monitor and troubleshoot events in the same platform
- Collaborate with your team throughout the troubleshooting process
- Improve developer experience with self-service access to resources without requiring in-depth knowledge of Kubernetes.
- Respond to alerts and access your cluster from any platform, even on the go

Botkube Overview

- Easy to install into Slack, Microsoft Teams, Discord, and Mattermost
- Monitor Kubernetes via K8s Events and Prometheus
- Control Kubernetes with kubectl and Helm
- Automate event responses with actions
- Extend Botkube to any source or executor via the plugin-system
- Audit events and commands from all of your clusters in the Botkube hosted web app
- Manage Botkube installation and configuration for all clusters in the Botkube web app

Empowering Observability

- Receive real-time updates on your environment in your collaboration/chat tool
- Stay informed about changes, new resources, and GitOps updates
- Create channels for incident response or rare errors



❗ **v1/pods error**

Kind: Pod
Namespace: frontend
Cluster: botkube-lab

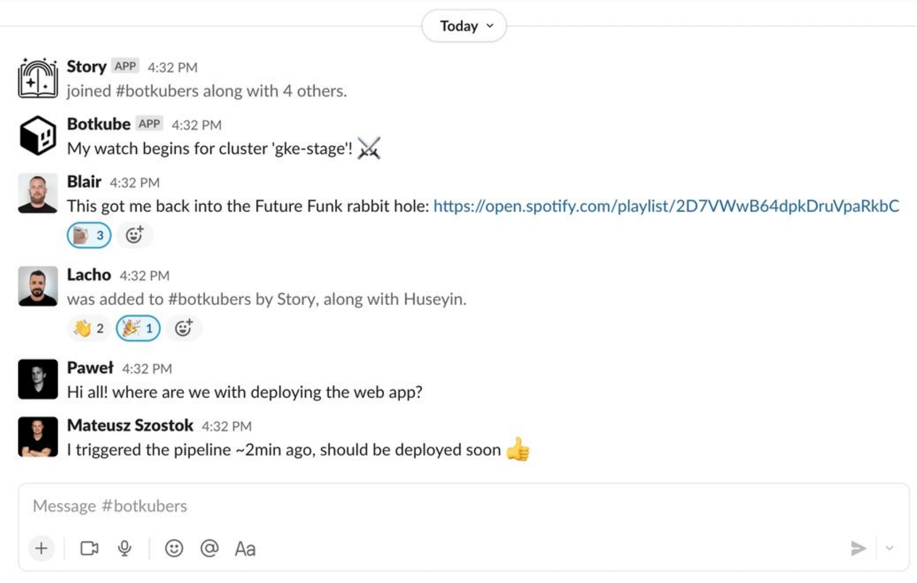
Name: webapp-server-68c5c57f6f
Reason: BackOff

Messages

- Back-off restarting failed container

Incident Response and Collaboration

- Resolve issues directly from your collaboration platform tools
- Botkube delivers rich context, including logs and resource descriptions



Story APP 4:32 PM
joined #botkubers along with 4 others.

Botkube APP 4:32 PM
My watch begins for cluster 'gke-stage'! ⚔

Blair 4:32 PM
This got me back into the Future Funk rabbit hole: https://open.spotify.com/playlist/2D7VWwB64dpkDruVpaRkbC
3

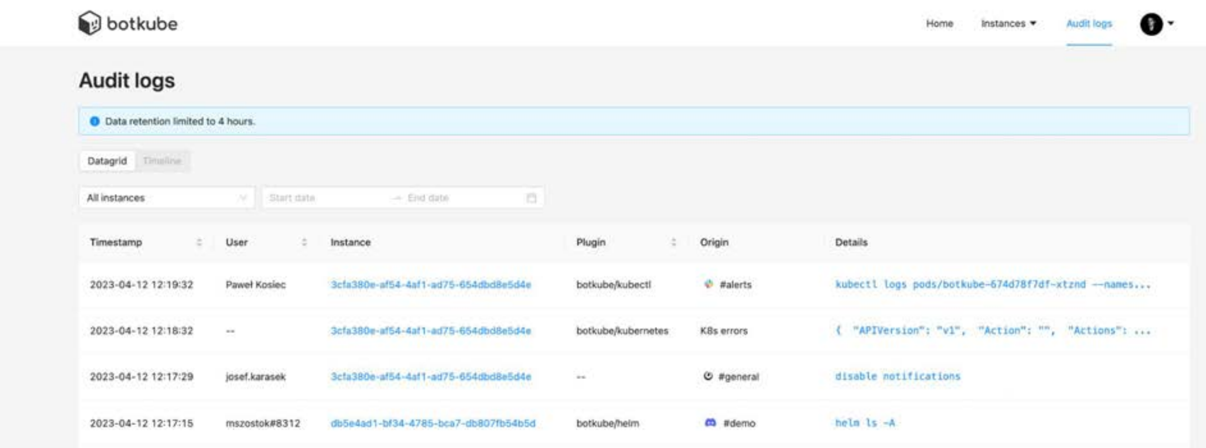
Lacho 4:32 PM
was added to #botkubers by Story, along with Huseyin.
👋 2 🎉 1

Paweł 4:32 PM
Hi all! where are we with deploying the web app?

Mateusz Szostok 4:32 PM
I triggered the pipeline ~2min ago, should be deployed soon 👍

Establish a Feedback Loop

- Gather comprehensive data about application behavior
- Insights into performance and potential issues
- Continuous improvement in troubleshooting



Audit logs

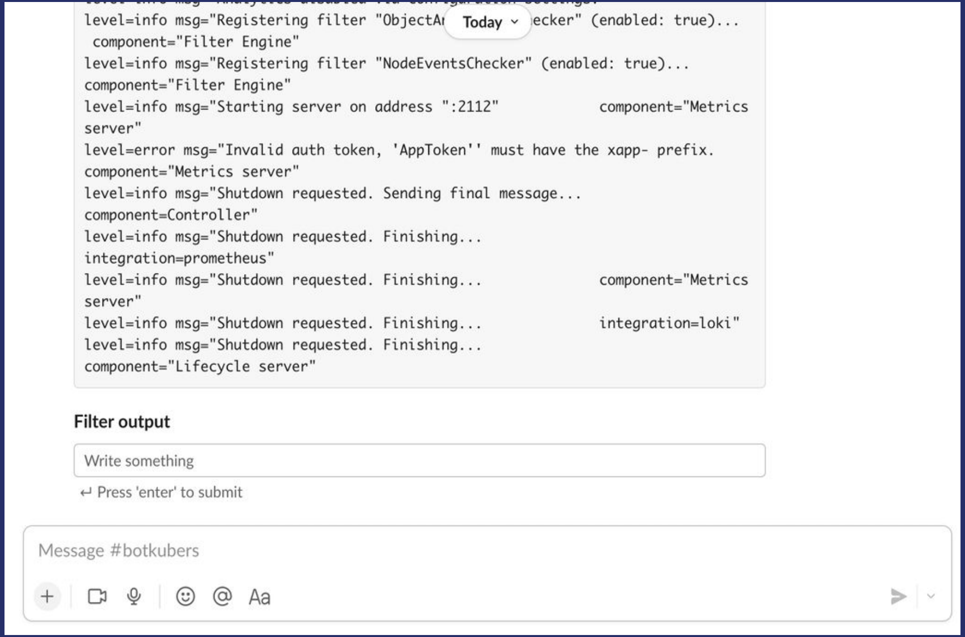
Data retention limited to 4 hours.

Timestamp	User	Instance	Plugin	Origin	Details
2023-04-12 12:19:32	Paweł Kosiec	3cfa380e-af54-4af1-ad75-654dbd8e5d4e	botkube/kubectl	#alerts	`kubectl logs pods/botkube-674d78f7df-xtznd --names...`
2023-04-12 12:18:32	--	3cfa380e-af54-4af1-ad75-654dbd8e5d4e	botkube/kubernetes	K8s errors	`{ "APIVersion": "v1", "Action": "", "Actions": ...`
2023-04-12 12:17:29	josef.karasek	3cfa380e-af54-4af1-ad75-654dbd8e5d4e	--	#general	`disable notifications`
2023-04-12 12:17:15	mszostok#8312	db5e4ad1-bf34-4785-bca7-db807fb54b5d	botkube/helm	#demo	`helm ls -A`

Streamline Command Execution

- Leverage tools for simultaneous command execution across clusters.

- Botkube enables non-experts to access troubleshooting info and take actions securely.



```
level=info msg="Registering filter "ObjectAr      ecker" (enabled: true)...
 component="Filter Engine"
level=info msg="Registering filter "NodeEventsChecker" (enabled: true)...
component="Filter Engine"
level=info msg="Starting server on address ":2112"            component="Metrics
server"
level=error msg="Invalid auth token, 'AppToken'' must have the xapp- prefix.
component="Metrics server"
level=info msg="Shutdown requested. Sending final message...
component=Controller"
level=info msg="Shutdown requested. Finishing...
integration=prometheus"
level=info msg="Shutdown requested. Finishing...              component="Metrics
server"
level=info msg="Shutdown requested. Finishing...              integration=loki"
level=info msg="Shutdown requested. Finishing...
component="Lifecycle server"
```

Filter output

Write something

↵ Press 'enter' to submit

Message #botkubers

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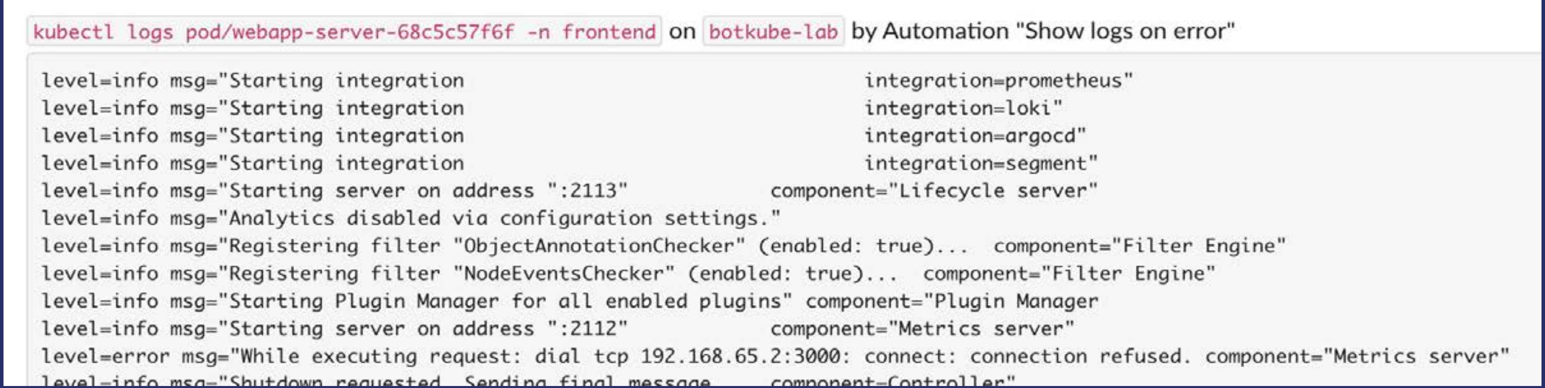
Streamlined Automation & Developer Empowerment

- Automate tools across the CNCF ecosystem and beyond
- Reduce time and effort for monitoring and managing services
- Automate common problem resolution with Botkube actions for quicker recovery



`kubectl logs pod/webapp-server-68c5c57f6f -n frontend` on `botkube-lab` by Automation "Show logs on error"

```
level=info msg="Starting integration                                   integration=prometheus"
level=info msg="Starting integration                                   integration=loki"
level=info msg="Starting integration                                   integration=argocd"
level=info msg="Starting integration                                   integration=segment"
level=info msg="Starting server on address ":2113"               component="Lifecycle server"
level=info msg="Analytics disabled via configuration settings."
level=info msg="Registering filter "ObjectAnnotationChecker" (enabled: true)...  component="Filter Engine"
level=info msg="Registering filter "NodeEventsChecker" (enabled: true)...  component="Filter Engine"
level=info msg="Starting Plugin Manager for all enabled plugins" component="Plugin Manager
level=info msg="Starting server on address ":2112"               component="Metrics server"
level=error msg="While executing request: dial tcp 192.168.65.2:3000: connect: connection refused. component="Metrics server"
level=info msg="Shutdown requested. Sending final message       component=Controller"
```

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Improved K8s workflow w/ Botkube

OOMKilled

"Hello, this is your Kernel speaking. I regret to inform you that several containers caused exesssive weight. They have been terminated. Have a nice day."

1. ~~Identify the container or pod that was terminated.~~
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3. ~~Look for any errors in the container or pod logs.~~
4. Update the container or pod image.
5. Increase the memory limit for the container or pod.

Conclusion

- Strategic approach to Kubernetes troubleshooting is vital for multi-cluster environments.
- Centralizing monitoring, collaboration, feedback loop, streamlined execution, and automation are key.
- Integrating solutions like Botkube enhances efficiency and reliability across all Kubernetes clusters.

How to get started with Botkube

- Easily and quickly configure monitoring and management in Slack, Microsoft Teams, Discord, and Mattermost
- Add the appropriate platform app and install Botkube in your cluster with Helm
- Configure Botkube via our hosted web app, Helm set parameters, or custom YAML configuration

Demo

botkube

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