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A Kubernetes Native Approach to Distribute Webhook Events to Multiple Non-Exported Clusters

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PURE STORAGE DEFENSIVE PUBLICATION

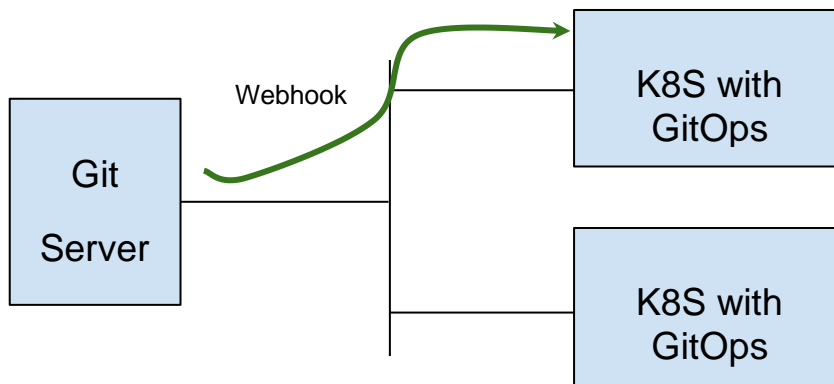
A Kubernetes Native Approach to Distribute Webhook Events to Multiple Non-Exported Clusters

Prashanth Kumar

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Motivation

The GitOps model of management allows users to manage Kubernetes (K8S) objects using a Git repository¹. Some of the technologies used to pull changes from a Git repository require polling the repository at a set interval, which may be too slow to see a change. Instead, users can configure a webhook² to allow the Git server to notify the GitOps pull service running on a Kubernetes cluster that a new change is available. This would cause the GitOps pull service to fetch the latest changes and apply them to the Kubernetes cluster.



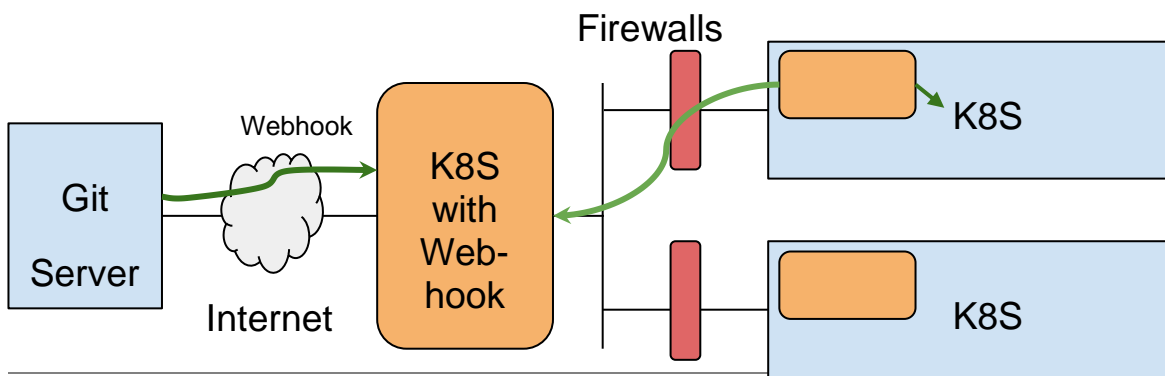
Although the model works well for a single cluster, it has two major drawbacks. First, it does not scale with the number of Kubernetes clusters and applications that a user may manage. For example, if the user has N number of Kubernetes clusters that need to pull from the Git server, the user must create N number of webhooks to each cluster. Second, the clusters must be accessible from the Git server over the network, which may require exposure of the GitOps pull services over the internet.

¹ <https://about.gitlab.com/topics/gitops/>

² <https://en.wikipedia.org/wiki/Webhook>

Description

In our model, a single Kubernetes service would be exposed externally over the network to listen to external webhooks. When a request is received by the Kubernetes cluster to create a webhook service, a controller would expose a new webhook service endpoint and bind it to a custom resource (CustomResource) object providing the status of the webhook event. The user could then register the webhook service endpoint as a target on the Git system to notify the Kubernetes service of events in the Git service. When an event is triggered, the Git service would trigger an event through the webhook service endpoint, which would then notify the webhook controller in Kubernetes to change the state of the webhook event object accordingly. Clients requiring event notification of the webhook could then connect to this Kubernetes cluster and watch the webhook object created for events coming from the webhook generator. Clients could be edge devices, applications, or other Kubernetes clusters.



About the Authors



Prashanth Kumar is a member of the technical staff at Pure Storage. Prashanth works on persistent container storage solutions. He has extensive experience as an engineer, including experience implementing scalable storage solutions. Prashanth holds degrees in Electronics and Communications from Sri Revana Siddeshwara Institute of Technology (SRSIT) and Embedded Systems from Manipal University.



Luis Pabón is a member of the technical staff at Pure Storage. Luis has been an architect and technical leader for an array of software applications and frameworks at a number of engineering organizations. He holds degrees in Electrical and Computer Engineering from the University of Massachusetts Amherst and Worcester Polytechnic Institute.



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