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Helm

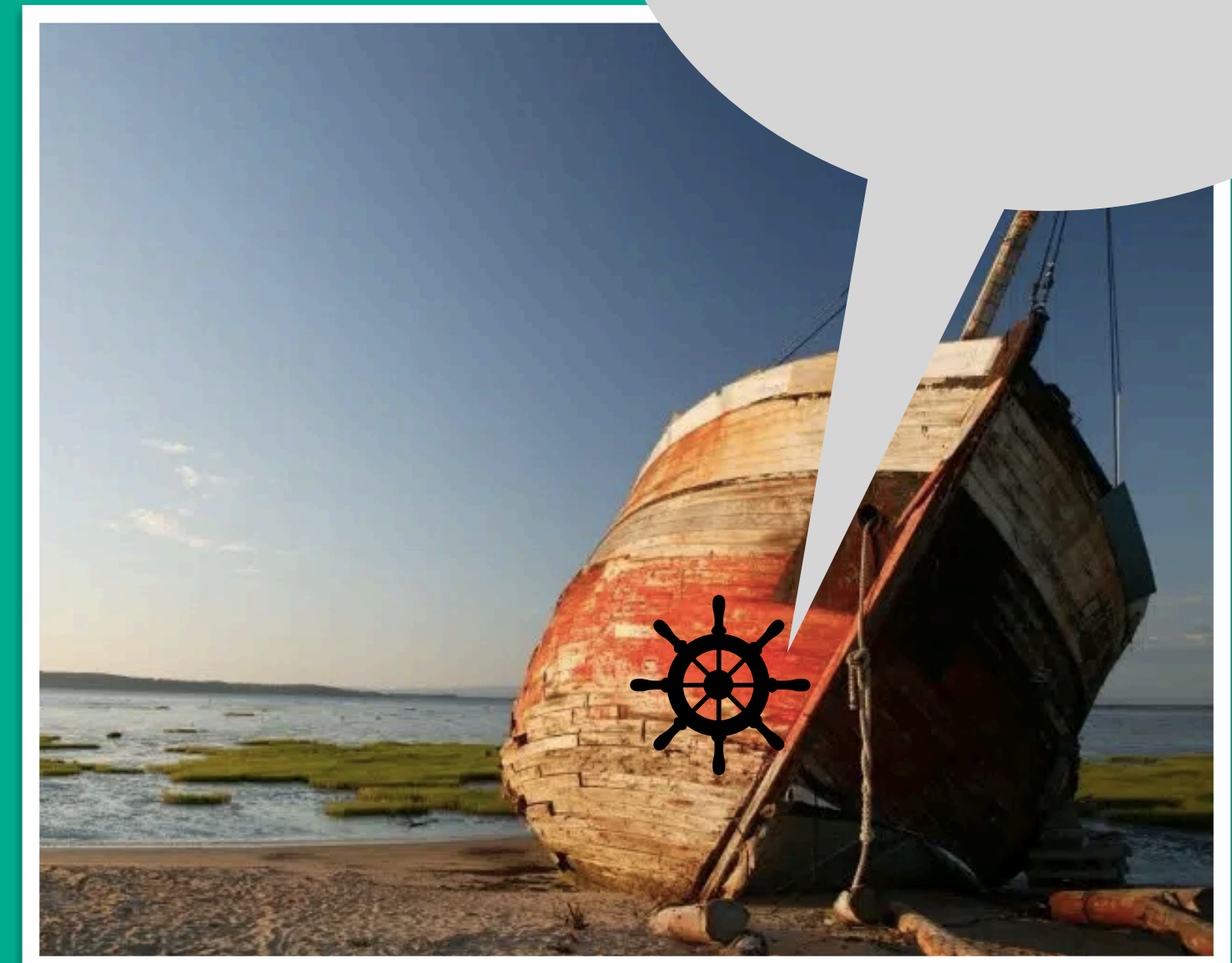


Sandip Das | Gaurav Dubey

# No Helm?

- How do I pack all or some of my contents (*read as K8s objects*) as a single luggage to be delivered
- Someone on the other ship wants to use the contents on my ship? I'm scared if I pick all the *loose* contents, I might drop some into the sea
- Wait! What was my last location? How am I even supposed to go back from this not-so-good-place (*read as last state*)
- You want to search(*read monitor*) my ship? NO! Not till you are from the "audit" department

In the first place, why even did you try riding me without my HELM?



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# The Power of Helm

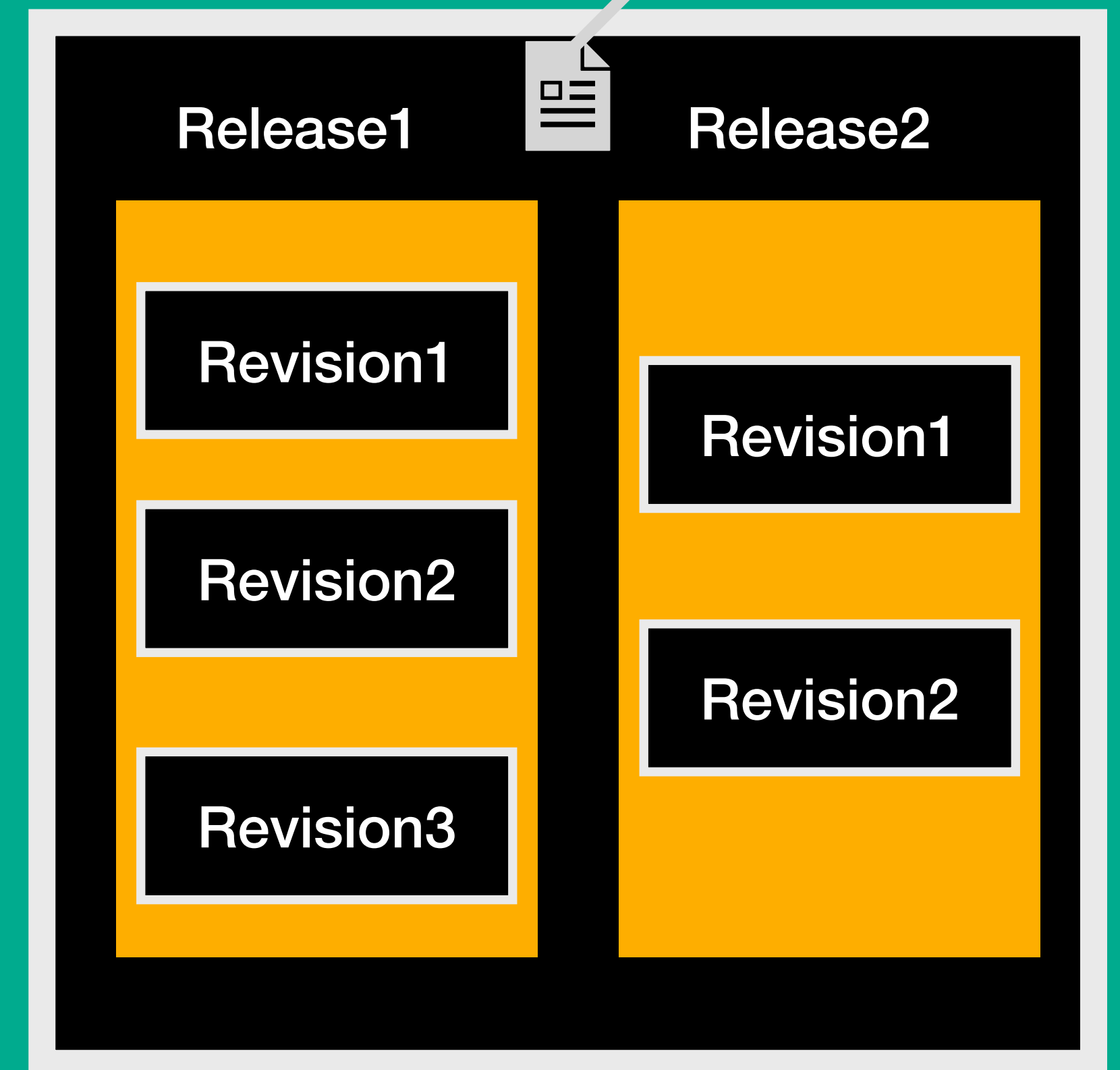
- Package Manger
- The archivist. Of YAMLS
- Templating Engine
- Add some sense(*read as logic*) to your YAMLS!



# Helm Basics

helm metadata as secrets

K8s cluster



- Charts
- Repository: [artifacthub.io](https://artifacthub.io) | [bitnami](https://bitnami.com) | [appcode](https://appcode.com) etc
- Release- e.g: prod, dev
- Revisions

- `helm repo add`
- `helm search hub`
- `helm search repo`
- `helm install`
- `helm list`
- `helm upgrade`
- `helm uninstall`
- `helm pull`
- `helm --help`
- `helm rollback`
- `helm history`



# Architecture

v3

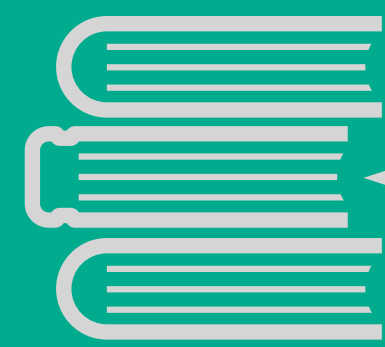


Chart Repo



Cluster

master

kube-  
apiserver

v2

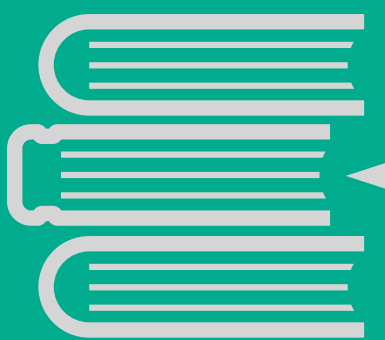


Chart Repo



Cluster

master

Tiller

kube-  
apiserver





# Why Tiller; Why No Tiller?

- Kubernetes did not have RBAC policies around <1.16
- It kept multiple resources consistent across our clusters
- Rollbacks
- *It worked way more frequently than it didn't*
- Security: cluster-wide access —> privilege escalation attacks if not properly secured
- Deployment of already complex tools like Istio was difficult as Tiller was buggy and unstable
- Securing tiller was a humongous task
- Deployment pipelines would fail at times due to false errors generated in Helm2



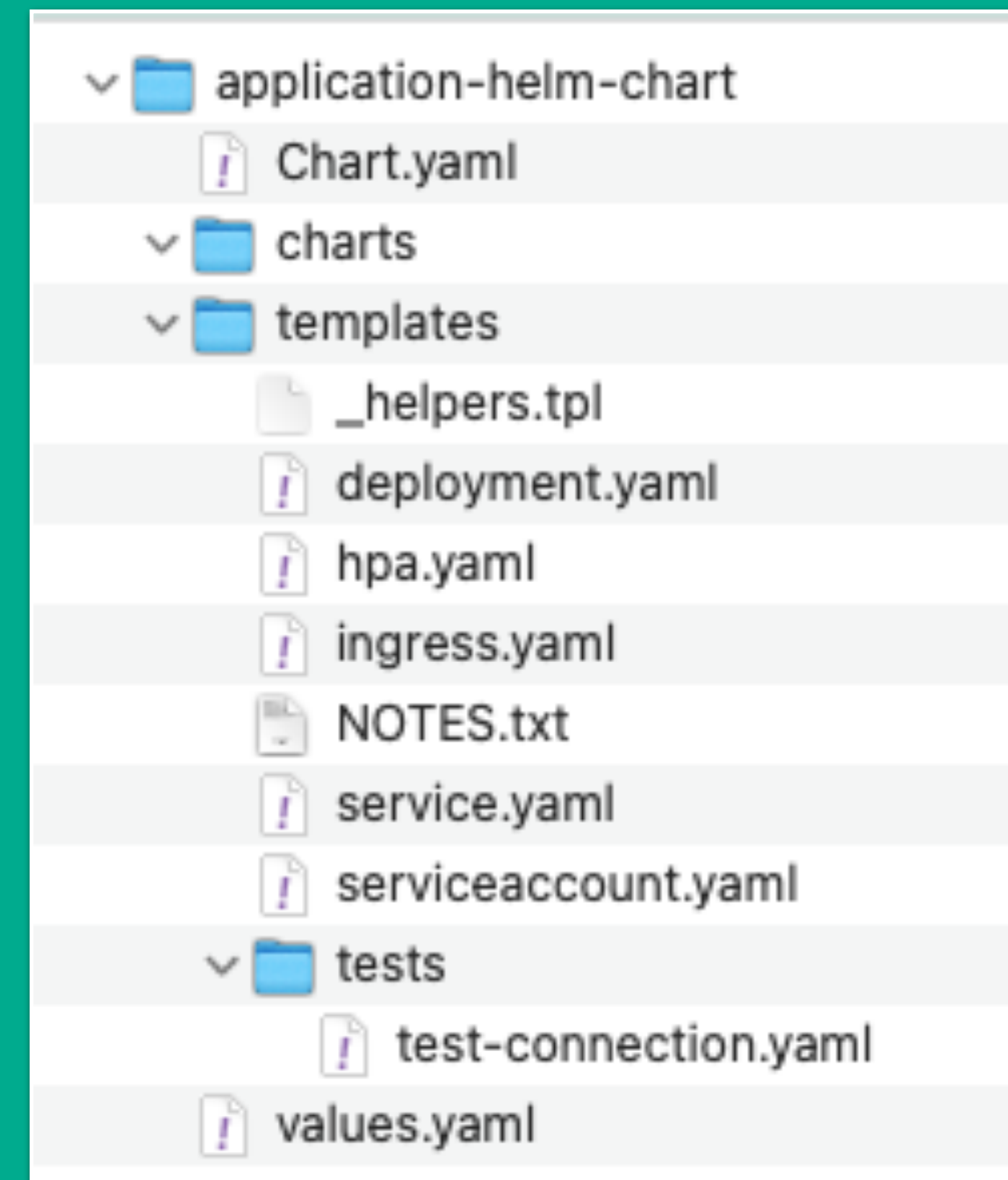
## V2 VS V3

- 2-way vs 3-way strategic merge patch
- Namespaces are now not created automatically
- Helm serve removed; its available as a plugin
- Release name is now not automatically generated
- Values provided by the user can be forced to follow a particular JSON schema
- Secrets are used instead of configMaps (with a secret type of helm.sh/release) as the default storage driver



# Charts: Structure; Configuration; Creation

- Chart directory/
- Chart.yaml
- templates/
- templates/k8sYAMLs
- templates/\*.tpl
- templates/NOTES.txt
- values.yaml
- tests/- write some tests to validate your charts





# values.yaml and objects

Almost every time, customisations will be done using the values.yamls

## Objects

- Release
  - Values
  - Charts
  - Files
  - Capabilities
- 
- Referencing variables: `{{ .Objects.variableName }}`



# Flow Control, Functions and Pipelines

Providing logic to Helm charts ... or lets say kubernetes YAMLS

- Conditionals: If/Else in Helm
- Functions: quote, upper, lower
- Operators are also functions (eq, ne, lt, gt, and, or)
- Pipe- '|' . - use output of one function for further processing



# Scopes; Ranges

- Range: for-each loop for helm
- Scopes- similar to scope of a variable in normal programming languages
- the dot(.) operator points to the current scope
- the dollar(\$) operator points to the root scope

```
$.Chart.Name  
.Release.Name
```



# \_\_NamedTemplates.tpl

- Used for removal of code duplication and the need of rewriting code or some code portions
- Present in the templates/ folder
- \_\_ indicates to helm to not consider it as a normal template file so that it is not processed as a YAML file

```
{{- define "labels" }}  
  app.kubernetes.io/name: {{ .Release.Name }}  
  app.kubernetes.io/instance: {{ .Release.Name }}  
{{- end }}
```

```
metadata:  
  name: {{ .Release.Name }}-nginx  
  labels:  
    {{- template "labels" . }}
```



# One-off tasks: Chart Hooks

Use to run specific tasks before/after running the main kubernetes objects

- pre-upgrade hook | post-upgrade hook
- pre-install hook | post-install hook
- pre-delete hook | post-delete hook
- pre-rollback hook | post-rollback hook
- test

```
annotations:  
  "helm.sh/hook": pre-upgrade
```

## Hook Deletion Policies

- hook-succeeded
- hook-failed
- before-hook-creation





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Thank You



- Feedback? YES PLEASE!
- Appreciation? Would love to hear!
- Criticism? Sure, sure

“Hope you liked it”

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