



Leibniz Supercomputing Centre
of the Bavarian Academy of Sciences and Humanities

FOLIO Installation and Configuration in Kubernetes with Helm

Leibniz Supercomputing Centre

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Goals

- Automation of the FOLIO Install process
- Flexibility (Multitenant)
- (Relative) Ease of use
- Repeatability
- Maintainability

Problem?

- Microservice Architecture: Lots of components to configure and install
 - Postgres / Elasticsearch /Kafka
 - Okapi
 - FOLIO Modules
 - Stripes / Tenants
- Shared environment information needs to be managed
- Documentation for configurations and tasks?

Possible Solution? Helm Charts

- Overview Helm
 - Package manager for Kubernetes
 - Templates of k8s manifests
 - On helm install: templates get rendered with variables (values) and applied to cluster

```
[...]  
imagePullSecrets:  
- name: {{ $.Values.global.image.pullsecret }}  
containers:  
- name: {{ $.Release.Name }}-supertenant  
  {{- with $.Values.global.image }}  
  image: {{ .repositoryBaseUrl }}folio-tools:{{ .folioToolsTag }}  
  {{- end }}  
imagePullPolicy: Always  
env:  
- name: OKAPI_URL  
  value: http://{{ $.Values.global.okapi.serviceName }}:{{ $.Values.global.okapi.port }}  
- name: SUPERUSER_PASSWORD  
  valueFrom:  
    secretKeyRef:  
      name: supertenant-secret  
      key: password  
[...]
```

Render with values

```
[...]  
imagePullSecrets:  
- name: gitlab-folio-group  
containers:  
- name: secure-supertenant  
  image: gitlab.bib-bvb.de:5050/folio/folio-tools:v0.12  
imagePullPolicy: Always  
env:  
- name: OKAPI_URL  
  value: http://okapi-4-13-2:9130  
- name: SUPERUSER_PASSWORD  
  valueFrom:  
    secretKeyRef:  
      name: supertenant-secret  
      key: password  
[...]
```

K8s cluster setup at LRZ

- Baremetal Kubernetes installed with Kubespray
- One time setup of Cluster:
 - Longhorn for persistent Storage
 - Ingress controller / certbot for e.g. Stripes
 - Kubegres operator for Postgres
 - Etc.
- External:
 - Gitlab (repository for containers, CI, version control of configuration)

Current FOLIO install workflow

- Base components: Postgres, Kafka, Elasticsearch
- Several custom charts for flexibility:
 - Okapi
 - Modules
 - Tenants
- Configuration before install:
 - Central global-values.yaml for general settings (shared environment)
 - Module and Tenant values: manage more specific settings

FOLIO Install in a few commands

- Build new stripes Container
- Adjust global and tenant values
- Helm install

```
vi global-values.yaml
vi tenant/values-lotus-lrz.yaml
helm template kubegres kubegres/ -f global-values.yaml > kubegres/renders/kubegres.yaml
kubectl -n folio-test apply -f kubegres/renders/kubegres.yaml
helm -n folio-test install bitnami-elasticsearch bitnami/elasticsearch -f bitnami/elastic-values.yml
helm -n folio-test install bitnami-kafka bitnami/kafka -f bitnami/kafka-values.yml
helm -n folio-test install okapi okapi/ -f global-values.yaml
helm -n folio-test install mods modules/ -f global-values.yaml -f modules/valuesd/2022-r1-all.yaml
helm -n folio-test install ten-lrz tenant/ -f global-values.yaml -f tenant/values-lotus-lrz.yaml \
-f modules/valuesd/2022-r1-all.yaml
```


Global Values



```
global:
  db:
    host: kubegres
    port: 5432
    pgSecret: kubegres-secret
    okapiName: okapi
    okapiUser: okapi
    okapiPwKey: okapiUserPassword
    folioName: folio
    folioUser: folio
    folioPwKey: folioUserPassword
    allModuleAccess: true
  kafka:
    serviceName: bitnami-kafka
    port: 9092
  elasticsearch:
    serviceName: bitnami-elasticsearch
    port: 9200
  s3storage:
    serviceName: minio.s3storage
    region: LRZ
    bucket: folio
    port: 443
  okapi:
    serviceName: okapi-4-13-2
    secureSupertenant: True
    port: 9130
    repositoryName: okapi
    version: v4.13.2
  image:
    pullSecret: gitlab-folio-group
    repositoryBaseUrl: gitlab.bib-bvb.de:5050/folio/
    folioToolsTag: "v0.12"
    okapiTag: okapi
    okapiVersion: "v4.13.2"
```

Module Values

```
backend_modules:
- name: mod-users
  version: 18.2.0
  image:
    repository: folioorg/mod-users:18.2.0
    tag: 2022-r1
  resources:
    requests:
      memory: '536870912'
    limits:
      memory: '536870912'
  dbAccess: true
  environment:
    JAVA_OPTIONS: -XX:MaxRAMPercentage=66.0
- name: mod-permissions
  version: 6.0.4
  image:
    repository: folioorg/mod-permissions:6.0.4
    tag: 2022-r1
  resources:
    requests:
      memory: '715827883'
    limits:
      memory: '715827883'
  dbAccess: true
  environment:
    JAVA_OPTIONS: -XX:MaxRAMPercentage=66.0
[...]
```

Module Deployment Template

```
{{range .Values.backend_modules -}}
apiVersion: apps/v1
kind: Deployment
metadata:
  name: {{ template "folio.backend.name" . }}
  labels:
    app: {{ template "folio.backend.name" . }}
    module: {{ .name }}
    version: {{ .version }}
    release: {{ $.Release.Name }}
spec:
  replicas: {{ .replicaCount | default "1" }}
  selector:
    matchLabels:
      app: {{ template "folio.backend.name" . }}
      release: {{ $.Release.Name }}
  template:
    metadata:
      labels:
        app: {{ template "folio.backend.name" . }}
        release: {{ $.Release.Name }}
    spec:
      imagePullSecrets:
      - name: {{ $.Values.global.image.pullsecret }}
      volumes:
      - name: log4j2-properties
        configMap:
          name: log4j2-properties-{{ $.Release.Name }}
      {{- if .customConfig }}
      - name: custom-config
        configMap:
          name: {{ printf "%s-custom-%s" .name $.Release.Name }}
      {{- end }}
      {{- if .persistentVolume }}
      - name: persistent-storage
        persistentVolumeClaim:
          claimName: {{ template "folio.backend.name" . }}-volume-claim
      {{- end }}
[...]
```

Work In Progress

- Update / Upgrade Process?
 - Folio: okapi, modules, multitenant system?
 - Base components
 - Kubernetes itself
 - Postgres
 - Longhorn
 - Etc.
- Backup/Restore, s3storage
- Generalise as much as possible for FOLIO Community

Questions?

Feedback is highly encouraged!

Reach out:

FOLIO Slack: @Florian_Kreft

Check out some of the Configuration:
<https://gitlab.lrz.de/bib-public/folio-helm>