

fans*

Start part 4

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Agenda

Kubernetes and components with SAS Viya4 in a Cloud environment

- What is Kubernetes (K8s)
- Main K8s Components
- K8s Architecture
- **Organizing your components with K8s Namespaces**
- SAS Viya in Kubernetes – helpful tools

Basic terms

- Kubernetes is organizing content in Namespaces – placeholders for content ...

Kubernetes Namespace

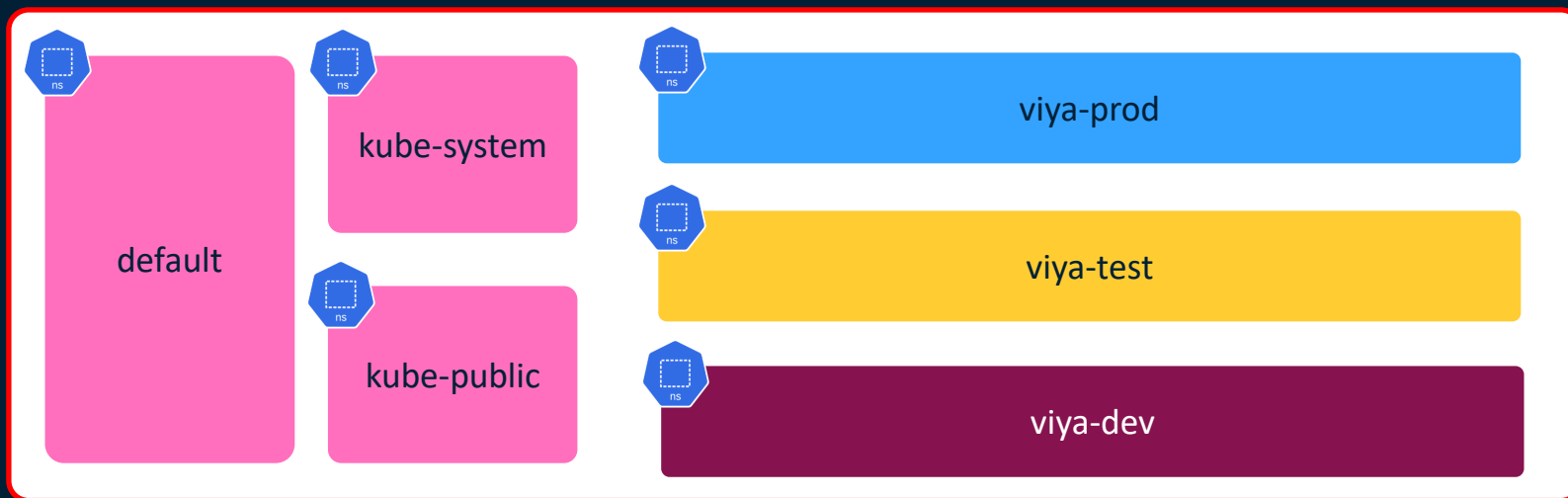


- Namespaces are a way of creating "virtual" clusters within a single physical Kubernetes cluster
 - Namespaces provide a way to divide cluster resources between multiple applications (via resource quota)
- Namespaces provide logical separation and a mechanism to logically group Kubernetes objects
- Namespaces provide a useful mechanism to provide some level of multi-tenancy
- A good approach is to use a namespace for a single application (for example, SAS Viya) or a group of applications that work together

Kubernetes Namespace



Kubernetes cluster



- There are system namespaces (■) and user defined namespaces
- User defined namespaces (viya-dev, viya-test, viya-prod)

Kubernetes Namespace



Kubernetes Namespaces

Namespaces		14 items
<input type="checkbox"/> Name ▾	<input type="checkbox"/> Labels ▾	
<input type="checkbox"/> argo	<code>kubernetes.io/metadata.name=argo</code>	
<input type="checkbox"/> batchns	<code>kubernetes.io/metadata.name=batchns</code> <code>name=batch-processing</code>	
<input type="checkbox"/> cert-manager	<code>kubernetes.io/metadata.name=cert-manager</code>	
<input type="checkbox"/> default	<code>kubernetes.io/metadata.name=default</code>	
<input type="checkbox"/> gelbad	<code>kubernetes.io/metadata.name=gelbad</code> <code>name=gelbad_namespace</code>	
<input type="checkbox"/> gelgood	<code>kubernetes.io/metadata.name=gelgood</code> <code>name=gelgood_namespace</code>	
<input type="checkbox"/> gelmailserver	<code>kubernetes.io/metadata.name=gelmailserver</code>	
<input type="checkbox"/> kube-node-lease	<code>kubernetes.io/metadata.name=kube-node-lease</code>	
<input type="checkbox"/> kube-public	<code>kubernetes.io/metadata.name=kube-public</code>	
<input type="checkbox"/> kube-system	<code>kubernetes.io/metadata.name=kube-system</code>	
<input type="checkbox"/> nfs	<code>kubernetes.io/metadata.name=nfs</code>	
<input type="checkbox"/> nginx	<code>kubernetes.io/metadata.name=nginx</code>	
<input type="checkbox"/> v4mlog	<code>kubernetes.io/metadata.name=v4mlog</code>	
<input type="checkbox"/> v4mmon	<code>kubernetes.io/metadata.name=v4mmon</code>	

Namespaces

14 items

Name

Labels

argo	kubernetes.io/metadata.name=argo
batchns	kubernetes.io/metadata.name=batchns name=batch-processing
cert-manager	kubernetes.io/metadata.name=cert-manager
default	kubernetes.io/metadata.name=default
gelbad	kubernetes.io/metadata.name=gelbad name=gelbad_namespace
gelgood	kubernetes.io/metadata.name=gelgood name=gelgood_namespace
gelmailserver	kubernetes.io/metadata.name=gelmailserver
kube-node-lease	kubernetes.io/metadata.name=kube-node-lease
kube-public	kubernetes.io/metadata.name=kube-public
kube-system	kubernetes.io/metadata.name=kube-system
nfs	kubernetes.io/metadata.name=nfs

Namespace: kube-system

Kind: Namespace Name: kube-system Namespace: default

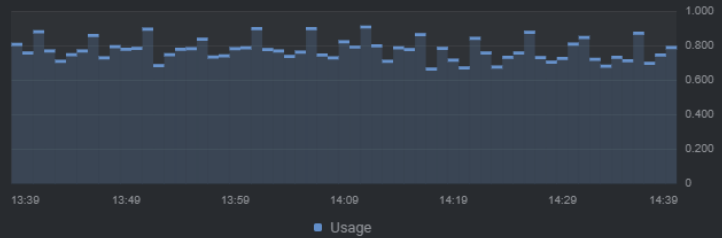
```

1  apiVersion: v1
2  kind: Namespace
3  metadata:
4    name: kube-system
5    uid: 9eb1e51e-7eac-4a15-94c5-0ade48f82a07
6    resourceVersion: '10'
7    creationTimestamp: '2022-09-12T15:07:03Z'
8    labels:
9      kubernetes.io/metadata.name: kube-system
10   managedFields:
11     - manager: kube-apiserver
12       operation: Update
13       apiVersion: v1
14       time: '2022-09-12T15:07:03Z'
15       fieldsType: FieldsV1
16       fieldsV1:
17         f:metadata:
18           f:labels:
19             .: {}
20           f:kubernetes.io/metadata.name: {}
21   selfLink: /api/v1/namespaces/kube-system
22   status:
23     phase: Active
24   spec:
25     finalizers:
26     - kubernetes
27

```

Namespace: kube-system

CPU Memory Network Filesystem



Created 24d 21h 32m ago (2022-09-12T17:07:03+02:00)

Name kube-system

Labels kubernetes.io/metadata.name=kube-system

Status Active

Resource Quotas -

Limit Ranges -

Kubernetes Namespace



Kubernetes cluster – services also organized by Namespace

Services

8 items

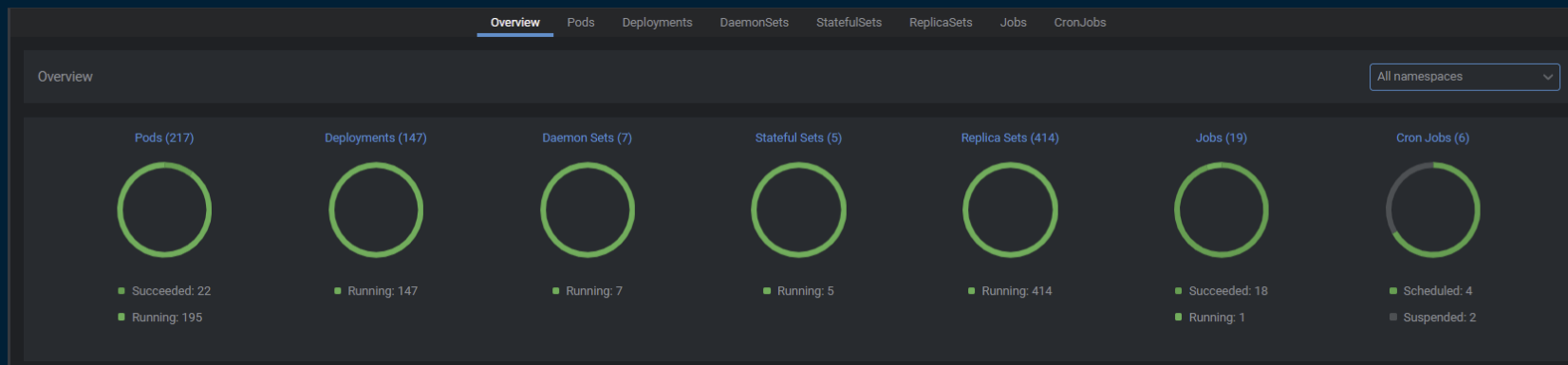
<input type="checkbox"/> Name ▾	Namespace ▾	Type ▾	Cluster IP ▾	Ports ▾
<input type="checkbox"/> alertmanager-operated	v4mmon	ClusterIP	None	9093:http-web/TCP, 9094/TCP, 9094/UDP
<input type="checkbox"/> prometheus-operated	v4mmon	ClusterIP	None	9090:http-web/TCP
<input type="checkbox"/> v4m-alertmanager	v4mmon	ClusterIP	10.43.128.50	9093/TCP
<input type="checkbox"/> v4m-grafana	v4mmon	ClusterIP	10.43.157.141	80:3000/TCP
<input type="checkbox"/> v4m-kube-state-metrics	v4mmon	ClusterIP	10.43.202.56	8080/TCP
<input type="checkbox"/> v4m-node-exporter	v4mmon	ClusterIP	10.43.31.197	9110/TCP
<input type="checkbox"/> v4m-operator	v4mmon	ClusterIP	10.43.23.219	443:https/TCP
<input type="checkbox"/> v4m-prometheus	v4mmon	ClusterIP	10.43.94.81	9090/TCP

Namespaces and pods

- Pods running belongs to a specific namespace
- You can name the “viya” namespace whatever you like – in this example it is called “Viya4”
- It is possible to run several namespaces with Viya on the same Kubernetes cluster*
 - * resource constraints can occur – must be sized accordingly

All pods running in K8s in a typical SAS Viya4 environment

Different namespaces in single overview using Lens



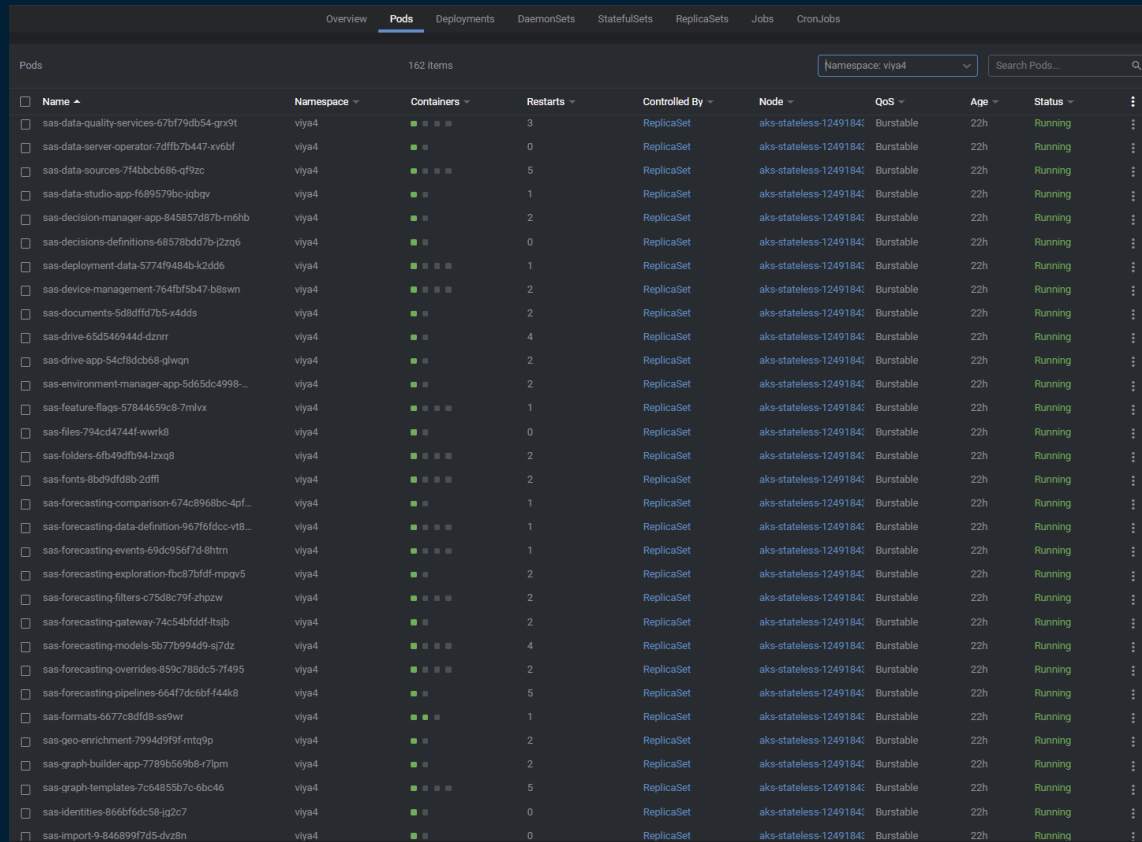
Pods in K8s

Using Lens to get an overview – all namespaces

Name	Namespace	Containers	Restarts	Controlled By	Node	QoS	Age	Status
azure-ip-masq-agent-6ensw	kube-system	1	0	DaemonSet	aks-stateful-16967586-	Burstable	9d	Running
azure-ip-masq-agent-f4dn4	kube-system	1	0	DaemonSet	aks-stateless-1249184-	Burstable	9d	Running
azure-ip-masq-agent-lr9bw	kube-system	1	0	DaemonSet	aks-cas-16967586-vms	Burstable	9d	Running
azure-ip-masq-agent-mq85s	kube-system	1	0	DaemonSet	aks-compute-16967586-	Burstable	9d	Running
azure-ip-masq-agent-rf74c	kube-system	1	0	DaemonSet	aks-system-16967586-	Burstable	9d	Running
azure-ip-masq-agent-n79l	kube-system	1	0	DaemonSet	aks-connect-16967586-	Burstable	9d	Running
calico-kube-controllers-5b6c6bd658-bmctb	calico-system	1	2	ReplicaSet	aks-system-16967586-	BestEffort	9d	Running
calico-node-2wf42	calico-system	1	0	DaemonSet	aks-compute-16967586-	BestEffort	9d	Running
calico-node-cwzfz	calico-system	1	3	DaemonSet	aks-stateless-1249184-	BestEffort	9d	Running
calico-node-i9zqz	calico-system	1	0	DaemonSet	aks-cas-16967586-vms	BestEffort	9d	Running
calico-node-pgkph	calico-system	1	0	DaemonSet	aks-connect-16967586-	BestEffort	9d	Running
calico-node-xt9s5	calico-system	1	0	DaemonSet	aks-system-16967586-	BestEffort	9d	Running
calico-node-ztm4s	calico-system	1	0	DaemonSet	aks-stateful-16967586-	BestEffort	9d	Running
calico-typha-759dc6c4db-gvfnh	calico-system	1	0	ReplicaSet		BestEffort	9d	Pending
calico-typha-759dc6c4db-zdz6v	calico-system	1	0	ReplicaSet		BestEffort	57d	Pending
calico-typha-759dc6c4db-zzpj5	calico-system	1	0	ReplicaSet	aks-system-16967586-	BestEffort	77d	Running
cert-manager-7dd5854bb4-nb8f4	cert-manager	1	2	ReplicaSet	aks-system-16967586-	BestEffort	9d	Running
cert-manager-cainjector-64c949654c-kfkwk	cert-manager	1	3	ReplicaSet	aks-system-16967586-	BestEffort	9d	Running
cert-manager-webhook-6bdfc7e9d-4c9ql	cert-manager	1	0	ReplicaSet	aks-system-16967586-	BestEffort	9d	Running
coredns-autoscaler-54d55c8b75-9vfvd	kube-system	1	0	ReplicaSet	aks-system-16967586-	Burstable	9d	Running
coredns-dc97c5f55-fkthg	kube-system	1	0	ReplicaSet	aks-system-16967586-	Burstable	9d	Running
coredns-dc97c5f55-n6tq2	kube-system	1	0	ReplicaSet	aks-system-16967586-	Burstable	9d	Running
csi-azuredisk-node-9cldm	kube-system	1	0	DaemonSet	aks-stateful-16967586-	Burstable	9d	Running
csi-azuredisk-node-bqgym	kube-system	1	0	DaemonSet	aks-stateless-1249184-	Burstable	9d	Running
csi-azuredisk-node-ddgmz	kube-system	1	0	DaemonSet	aks-system-16967586-	Burstable	9d	Running
csi-azuredisk-node-l7vfx	kube-system	1	0	DaemonSet	aks-cas-16967586-vms	Burstable	9d	Running
csi-azuredisk-node-klcht	kube-system	1	0	DaemonSet	aks-connect-16967586-	Burstable	9d	Running
csi-azuredisk-node-p5bbt	kube-system	1	0	DaemonSet	aks-compute-16967586-	Burstable	9d	Running
csi-azurefile-node-5bpc5	kube-system	1	0	DaemonSet	aks-connect-16967586-	Burstable	9d	Running
csi-azurefile-node-5ps96	kube-system	1	0	DaemonSet	aks-stateless-1249184-	Burstable	9d	Running
csi-azurefile-node-9rtm	kube-system	1	0	DaemonSet	aks-cas-16967586-vms	Burstable	9d	Running

Pods in K8s

Using Lens to get an overview – Viya4 namespaces



Name	Namespace	Containers	Restarts	Controlled By	Node	QoS	Age	Status	
sas-data-quality-services-67b79db54-grx9t	viya4	4	3	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-data-server-operator-7dfb7b447-xv6bf	viya4	1	0	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-data-sources-7f4bcc686-ql9zc	viya4	5	5	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-data-studio-app-f689579bc-jqbgv	viya4	2	1	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-decision-manager-app-845857d87b-r6bh	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-decisions-definitions-6857bdd7b-j2zq6	viya4	2	0	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-deployment-data-57749484b-k2dd6	viya4	2	1	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-device-management-764fb5b47-b8sw	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-documents-5d8dff7b5-x4dds	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-drive-65d546944d-dzrr	viya4	4	4	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-drive-app-54cf8dcb68-qlwqn	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-environment-manager-app-5d65dc4998...	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-feature-flags-57844659c8-7mlvx	viya4	1	1	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-files-794cd4744f-wwrk8	viya4	1	0	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-folders-6fb49dfb94-lzqx8	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-fonts-8bd9dfdb8-2dfll	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-forecasting-comparison-674c8968bc-4pf...	viya4	1	1	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-forecasting-data-definition-9676fdcc-vt8...	viya4	1	1	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-forecasting-events-69dc956f7d-8htrn	viya4	1	1	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-forecasting-exploration-fbc87bdf-fmpgv5	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-forecasting-filters-c75d8c79f-zhpzw	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-forecasting-gateway-74c54bfdd-fsjsb	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-forecasting-models-5b776994d9-sj7dz	viya4	4	4	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-forecasting-overrides-859c788dc-5-7f495	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-forecasting-pipelines-6647dc6bf-f44k8	viya4	5	5	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-formats-6677c8df8-ss9wr	viya4	1	1	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-geo-enrichment-7994d9f9f-mtq9p	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-graph-builder-app-7789b569b8-r7lpm	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-graph-templates-7c64855b7c-ebc46	viya4	5	5	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-identities-866bf6dc58-jq2c7	viya4	2	2	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	
sas-import-9-84689917d5-dvz8n	viya4	0	0	ReplicaSet	aks-stateless-1249184	Burstable	22h	Running	

Pods in K8s

Interaction with pods

- Access thru Lens
 - demo
- CLI access
 - kubectl
- Logs
 - Access logs demo

The screenshot shows the Lens Kubernetes dashboard for a pod named 'sas-lineage-app-8b7c65f9-xkq7x'. The pod is in the 'hackinsas-dnbpoc' namespace and is currently 'Running'. The dashboard displays various metadata and configuration details:

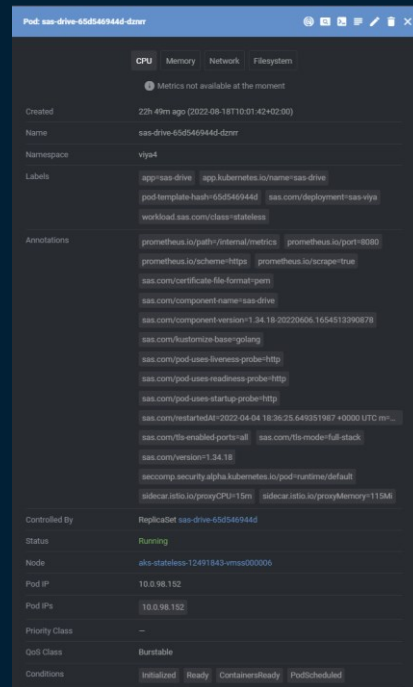
- Created:** 10d 82m ago (2022-03-29T16:59:11+02:00)
- Name:** sas-lineage-app-8b7c65f9-xkq7x
- Namespace:** hackinsas-dnbpoc
- Labels:** app=sas-lineage-app, app.kubernetes.io/name=sas-lineage-app, pod-template-hash=8b7c65f9, sas.com/deployment=sas-viya, workload.sas.com/class=stateless
- Annotations:** prometheus.io/path=/internal/metrics, prometheus.io/port=8080, prometheus.io/scheme=https, prometheus.io/scrape=true, sas.com/certificate-file-format=pem, sas.com/component-name=sas-lineage-app, sas.com/component-version=2.16.3-20220322.1647950590592, sas.com/kustomize-base=golang, sas.com/pod-uses-liveness-probe=http, sas.com/pod-uses-readiness-probe=http, sas.com/pod-uses-startup-probe=http, sas.com/tls-enabled-ports=all, sas.com/tls-mode=full-stack, sas.com/version=2.16.3, seccomp.security.alpha.kubernetes.io/pod-runtime/default, sidecar.istio.io/proxyCPU=15m, sidecar.istio.io/proxyMemory=115Mi
- Controlled By:** ReplicaSet sas-lineage-app-8b7c65f9
- Status:** Running
- Node:** aks-stateless-57434873-vmss000000
- Pod IP:** 10.244.6.17
- Pod IPs:** 10.244.6.17
- Priority Class:** -
- QoS Class:** Burstable
- Conditions:** Initialized, Ready, ContainersReady, PodScheduled
- Tolerations:** 5 (Show)
- Affinities:** 2 (Show)
- Secrets:** sas-cerframe-token

At the bottom, there is a section for 'Init Containers'.

Pods in K8s

Access thru Lens

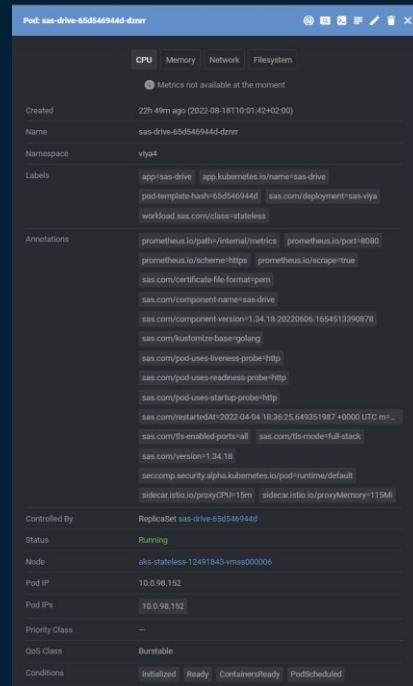
- You can interact with pods in Lens
- Attach to pod



Pods in K8s

Access thru Lens

- You can interact with pods in Lens
- Open the pod shell



Pods in K8s

Access thru Lens

- You can interact with pods in Lens
- Open the pod shell

```
Pod: sas-drive-65d546944d-dznrr (namespace: viya4) x +
PS C:\Users\noro1h> kubectl exec -i -c -n viya4 sas-drive-65d546944d-dznrr -- sas-drive -- sh -c "clear; (bash || ash || sh)"
sh: clear: command not found
bash-4.4$
```

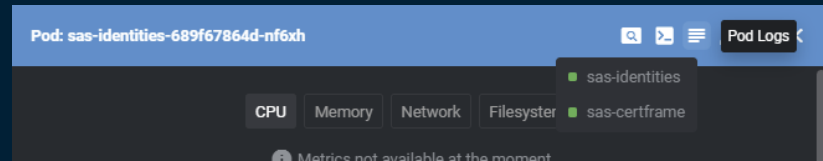
The screenshot shows the Lens application interface for a pod. At the top, there are tabs for CPU, Memory, Network, and Filesystem. Below these, a message states "Metrics not available at the moment". The main content area displays various pod details:

- Created:** 22h 49m ago (2022-08-18T10:01:42+02:00)
- Name:** sas-drive-65d546944d-dznrr
- Namespace:** viya4
- Labels:** app=sas-drive, app.kubernetes.io/name=sas-drive, pod-template-hash=65d546944d, sas.com/deployment=sas-viya, workload.sas.com/class=stateless
- Annotations:** prometheus.io/path=/external/metrics, prometheus.io/port=8080, prometheus.io/scheme=https, prometheus.io/scrape=true, sas.com/certificate-file-format=pem, sas.com/component=name=sas-drive, sas.com/component-version=1.34.18, 20220606.164451399878, sas.com/customize-base=gotlang, sas.com/pod-uses-liveness-probe=http, sas.com/pod-uses-readiness-probe=http, sas.com/pod-uses-startup-probe=http, sas.com/restartAt=2022-04-04 18:36:25.649351987 +0000 UTC min, sas.com/tls-enabled-ports=all, sas.com/tls-mode=full-stack, sas.com/version=1.34.18, seccomp.security.alpha.kubernetes.io/pod-runtime/default, sidecar.info.io/proxyCPU=15m, sidecar.info.io/proxyMemory=115M
- Controlled By:** ReplicaSet sas-drive-65d546944d
- Status:** Running
- Node:** aks-stateless-12491845-vms000006
- Pod IP:** 10.0.98.152
- Pod IPs:** [10.0.98.152]
- Priority Class:** -
- QoS Class:** Burstable
- Conditions:** Initialized, Ready, ContainerReady, PodScheduled

Pods in K8s

Accessing pods logs

- Access to logs to debug eventual problems is easy with Lens



```
{ "version": 1, "timestamp": "2022-04-08T10:05:39.282Z", "level": "warn", "source": "sas-identities", "message": "[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DecisionBuilder\'.', 'properties': {'logger': 'com.sas.identities.Id..."}, {"version": 1, "timestamp": "2022-04-08T10:05:39.342Z", "level": "warn", "source": "sas-identities", "message": "[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DataBuilders\'.', 'properties': {'logger': 'com.sas.identities.Id..."}, {"version": 1, "timestamp": "2022-04-08T10:05:39.343Z", "level": "warn", "source": "sas-identities", "message": "[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DecisionBuilder\'.', 'properties': {'logger': 'com.sas.identities.Id..."}, {"version": 1, "timestamp": "2022-04-08T10:05:39.451Z", "level": "warn", "source": "sas-identities", "message": "[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DataBuilders\'.', 'properties': {'logger': 'com.sas.identities.Id..."}, {"version": 1, "timestamp": "2022-04-08T10:05:39.451Z", "level": "warn", "source": "sas-identities", "message": "[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DecisionBuilder\'.', 'properties': {'logger': 'com.sas.identities.Id..."}, {"version": 1, "timestamp": "2022-04-08T10:05:56.892Z", "level": "warn", "source": "sas-identities", "message": "[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DataBuilders\'.', 'properties': {'logger': 'com.sas.identities.Id..."}, {"version": 1, "timestamp": "2022-04-08T10:05:56.893Z", "level": "warn", "source": "sas-identities", "message": "[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DataBuilders\'.', 'properties': {'logger': 'com.sas.identities.Id..."}, {"version": 1, "timestamp": "2022-04-08T10:05:57.33Z", "level": "warn", "source": "sas-identities", "message": "[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DataBuilders\'.', 'properties': {'logger': 'com.sas.identities.Id..."}, {"version": 1, "timestamp": "2022-04-08T10:05:57.331Z", "level": "warn", "source": "sas-identities", "message": "[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DecisionBuilder\'.', 'properties': {'logger': 'com.sas.identities.Id..."}, {"version": 1, "timestamp": "2022-04-08T10:06:06.99Z", "level": "warn", "source": "sas-identities", "message": "[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DataBuilders\'.', 'properties': {'logger': 'com.sas.identities.Id..."}, {"version": 1, "timestamp": "2022-04-08T10:06:06.99Z", "level": "warn", "source": "sas-identities", "message": "[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DecisionBuilder\'.', 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"[IDENTIFIER_VALUES_MISSING] The identifier values were not found or generated for GROUP \\'DataBuilders\'.', 'properties': {'logger': 'com.sas.identities.Id..."}]
```

Pods in K8s

Access thru Lens

- Open the pod logs
- Download log is also possible

```
Pod: sas-drive-65d546944d-dzrrr (namespace: viya4) Pod: sas-drive-65d546944d-dzrrr x +
Namespace: viya4 Owner: ReplicaSet sas-drive-65d546944d Pod: sas-drive-65d546944d-dzrrr Container: sas-drive
[{"level": "info", "version": "1", "source": "sas-run-tool", "messageKey": "Executing sas-config-tool with retrier. Attempt 1...", "properties": {"logger": "tools/run", "caller": "impl/executor.go:199"}, "timestamp": "2022-08-18T08:14:45.2877040"}, {"level": "info", "version": "1", "source": "sas-run-tool", "messageKey": "Executing sas-bootstrap-tool with retrier. Attempt 1...", "properties": {"logger": "tools/run", "caller": "impl/executor.go:199"}, "timestamp": "2022-08-18T08:14:45.28783"}, {"level": "info", "version": "1", "source": "sas-run-tool", "messageKey": "...sas-config-tool completed.", "properties": {"logger": "tools/run", "caller": "impl/executor.go:177"}, "timestamp": "2022-08-18T08:14:45.587658000"}, {"level": "info", "version": "1", "source": "sas-run-tool", "messageKey": "sonder-log-icu.run.tool.waiting.for.service.finish.log", "properties": {"logger": "tools/run", "caller": "impl/executor.go:263"}, "timestamp": "2022-08-18T08:14:45.69092"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "sonder-log-icu.event.consumer.register.log", "messageParameters": {"Name": "SASLogonSessionDestroyed"}, "properties": {"logger": "commons/event/consumer", "caller": "event/co"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "sonder-log-icu.event.consumer.register.log", "messageParameters": {"Name": "DriveFolderChangeConsumer"}, "properties": {"logger": "commons/event/consumer", "caller": "event/co"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "sonder-log-icu.event.consumer.register.log", "messageParameters": {"Name": "DriveQueryFolderChangeConsumer"}, "properties": {"logger": "commons/event/consumer", "caller": "event/co"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "OpenTelemetry support is disabled", "properties": {"caller": "trace/trace.go:38"}, "timestamp": "2022-08-18T08:14:45.882040000"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "sonder-log-icu.event.manager.connect.log", "messageParameters": {"Name": "arke", "url": "20.105.153.79:5001"}, "properties": {"logger": "commons/event", "caller": "event/manag"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "sonder-log-icu.event.manager.connect.ok.log", "messageParameters": {"Name": "arke"}, "properties": {"logger": "commons/event", "caller": "event/manager.go:149"}, "timestamp": "2022-08-18T08:14:45.941000000"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "Connecting to message broker: Connecting to message broker: {} doNotCompare: [] doNotCopy: [] atomixMessageInfo: null} sizeCache: unknownFi"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "sonder-log-icu.event.consumer.worker.pool.create.log", "messageParameters": {"Name": "DriveFolderChangeConsumer"}, "properties": {"logger": "commons/event/consumer", "caller": "event/manager.go:149"}, "timestamp": "2022-08-18T08:14:45.941000000"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "sonder-log-icu.event.consumer.worker.pool.start.log", "messageParameters": {"Name": "DriveQueryFolderChangeConsumer"}, "properties": {"logger": "commons/event/consumer", "caller": "event/manager.go:149"}, "timestamp": "2022-08-18T08:14:45.941000000"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "sonder-log-icu.event.consumer.worker.pool.start.log", "messageParameters": {"Name": "SASLogonSessionDestroyed"}, "properties": {"logger": "commons/event/consumer", "caller": "event/manager.go:149"}, "timestamp": "2022-08-18T08:14:45.941000000"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "sonder-log-icu.event.consumer.worker.pool.start.log", "messageParameters": {"Name": "SASLogonSessionDestroyed"}, "properties": {"logger": "commons/event/consumer", "caller": "event/manager.go:149"}, "timestamp": "2022-08-18T08:14:45.941000000"}, {"level": "info", "version": "1", "source": "sas-drive", "messageKey": "sonder-log-icu.server.startup.log", "messageParameters": {"port": "8080", "startupTime": "655ms"}, "properties": {"caller": "app/application.go:352"}, "timestamp": "2022-08-18T08:14:45.941000000"}]
```

The screenshot shows the Lens Kubernetes dashboard for a pod named 'sas-drive-65d546944d-dzrrr'. The pod is in the 'viya4' namespace and is part of the 'sas-drive-65d546944d' ReplicaSet. The pod is currently in a 'Running' state. The dashboard displays various metrics and labels, including CPU and memory usage, network activity, and filesystem information. The pod is running on a node named 'aks-stable1-12491845-rms000006'. The pod IP is '10.0.98.152'. The pod is running on a priority class of '-' and a QoS class of 'Burstable'. The pod is in a 'Ready' state and is scheduled on a node.

CPU	Memory	Network	Filesystem
Metrics not available at the moment			

Created: 22h 49m ago (2022-08-18T10:01:42:02:00)

Name: sas-drive-65d546944d-dzrrr

Namespace: viya4

Labels: app=sas-drive, app.kubernetes.io/name=sas-drive, pod-template-hash=65d546944d, sas.com/deployment=sas-viya, workload.sas.com/class=stable1

Annotations: prometheus.io/path=/internal/metrics, prometheus.io/port=8080, prometheus.io/scheme=https, prometheus.io/scrape=true, sas.com/certificate=file-format=plain, sas.com/component=name=sas-drive, sas.com/component=version=1.34.16, 20220606.164512390878, sas.com/customize=base-golang, sas.com/pod-uses=livestats-probe-http, sas.com/pod-uses=readiness-probe-http, sas.com/pod-uses=startup-probe-http, sas.com/restapi=6442022-04-04-18:36:25.649201987-40000-UTC-mem, sas.com/vis-enabled-ports=all, sas.com/vis-mode=full-stack, sas.com/vison=1.34.16, seccomp.security.alpha.kubernetes.io/pod-runtime/default, sideway.info.io/procCPU=15m, sideway.info.io/procMemory=115MB

Controlled By: ReplicaSet sas-drive-65d546944d

Status: Running

Node: aks-stable1-12491845-rms000006

Pod IP: 10.0.98.152

Pod IP#s: 10.0.98.152

Priority Class: -

QoS Class: Burstable

Conditions: Initialized, Ready, ContainerReady, PodScheduled



Agenda

Kubernetes and components with SAS Viya4 in a Cloud environment

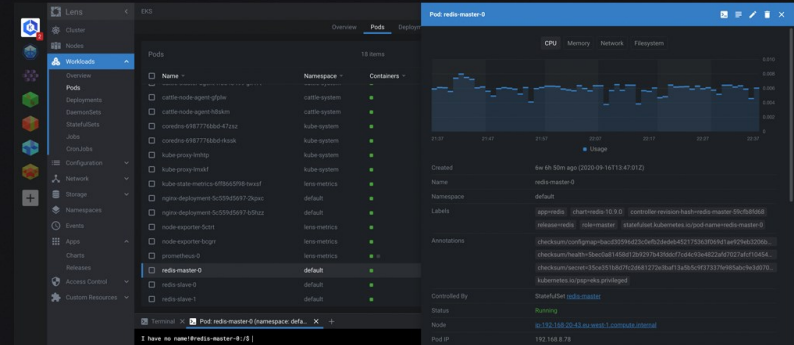
- What is Kubernetes (K8s)
- Main K8s Components
- K8s Architecture
- K8s YAML Configuration File(s)
- Organizing your components with K8s Namespaces
- **SAS Viya in Kubernetes – helpful tools**

Tools to get an overview

Lens

- Kubernetes Lens is an **effective, open-source IDE for Kubernetes.**
- Lens simplifies working with Kubernetes by helping you manage and monitor clusters in real time.

LENS // THE KUBERNETES IDE



Lens usage

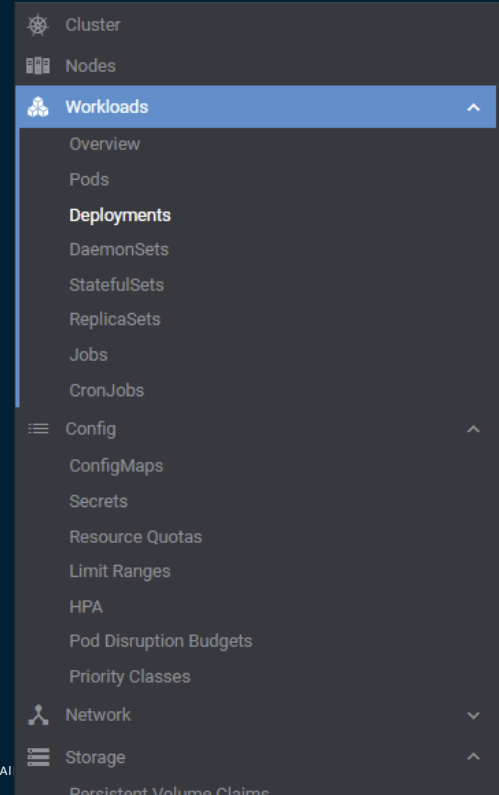
- Lens gives you control of your Kubernetes clusters
- K8s and SAS Viya4 configuration files we have looked at today will be available in Lens
- Graphical overview of you K8s system
- Easy to find pods state and issues with the cluster
- Easy to read logs from the different Pods

- Lets take a look at Lens

Lens

So much more than we have time to

- You can access all
 - Deployments
 - DaemonSets
 - StatefulSets
 - ReplicaSets
 - Jobs
 - CronJobs
 - Config files
 - Etc. etc.



Tools to get an overview

- A text editor such as Notepad++ or Visual Studio Code.
- If using VS Code, I recommend that you also install some extensions, namely:
 - "Remote SSH" - use this extension to open a remote connection to the virtual machine (for editing remote files)
 - "Markdown Preview Enhanced"
 - "JSON Formatter"
- A SSH client utility such as MobaXterm or PuTTY
- The kustomize utility for Windows.
- The kubectl utility for Windows.
- The Lens Kubernetes management IDE
- The Azure CLI for Windows.
- The Obsidian editor for viewing and editing markdown files (e.g. Git pages)

The end part 4
Thank You – that's it 😊

sas.com

