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

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Basic terms

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

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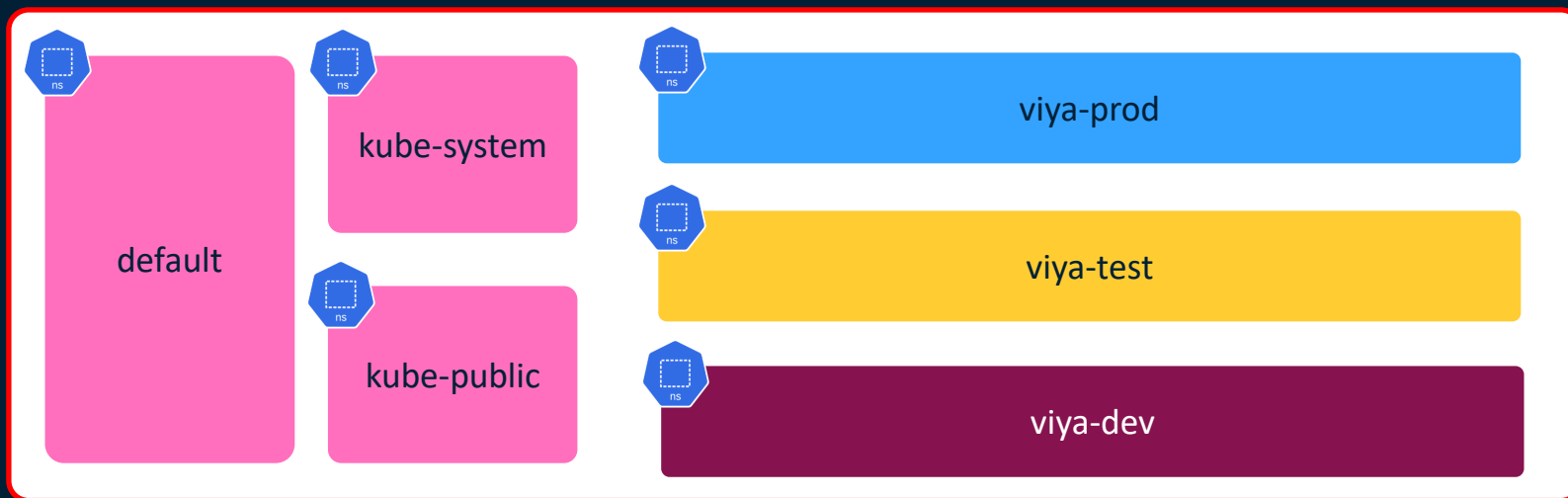
- There are system namespaces ( ) and user defined namespaces
- User defined namespaces (viya-dev, viya-test, viya-prod)

Kubernetes Namespace

ns

Kubernetes Namespaces

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
☐	nginx	kubernetes.io/metadata.name=nginx
☐	v4mlog	kubernetes.io/metadata.name=v4mlog
☐	v4mmon	kubernetes.io/metadata.name=v4mmon

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

| CPU | Memory | Network | Filesystem |

Usage
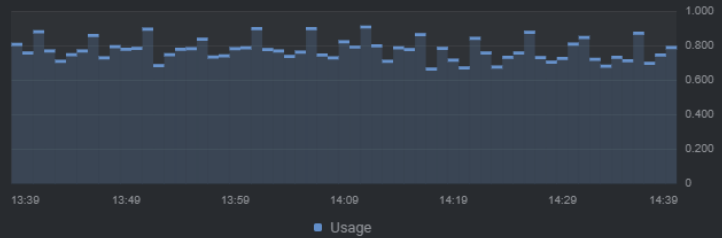
Created	24d 21h 32m ago (2022-09-12T17:07:03+02:00)
Name	kube-system
Labels	kubernetes.io/metadata.name=kube-system
Status	Active
Resource Quotas	—
Limit Ranges	—

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
```

Kubernetes Namespace

Kubernetes cluster – services also organized by Namespace

Services				8 items
Name ⌄	**Namespace** ⌄	**Type** ⌄	**Cluster IP** ⌄	**Ports** ⌄
alertmanager-operated	v4mmon	ClusterIP	None	9093:http-web/TCP, 9094/TCP, 9094/UDP
prometheus-operated	v4mmon	ClusterIP	None	9090:http-web/TCP
v4m-alertmanager	v4mmon	ClusterIP	10.43.128.50	9093/TCP
v4m-grafana	v4mmon	ClusterIP	10.43.157.141	80:3000/TCP
v4m-kube-state-metrics	v4mmon	ClusterIP	10.43.202.56	8080/TCP
v4m-node-exporter	v4mmon	ClusterIP	10.43.31.197	9110/TCP
v4m-operator	v4mmon	ClusterIP	10.43.23.219	443:https/TCP
v4m-prometheus	v4mmon	ClusterIP	10.43.94.81	9090/TCP

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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
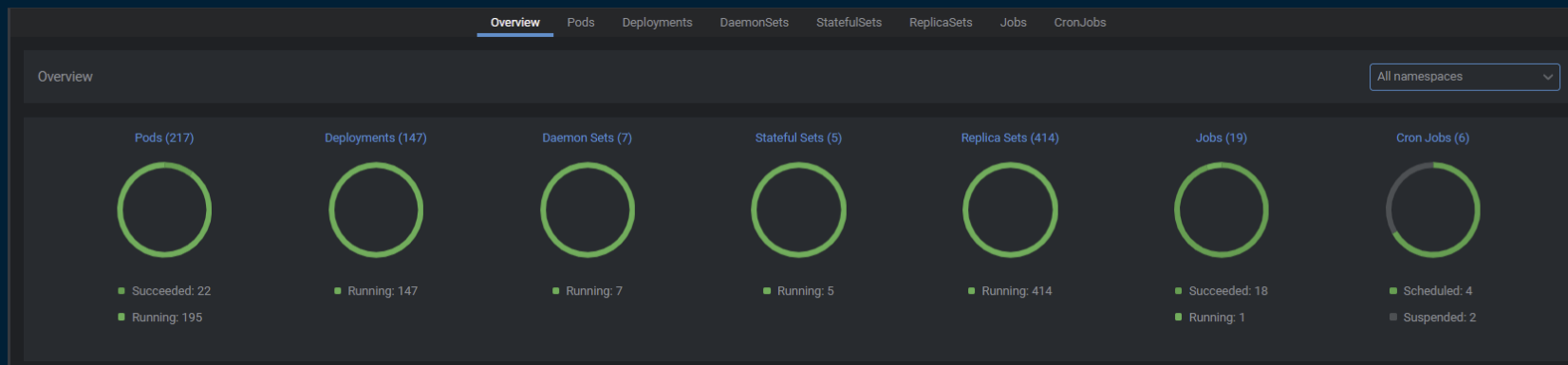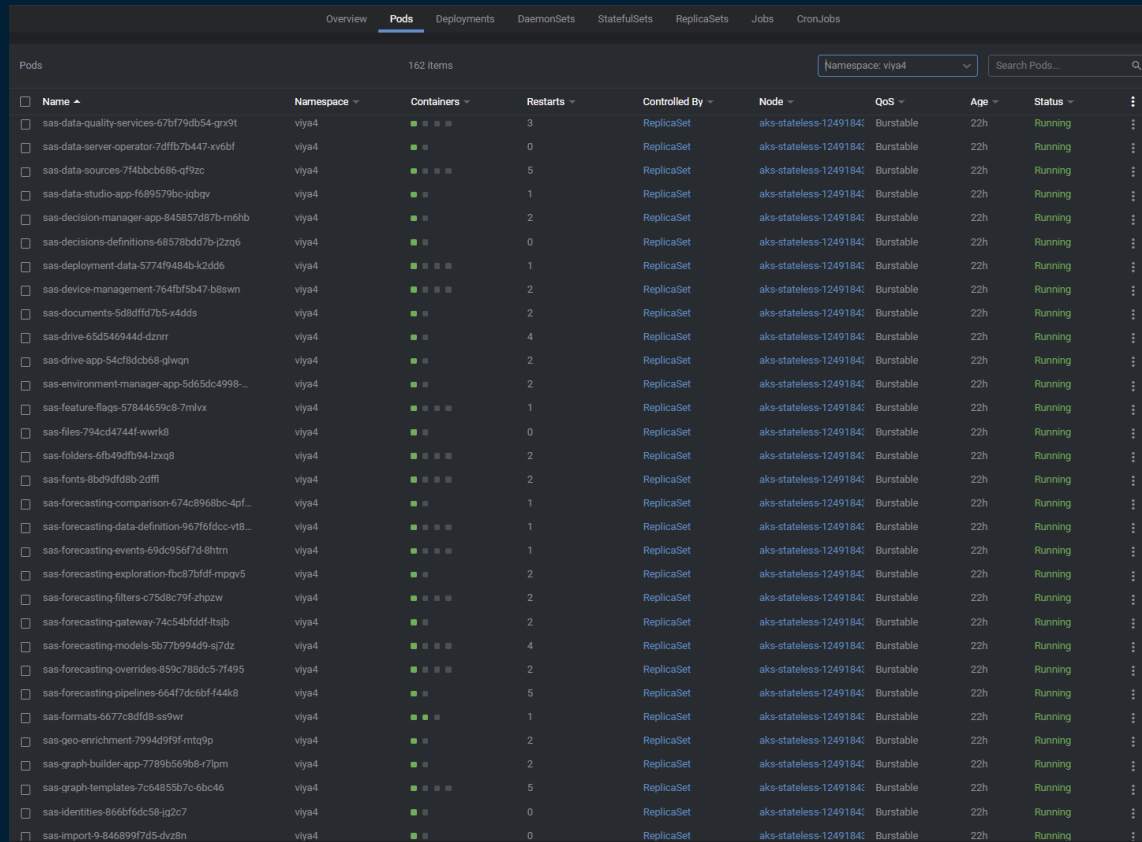
Pods in K8s

Using Lens to get an overview – all namespaces

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Pods in K8s

Using Lens to get an overview – Viya4 namespaces

Pods in K8s

Interaction with pods

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

Pods in K8s

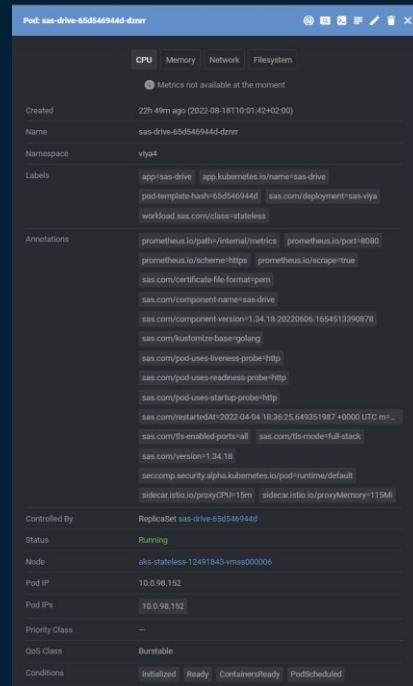## Access thru Lens

- 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

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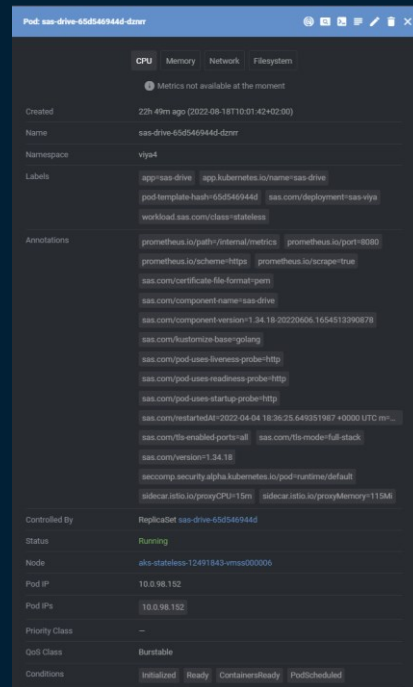
Pods in K8s

Access thru Lens

- You can interact with pods in Lens

- Open the pod shell

Pods in K8s

Accessing pods logs

- Access to logs to debug eventual problems is easy with Lens
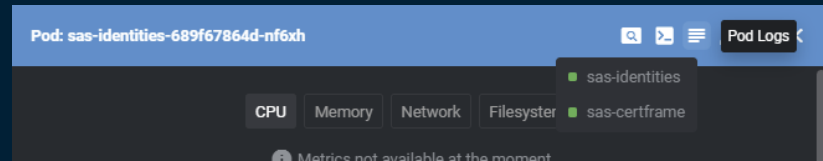
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Pods in K8s

Access thru Lens

- Open the pod logs
- Download log is also possible

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**

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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

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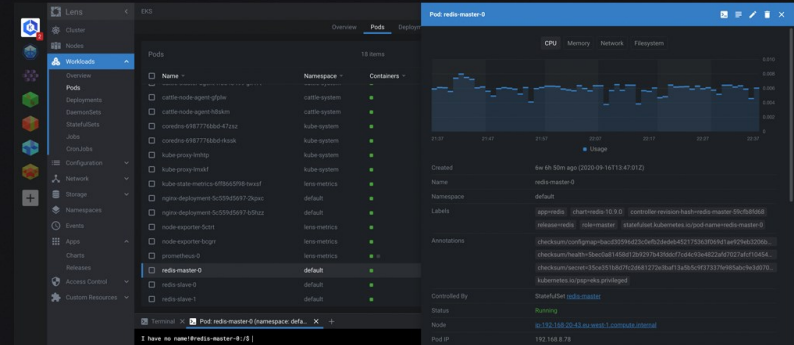
Lens usage

- 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
  - DeamonSets
  - StatefulSets
  - ReplicaSets
  - Jobs
  - CronJobs
  - Config files
  - Etc. etc.
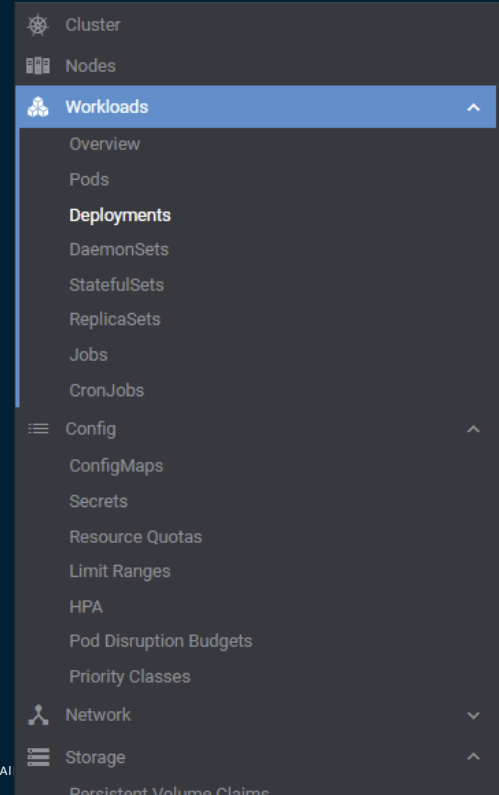
Tools to get an overview

- A text editor such as Nodepad++ 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)

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

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