

SAS Batch-Verarbeitung in der Welt von Kubernetes & Co.

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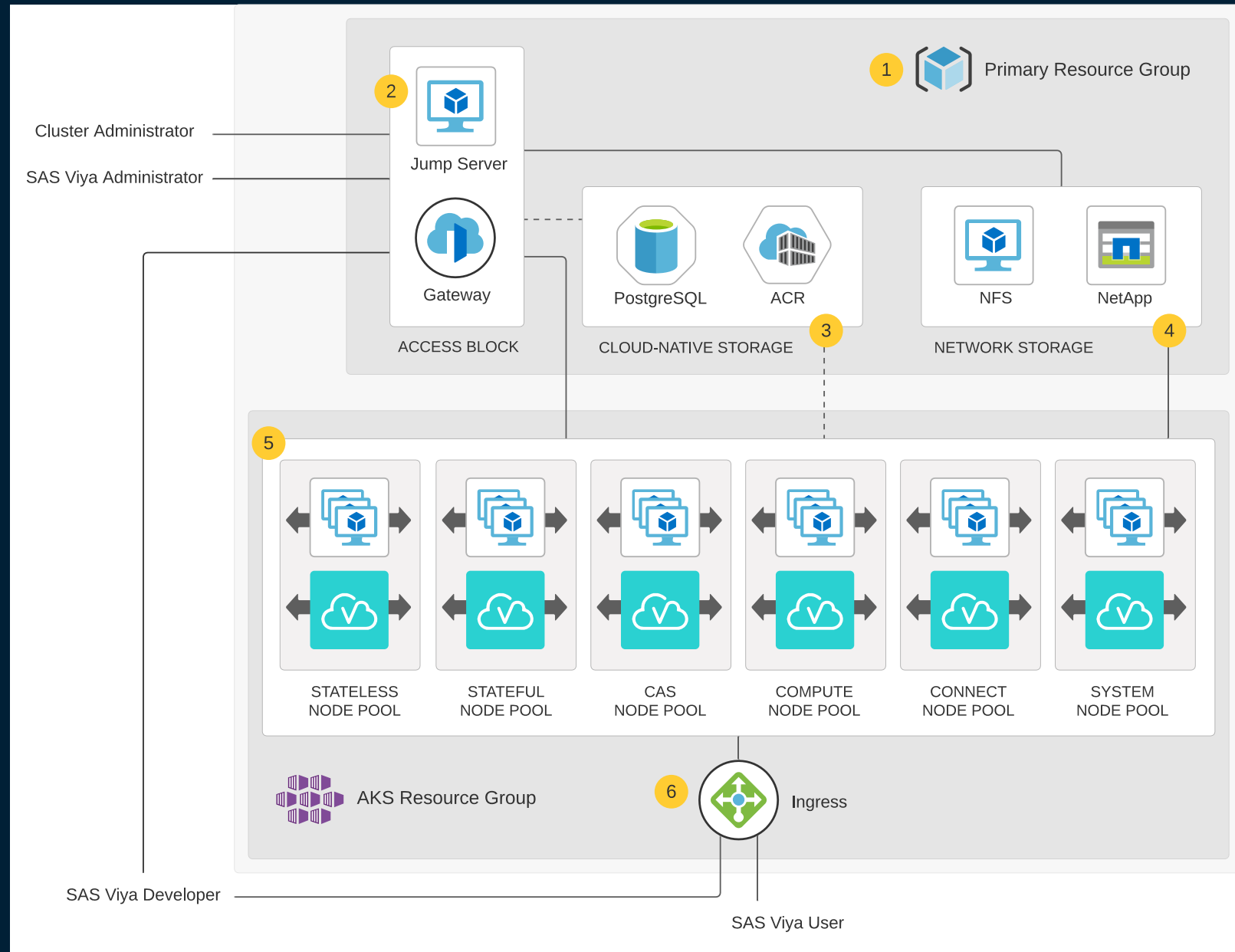
Agenda

- SAS Viya Workload Management (on Kubernetes)
- Infrastructure considerations
 - Choosing the best instance type (CPU, memory, local storage)
 - Benefits of enabling autoscaling for Compute nodepool
- SAS Viya Batch CLI
 - Live demo

SAS Viya 202x.x

Deployment overview for Azure (taken from Viya Operations Guide)

- Focus on the COMPUTE nodepool today
- Kubernetes scheduler assigns all SAS jobs to run on COMPUTE (if available)
- User/warehouse data lives on (shared) network storage or in databases
- Nodes have local storage attached as well (SASWORK?)



SAS Workload Management

(bringing SAS Grid to Viya)

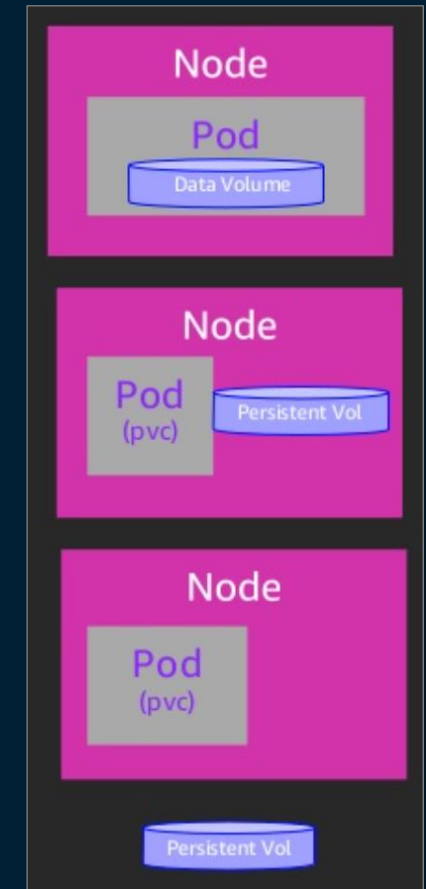
- November 2020 – Kubernetes
 - High availability
 - Scalability
 - Batch submission of jobs
 - Job flow definition/scheduling
- 2021 – SAS Grid parity
 - Option sets for users/groups/roles
 - Queues
 - Prioritization
 - Preempt/resume
 - SAS program checkpoint/restart
- 2022+ – Workload Optimization
 - Optimization of cloud resources
 - Profiling



Infrastructure considerations

Kubernetes storage concepts

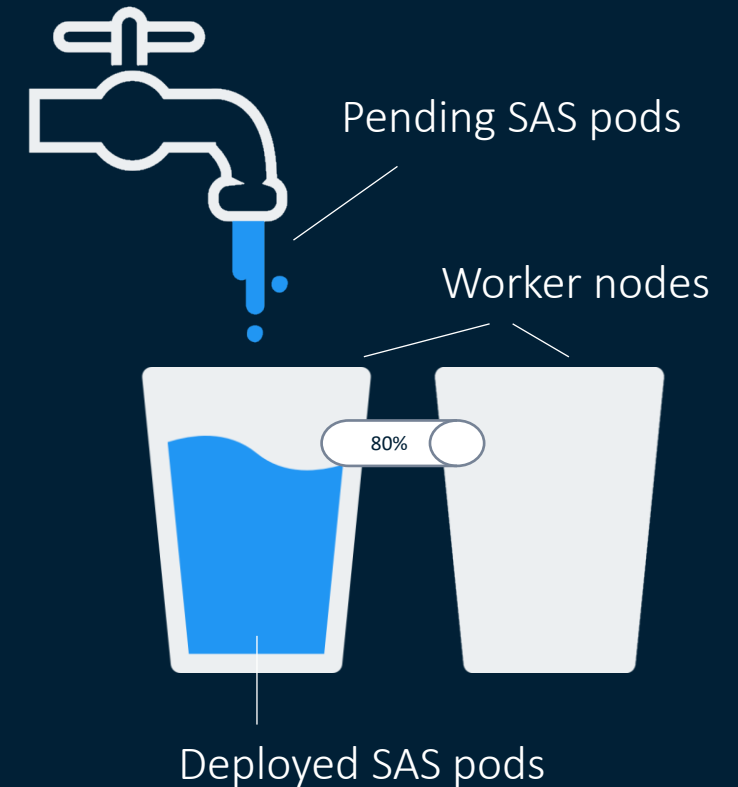
- Pods have access to ephemeral storage which is directly attached to their host (i.e. worker node)
 - Not a good choice for SASWORK and CAS Disk Cache
 - Better attach additional fast disks to Kubernetes nodes (e.g. select the right instance type in public clouds)
- User / warehouse data needs to be made available on shared storage („RWX storage“) mapped to Kubernetes
 - Cloud providers offer managed services for this, e.g. EFS, Lustre, Azure Files, NetApp etc.
 - NFS is a popular and simple choice for on-premise clusters
 - Keep in mind that SAS processing is still heavily I/O-bound (even with SAS Viya)



Infrastructure considerations

Enabling autoscaling for Compute nodepool

- Allows Kubernetes to grow (and shrink) the number of worker nodes in the Compute nodepool in response to the requested workload (number of SPRE sessions)
- Great for adding compute power „just in time“ without wasting resources (and money)
- The Kubernetes Cluster Autoscaler component instructs the underlying infrastructure (AWS, Azure, GCE, OpenStack etc.) to add or remove machines
- Decisions based on node utilization and declared resource usage of pending pod



SAS Viya Batch CLI

Setup

- Download CLI and configure

```
export SSL_CERT_FILE=/path/to/server.crt
```

```
sas-viya plugins install --repo sas authorization
```

```
sas-viya plugins install --repo sas batch
```

```
sas-viya plugins install --repo sas compute
```

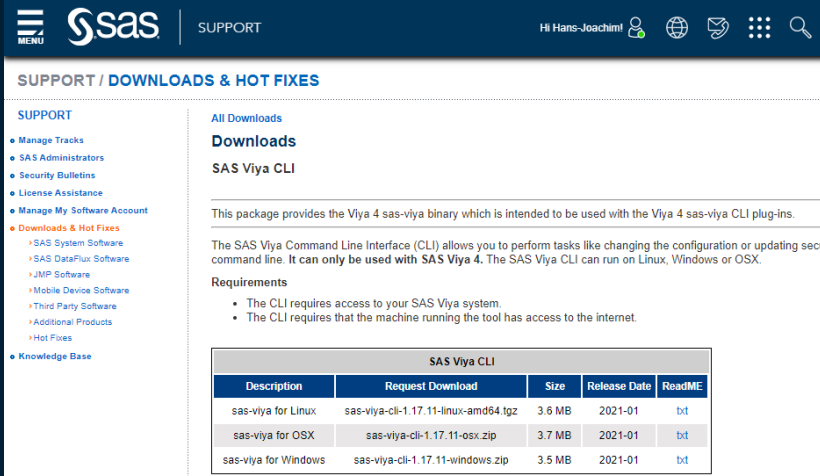
...

```
sas-viya profile init
```

```
sas-viya auth login
```

- Run interactively or integrate with your enterprise scheduler

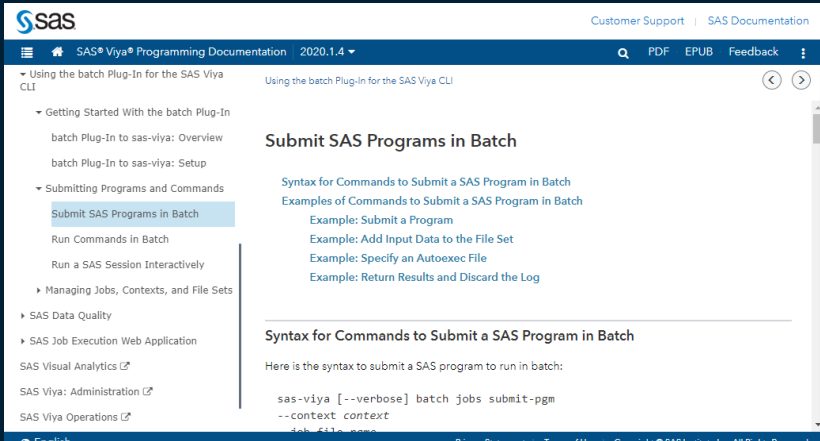
```
sas-viya batch jobs submit-pgm \  
  --pgm-path /myuser/sas/mypgm.sas \  
  --context default
```



The screenshot shows the SAS Support website. The top navigation bar includes the SAS logo, a 'SUPPORT' link, and a user profile 'Hi Hans-Joachim'. The main content area is titled 'SUPPORT / DOWNLOADS & HOT FIXES'. On the left, a sidebar lists various support topics like 'Manage Tracks', 'SAS Administrators', 'Security Bulletins', 'License Assistance', 'Manage My Software Account', 'Downloads & Hot Fixes', and 'Knowledge Base'. The 'Downloads & Hot Fixes' section is expanded, showing 'All Downloads' and 'Downloads'. Under 'Downloads', there is a section for 'SAS Viya CLI'. It states: 'This package provides the Viya 4 sas-viya binary which is intended to be used with the Viya 4 sas-viya CLI plug-ins.' It also explains that the SAS Viya Command Line Interface (CLI) allows performing tasks like changing configuration or updating security command line, and that it can only be used with SAS Viya 4. Below this, there are 'Requirements' listed: 'The CLI requires access to your SAS Viya system.' and 'The CLI requires that the machine running the tool has access to the internet.' A table titled 'SAS Viya CLI' provides details for different operating systems:

Description	Request Download	Size	Release Date	ReadME
sas-viya for Linux	sas-viya-cli-1.17.11-linux-amd64.tgz	3.6 MB	2021-01	txt
sas-viya for OSX	sas-viya-cli-1.17.11-osx.zip	3.7 MB	2021-01	txt
sas-viya for Windows	sas-viya-cli-1.17.11-windows.zip	3.5 MB	2021-01	txt

<https://support.sas.com/downloads/package.htm?pid=2512>



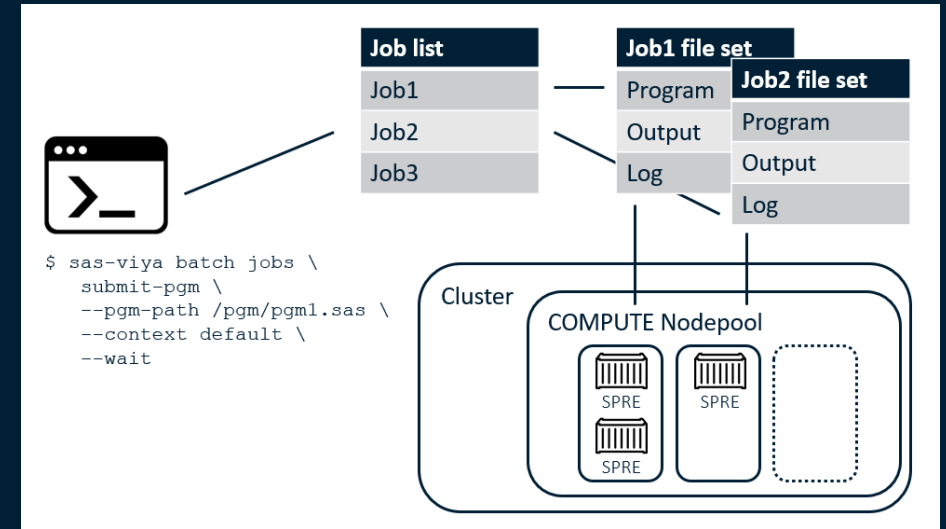
The screenshot shows the SAS Viya Programming Documentation page for 'Submit SAS Programs in Batch'. The top navigation bar includes the SAS logo, 'Customer Support', and 'SAS Documentation'. The page title is 'SAS® Viya® Programming Documentation | 2020.1.4'. The left sidebar shows a navigation menu with options like 'Using the batch Plug-In for the SAS Viya CLI', 'Getting Started With the batch Plug-In', 'batch Plug-In to sas-viya: Overview', 'batch Plug-In to sas-viya: Setup', 'Submitting Programs and Commands', 'Submit SAS Programs in Batch' (which is highlighted), 'Run Commands in Batch', 'Run a SAS Session Interactively', 'Managing Jobs, Contexts, and File Sets', 'SAS Data Quality', 'SAS Job Execution Web Application', 'SAS Visual Analytics', 'SAS Viya: Administration', and 'SAS Viya Operations'. The main content area is titled 'Submit SAS Programs in Batch'. It includes a section 'Syntax for Commands to Submit a SAS Program in Batch' with examples: 'Example: Submit a Program', 'Example: Add Input Data to the File Set', 'Example: Specify an Autoexec File', and 'Example: Return Results and Discard the Log'. Below this, there is a section 'Syntax for Commands to Submit a SAS Program in Batch' which states: 'Here is the syntax to submit a SAS program to run in batch:' and provides the command: 'sas-viya [--verbose] batch jobs submit-pgm --context context'.

https://go.documentation.sas.com/?cdId=pgmsascdc&cdcVersion=v_010&docsetId=gsub&docsetTarget=p10gm7sg1m9k8dn1lvh0an2cic08.htm&locale=en

SAS Viya Batch CLI

Usage

- The Viya Batch CLI allows you to submit SAS programs and commands to a SPRE environment
 - Every SPRE session is a separate Kubernetes pod of type „job“
 - Kubernetes „job“ objects always run to completion (unlike services they stop)
- You can submit SAS programs interactively or in batch
- You can define execution contexts (user identity, SAS options ...)
- Results, code, logs, (data) is kept in a SAS managed file set
- Usage of Batch CLI is restricted via permissions (set in EV)



Zzz zzz...

Zzz zzz...

Zzz zzz...

**Demo
Time!**

Zzz zzz...

Darling, bring the popcorn!

Have you seen
my glasses?

A series of horizontal bars of varying lengths and colors (teal, blue, and dark blue) are arranged on the left side of the slide, creating a modern, abstract background element.

Thank you for your time!

sas.com

