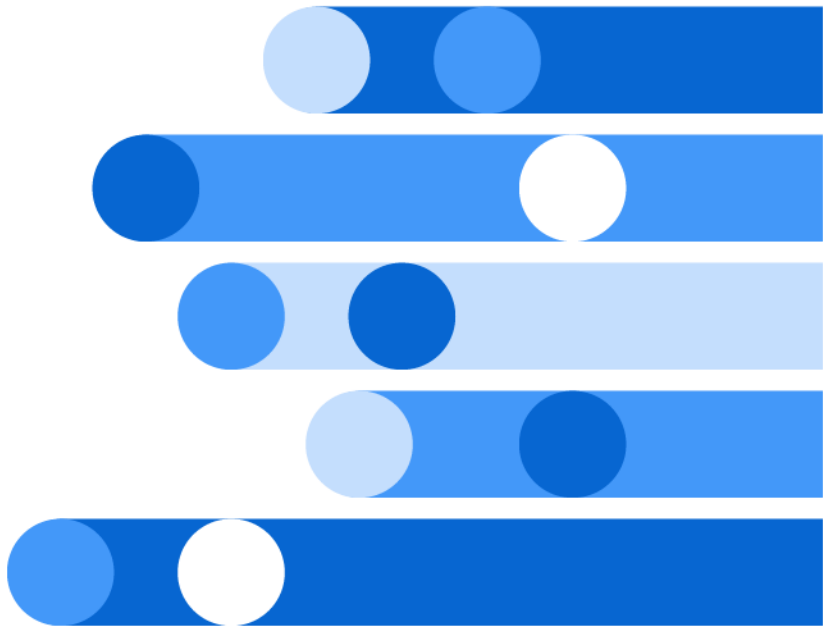
What's New in SAS® Viya® Platform Operations

2020.1 - 2026.05*



* This document might apply to additional versions of the software. Open this document in SAS Help Center and click on the version in the banner to see all available versions.

SAS® Documentation
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What's New in SAS® Viya® Platform Operations

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Long-Term Support Releases

LTS 2026.03 (May 2026)

About the Release

The Long-Term Support 2026.03 (May 2026) release is based on the Stable 2026.03 (March 2026). The Long-Term Support 2026.03 release includes all the features, enhancements, fixes, and security patches that are included in the Long-Term Support 2025.09 (November 2025) release and in the subsequent Stable releases through the Stable 2026.03 release. Also, patch updates that are available through Stable 2026.05 are included.

Note: When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

System Requirements: Critical Changes

Critical Changes: Kubernetes Requirements

Support for Kubernetes 1.34.*x* has been added for all supported providers. Kubernetes 1.31.*x* is no longer supported. SAS Viya platform 2026.02 supports Kubernetes 1.32.*x* - 1.34.*x*.

Critical Change: Red Hat OpenShift Support

For SAS Viya platform deployments in OpenShift clusters, support for Red Hat OpenShift Container Platform (OCP) and OpenShift Kubernetes Engine (OKE) 4.21.*x* has been added. Red Hat OCP or OKE 4.17.*x* is not supported. With 2026.03 and later, you can use Red Hat OCP or OKE 4.19.*x* – 4.21.*x*.

OpenShift must be running in one of the supported environments. These OKE and OCP versions align with Kubernetes 1.32.*x* – 1.34.*x*.

Critical Change: Ingress Controller

An ingress controller that the SAS Viya platform supports for deployment, ingress-nginx (or Ingress NGINX controller), is being retired by the Kubernetes community. You can replace ingress-nginx with Contour ingress controller.

Starting with 2026.03, SAS provides support for Contour 1.30.0 or later in all Stable and Long-Term Support (LTS) releases of the SAS Viya platform and solutions that are in Standard Support. You can replace the ingress controller with Contour in any SAS Viya version in Standard Support by:

- applying the latest patch updates while making the change
- making the change while performing a version update of your SAS Viya platform deployment

The deployment documentation includes information to assist you with the transition. See the Cluster Ingress Requirements and *Changing Ingress Controllers in a Deployment* for more information.

Using the Contour ingress controller requires a new command when updating a SAS Viya platform deployment that is using the Kubernetes commands method of deployment. The new command is included in the list of deployment commands in Deployment Using Kubernetes Commands.

After the retirement of ingress-nginx, the SAS Viya platform will continue to provide Standard Support for environments that use it; however, neither SAS nor the Kubernetes community will address bugs or security issues for that component. Continuing to use ingress-nginx after March, 2026 is at your own risk.

Critical Change: Upgraded Source Base Image

The source base image for the SAS Viya platform has been upgraded from the Red Hat Universal Base Image 8 (UBI8) to the Red Hat Universal Base Image 9 (UBI9). Containers based on UBI9 are no longer supported on Red Hat Enterprise Linux 7. Therefore, SAS does not support running SAS Viya platform on clusters with nodes that are running Red Hat Enterprise Linux 7.*x*.

This change might affect you if your deployment is running in open-source Kubernetes. Red Hat Enterprise Linux and other versions of Linux that are used by the supported cloud providers are supported. The basic requirement is an operating system that is compatible with Red Hat UBI9. This Compatibility Matrix from Red Hat provides a summary.

Critical Changes: Requirements for External Language Integration

SAS Viya platform integration with open-source languages requires compatible binary files for your language source. Your Python or R source installation must consist of Linux binaries that are compatible with Red Hat Universal Base Image 9 (UBI9). Previously, Red Hat UBI8 was used as the source base image for the SAS Viya platform.

SAS Viya is not compatible with Windows binaries.

As a result of this change to SAS Viya platform base images, SAS Configurator for Open Source will automatically rebuild all content that it manages in order to use UBI9-compatible libraries. SAS Configurator for Open Source detects UBI8 related content in the shared storage volume (at the mountPath **`/opt/sas/viya/home/sas-pyconfig`**) and rebuilds it automatically.

> **IMPORTANT** Any content in the shared storage volume at **`/opt/sas/viya/home/sas-pyconfig`** should be strictly for the use of SAS Configurator for Open Source to support SAS Viya integration with open-source languages. Move any content that was not produced by SAS Configurator for Open Source out of this storage volume before you update your deployment to 2025.11 or later

SAS Configurator for Open Source now supports Python 3.12.12 and R 4.4.3. The Python and R versions are determined by parameters in the SAS Configurator for Open Source transformer: **`$deploy/site-config/sas-pyconfig/change-configuration.yaml`**. The `default_py.python_signature` and `default_py.python_tarball` properties have been modified to support a newer version of Python, and `default_r.r_tarball` has been modified for R. If you have enabled the transformer and are using the most recent version of it, the utility attempts to download and build the newer versions of Python and R by default.

If you upgrade your cluster to Red Hat OCP 4.20 or later, an additional step is required to configure the fsGroup. For more information, see "Enable SAS Configurator for Open Source to Function in OpenShift" in *SAS Viya Platform: Integration with External Languages*.

Changes to Data Access Requirements

SAS In-Database Technologies for Azure Synapse Analytics no longer supports Spark 3.3. An additional RPM file that became available for a SAS Embedded Process for Spark deployment in 2024.11 is now compatible with SAS In-Database Technologies for Azure Synapse. The new deployment is referred to as the *accelserver* RPM file. The previous deployment, referred to as the *sepcorespark* RPM file, continues to be supported. When you deploy the accelserver RPM, additional functionality is available.

The two SAS Embedded Process deployments support different versions of Spark. For more information, see "Requirements for SAS In-Database Technologies for Azure Synapse Analytics" in *System Requirements for the SAS Viya Platform*.

SAS/ACCESS Interface to Hadoop has added support for Amazon EMR 7. This support has been added in addition to support for Amazon EMR 5.13 and EMR 6.

SAS In-Database Technologies for Cloudera Data Platform has added support for an additional distribution: Cloudera CDP 7.3. Both Public Cloud and Private Cloud deployments are supported. Additional configuration might be required for backward compatibility with existing SAS programs. For more information, see "Requirements for SAS In-Database Technologies for Cloudera Data Platform" in *System Requirements for the SAS Viya Platform*.

Changes to Requirements for SAS Risk Solutions

A new component, SAS Fast Execution Resource Management Infrastructure (FERMI), is used by SAS Insurance Capital Management, SAS Insurance Contract Valuation, and SAS Regulatory Capital Management.

FERMI was designed to support SAS Risk solutions by orchestrating job flows with explicit task dependencies, scalable execution, and fault tolerance. It operates as a standalone component for the SAS Viya platform and is gradually being adopted by additional SAS Risk offerings.

Over the longer term, FERMI will replace the Process Orchestration functionality for SAS Risk that uses an Apache Airflow database. It has additional requirements. For more information about SAS Fast Execution Resource Management Infrastructure and its requirements, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

Changes to SAS SpeedyStore

SAS SpeedyStore has added support for deployment in any of the supported Google Cloud environments. As a result, SAS SpeedyStore can now be deployed on all the supported cloud platforms.

Documentation has been added about a default SingleStore setting that can affect string comparisons. For case-sensitive comparisons, you might need to change the server collation setting in the SingleStore deployment. For more information and instructions to change the default setting, see "Setting or Modifying the Collation" in *SAS SpeedyStore: Administration and Configuration Guide*.

Support for Deployment into Multiple Availability Zones

You can deploy the SAS Viya platform into a cluster that spans multiple availability zones in Microsoft Azure, AWS, and Google Cloud environments. Multiple availability zones can enhance the high availability (HA) that is provided by Kubernetes and by your SAS workload placement strategy.

SAS intends to address existing limitations to multi-zone support in a future release of the SAS Viya platform. For detailed requirements and limitations, see "Requirements for Environments with Multiple Availability Zones" in *System Requirements for the SAS Viya Platform*.

Changes to Crunchy Postgres for Kubernetes (Internal PostgreSQL)

Note: If you are using an external instance of PostgreSQL for your SAS Viya platform deployment, you can skip this What's New topic.

Crunchy Postgres for Kubernetes, the version of Kubernetes that is included for internal instances of PostgreSQL, has been upgraded from 5.7.5 to 5.8.3. As part of the upgrade, the source base image is upgraded from the Red Hat Universal Base Image 8 (UBI8) to the Red Hat Universal Base Image 9 (UBI9). No user intervention is required.

SAS is gradually automating the process for an update to Crunchy Postgres for Kubernetes. As a result of some code changes, you might receive the following warning message:

```
WARNING:  database "postgres" has a collation version mismatch
DETAIL:  The database was created using collation version 2.28, but the operating
system provides version 2.34.
```

If you see this message, it can be safely ignored.

Note: For more information, see Warning messages occur after you apply the SAS Viya 2025.10 update with internal PostgreSQL.

Pod Changes: Critical Changes

Critical Change: Pod Change

Here is a summary of the pod changes in LTS 2026.03:

- The sas-device-management pod was removed.
- The sas-studio-development pod was merged into the sas-data-flows pod.
- The sas-decisions-runtime-builder pod was merged into the sas-model-publish pod.
- The buildkitd pod was renamed to sas-buildkitd.
- The sas-workload-orchestrator pod was renamed to sas-workload-orchestrator-server.

Deployment and Configuration Changes

Critical Change: Revised Configuration Files for Backup and Restore

The deployment configuration files for backup, restore, and migration have been revised. The new format simplifies future updates and maintenance of backup and restore configurations.

If you plan to modify any backup or restore deployment configuration values, you can use the new configuration format by following the steps described in the following README files:

- Backup: **`$deploy/sas-bases/examples/backup/configure/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/configuration_settings_for_backup_using_the_sas_viya_backup_and_restore_utility.htm`** (for HTML)
- Restore: **`$deploy/sas-bases/examples/restore/configure/README.md`** (for Markdown) or **`$deploy/sas-bases/docs/configuration_settings_for_restore_using_the_sas_viya_backup_and_restore_utility.htm`** (for HTML)
- Migration: **`$deploy/sas-bases/examples/migration/configure/README.md`** (for Markdown) or **`$deploy/sas-bases/docs/configuration_settings_for_sas_viya_platform_migration.htm`** (for HTML)

Users with existing deployments should perform the steps that are described at "New Configuration File Format for Backup and Restore" in *SAS Viya Platform: Deployment Notes*.

Critical Change: New Architecture for SAS Workload Orchestrator

SAS Workload Orchestrator has been modified so that it now uses both a manager/StatefulSet (sas-workload-orchestrator) and a server/DaemonSet (sas-workload-orchestrator-server). For more information about the changes, see "Configure SAS Workload Orchestrator" in *SAS Viya Platform: Deployment Guide*.

In addition, the files used to configure SAS Workload Orchestrator have been revised to match the ongoing configuration file changes. The new format will simplify future updates.

Critical Change: Revised Configuration Files for SAS Detection Architecture

The files used to configure SAS Detection Architecture have been revised. The new format will simplify future updates. In order to use the new configuration files, follow the steps described in the README file at **`$deploy/sas-bases/examples/sas-detection/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/sas_detection_engine_configuration.htm`** (for HTML).

Critical Change: Revised Configuration Files for SAS Risk Cirrus KRM Service

The SAS Risk Cirrus KRM service provides a REST API for starting and managing KRM runs associated with Risk Cirrus analysis runs and comes with default settings that may be changed. The files used to configure SAS Risk Cirrus KRM Service have been revised. The new format will simplify future updates.

In order to use the new configuration files, follow the steps described in the README file at **`$deploy/sas-bases/examples/sas-risk-cirrus-krm/resources/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_the_sas_risk_cirrus_krm_service.htm`** (for HTML).

New Transformer to Enable FIPS for OpenSearch

SAS Viya platform now includes a predefined transformer file that enables FIPS for instances of OpenSearch. Earlier versions required a workaround in order to enable FIPS for OpenSearch.

> **IMPORTANT** The new transformer file is intended for use with new, initial deployments. Do not attempt to use the new transformer with an existing deployment.

For more information, see "Additional Configuration for FIPS Compliance" in *SAS Viya Platform: Deployment Guide*.

Changes to SAS/CONNECT Spawner Security Context Constraint

Note: If you are not deploying your software on Red Hat OpenShift, skip this topic.

Previously, deployments on Red Hat OpenShift were required to apply a security context constraint (SCC) for the SAS/CONNECT Spawner. In LTS 2026.03, the SCC is only required if you are attempting to mount NFS to the sas-connect-spawner pod. For more information, see Apply and Bind the Security Context Constraints.

Changes to SAS Configurator for Open Source

SAS Configurator for Open Source now manages an additional Python package by default. The pandas package has been added to the default Python profile in the SAS Configurator for Open Source configuration file: **`$deploy/site-config/sas-pyconfig/change-configuration.yaml`**. If you have enabled the transformer and are using the most recent version of it, the SAS Configurator for Open Source utility attempts to download this package when it builds Python.

The change-configuration.yaml transformer file for SAS Configurator for Open Source has been revised to manage a newer list of supported Python versions. The transformer is replaced when you update to LTS 2026.03. Be sure to follow the steps in the Deployment Notes to apply the newer file.

> **IMPORTANT** In order to preserve any modifications that you have made to change-configuration.yaml from a previous release, follow the steps that are described in "Revised SAS Configurator for Open Source Transformer" in *SAS Viya Platform: Deployment Notes*. First-time deployments of the SAS Viya

platform that use SAS Configurator for Open Source for Python integration are unaffected by changes to the default file.

SAS Configurator for Open Source now manages two additional packages for R by default. The R6 and knitr packages have been added to the default R profile in the SAS Configurator for Open Source configuration file: **$deploy/site-config/sas-pyconfig/change-configuration.yaml**. If you have enabled the transformer and are using the most recent version of it, the SAS Configurator for Open Source utility attempts to download these R packages when it builds R.

SAS has also added a PROC to enable end users to execute R code. This new procedure is called PROC R. The Programming documentation has been updated to describe its use, and the deployment documentation for external languages has been updated with additional steps to enable and configure this new PROC. For more information, see "Configure R Integration Using SAS Configurator for Open Source" in *SAS Viya Platform: Integration with External Languages*.

A new example file has been included with your deployment assets to help you enable PROC R functionality. For more information, see "New PROC R Requires Revisions to Resource File" in *SAS Viya Platform: Deployment Notes*.

An additional enhancement to SAS Configurator for Open Source is available. By default, the `--upgrade` option in each Python profile ignores any pinning of specific package versions that you might have added to the change-configuration.yaml file. Now you can disable the `--upgrade` functionality so that pinning is preserved. To disable this option, specify "`none`" as the value for `pip_install_opts` in the Python profile that you are using.

Changes to SAS Micro Analytic Service and External Language Support

A new example YAML file and accompanying README describe customizations that the SAS Viya administrator can perform in order to enable optional access to data from an external Databricks source. In 2026.03, a Python package, databricks-sql-connector, enables Python code in SAS Micro Analytic Service to connect to and query Databricks SQL warehouses. SAS Configurator for Open Source is recommended to provision Python for this integration.

The README explains how to configure SAS Micro Analytic Service to enable access to Databricks and provides example code. For more information, see **$deploy/sas-bases/examples/sas-microanalytic-score/databricks/README.md** (for Markdown format) or **$deploy/sas-bases/docs/configure_sas_micro_analytic_service_to_enable_access_to_databricks** (for HTML).

CAS Server Optional for Programming-Only Deployments

If your software order includes the SAS Viya Programming offering, you can exclude the default CAS server from your deployment. You must be able to run all of your programming use cases using only Programming Runtime servers such as SAS Compute Server. Excluding the CAS server allows your SAS programmers to access the SAS Viya analytics using familiar PROC interfaces. For more information, see "Configure CAS" in *SAS Viya Platform: Deployment Guide*.

Storage Classes Can Be Used with SAS Configuration Server

Previously, SAS Configuration Server used a persistent volume claim with no storage class specified by default. With this release, if you are performing the initial deployment of your software, you can configure a storage class for the persistent volume claims used by SAS Configuration Server to meet your environment's requirements.

For more information, see the README file located at **`$deploy/sas-bases/examples/sas-consul-server/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_storage_class_for_sasconfiguration_server.htm`** (for HTML).

> **IMPORTANT** Configuring a StorageClass for SAS Configuration Server is intended for new deployments only. Do not attempt this configuration with an existing deployment. It will result in data loss.

Default Resource Restrictions for BuildKit with SAS Model Publish Service

BuildKit with SAS Model Publish Service now has default resource restrictions:

Table 1.1 *Default Restrictions for BuildKit*

Minimum CPU	1 core
Minimum memory	1Gi
Maximum memory	1Gi

Maximum replicas	1 replica

For more information about the resource restrictions, including how to revise them, see the README file located at **$deploy/sas-bases/examples/sas-model-publish/buildkit/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_buildkit_for_sas_model_publish_service.htm** (for HTML).

Support for Disabling Private IP Address Filtering

To prevent the exposure of internal infrastructure information, SAS Viya platform events are configured by default to filter out IP addresses that are designated as private. However, in cases where the filtered IP address ranges are needed for auditing, the SAS Viya platform now lets you disable that filtering.

For more information, see the README file located at **$deploy/sas-bases/examples/security/private-ip-filtering/README.md** (for Markdown format) or at **$directory/sas-bases/docs/private_ip_filtering.htm** (for HTML).

SAS Viya Copilot Now Available

SAS Viya Copilot is now available for use with the SAS Viya platform.

SAS Viya Copilot is a GenAI-powered assistant built into the SAS Viya platform, designed to accelerate productivity across the analytics life cycle. It uses large language models (LLMs) that are stored on a SAS tenant and accessed through a secure gateway to enable conversational, AI-driven assistance. For more information about SAS Viya Copilot, including requirements and limitations, see *SAS Viya Copilot: Foundation Overview*.

SAS Viya Copilot is deployed as part of the SAS Viya platform. After you have deployed the SAS Viya platform, and if you have the combination of products currently supported by SAS Viya Copilot, SAS Environment Manager includes a new SAS Viya Copilot page, from which you can activate the copilot. If you do not have the products that enable the activation of SAS Viya Copilot, the SAS Viya Copilot page is not available. For more information about activating the deployed SAS Viya Copilot, see "Set Up the Credential and Secrets for SAS Viya Copilot" in *SAS Viya Platform: Licensing*.

SAS Viya Copilot will be added to more products in the future.

Name Change: Model Studio Is Now SAS Model Studio

SAS Model Studio is now a trademarked product for SAS. SAS Model Studio provides a common user interface with functionality shared among SAS Viya: Machine Learning, SAS Visual Text Analytics, and SAS Visual Forecasting. The new name appears in the product user interface and documentation starting with 2026.01.

Bug Fix: SAS Mirror Manager

Some administrators who deployed the SAS Viya platform from a mirror registry reported an issue with Artifactory registries. Each time that they ran the `mirrormgr mirror` command for any reason, SAS Mirror Manager attempted to pull and push a subset of images to the target container registry. This behavior occurred despite the fact that the images were already available in the registry.

This issue has been resolved.

Retired Product

SAS In-Database Technologies for Hadoop Cloud Services has been retired. The relevant documentation has been removed.

For more information, contact your SAS Customer Support representative.

LTS 2025.09 (November 2025)

About the Release

The Long-Term Support 2025.09 (November 2025) release is based on the Stable 2025.09 (September 2025) release and includes patch updates that were released since the Stable 2025.09 release. The Long-Term Support 2025.09 release includes all the features, enhancements, fixes, and security patches that are included in the

Long-Term Support 2025.03 (May 2025) release and in the subsequent Stable releases through the Stable 2025.09 release.

Note: When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

New and Enhanced Offerings

SAS Clinical Acceleration Offering Now Available

A new solution from SAS Health and Life Sciences, SAS Clinical Acceleration, is now available for deployment with the SAS Viya platform.

SAS Clinical Acceleration provides a modular, open, cloud-native content repository and statistical compute environment for managing, analyzing, reporting, and reviewing clinical research and medical data. It represents the modernization of SAS Life Science Analytics Framework, bringing features and benefits from SAS®9 to the SAS Viya platform.

SAS Clinical Acceleration can be deployed in Microsoft Azure. For additional system requirements to support SAS Clinical Acceleration, see "Requirements for SAS Clinical Acceleration Solutions" in *System Requirements for the SAS Viya Platform*.

SAS Health Offering Renamed and Enhanced

The SAS Health Episode Builder offering has been renamed to SAS Health Cost of Care Analytics. SAS Health Cost of Care Analytics now includes a user interface. You can point and click in order to construct episodes and create analysis jobs.

SAS Health Cost of Care Analytics can be deployed on Microsoft Azure and AWS. For additional system requirements to support SAS Health Cost of Care Analytics, see "Requirements for SAS Health Solutions" in *System Requirements for the SAS Viya Platform*.

SAS Governance and Compliance Manager Offerings Now Available

New Risk offerings, SAS Governance and Compliance Manager and SAS Governance and Compliance Manager Advanced, are now available for deployment with the SAS Viya platform.

SAS Governance and Compliance Manager enables your organization to respond promptly to regulatory requirements and internal initiatives in an ever-changing regulatory landscape. Changes in regulations often mean that potential customers are consistently looking for updated systems using the most recent technologies. SAS Governance and Compliance Manager helps you simplify internal processes, record-keeping, policy management, and risk/control assessments for multi-industry clients. It establishes a baseline for robust risk and compliance management and provides a foundation for market leadership in operational risk governance.

SAS Governance and Compliance Manager and SAS Governance and Compliance Manager Advanced can be deployed on all the platforms that are supported by SAS Viya. For additional system requirements to support SAS Governance and Compliance Manager, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

Additional SAS/ACCESS Engine Now Available

A new SAS/ACCESS engine is now included with the SAS Viya platform: SAS/ACCESS Interface to DuckDB. All the standard data types supported by SAS Viya platform applications are supported. DuckDB 1.2.0 and later are supported.

SAS/ACCESS Interface to DuckDB supports data sources in Amazon S3, Azure blob store, and Google Cloud Storage. For more information, see "Requirements for SAS/ACCESS Interface to DuckDB" in *System Requirements for the SAS Viya Platform*.

SAS with SingleStore Is Now SAS SpeedyStore

The SAS product formerly named SAS with SingleStore has a new name: SAS SpeedyStore.

Platform Enhancements

Security Enhancement to External Language Support

You can now use TLS to secure the connections that SAS Configurator for Open Source makes when managing Python or R. Starting with 2025.08, SAS Configurator for Open Source automatically uses the CA certificates that are already trusted by the SAS Viya platform when it configures Python and R integration. As a result, the procedure for adding a custom Certificate Authority is the same as it is for other SAS Viya platform applications. No additional configuration is required.

Customer-Provided Root CA Certificate Is Now Supported

Prior to deployment, the SAS Viya platform deployment can be configured to use a customer-provided root CA certificate by using the **`$deploy/sas-bases/examples/security/customer-provided-sas-viya-ca-certificate-secret.yaml`** file. Follow the instructions in "Configure the SAS Viya Platform Root CA Certificate" in the README file **`$deploy/sasbases/examples/security/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_network_security_and_encryption_using_sas_security_certificate_framework.htm`** (for HTML).

SMTP Server Connection Has Enhanced Security

The SAS Viya platform now provides a method of connecting to selected mail servers with security other than Basic Authentication. For more information, see "Microsoft 365/Office 365 with OAuth 2.0" in *SAS Viya Platform: Deployment Guide*.

SAS Mirror Manager Enhancements

SAS container image signatures are now available for Google Artifact Registry after Google added support for version 1.1 of the OCI distribution specification.

The SAS Mirror Manager documentation has been enhanced with the addition of a procedure describing the steps to set up a mirror registry in Harbor.

System Requirements: Critical Changes

Critical Change: Kubernetes Requirements

Support for Kubernetes 1.33.*x* has been added for all supported providers. Kubernetes 1.30.*x* is no longer supported. SAS Viya platform 2025.09 (LTS) supports Kubernetes 1.31.*x* - 1.33.*x*.

Critical Change: OpenShift Requirements

For SAS Viya platform deployments in OpenShift clusters, support for Red Hat OpenShift Container Platform (OCP) and OpenShift Kubernetes Engine (OKE) 4.20.*x* has been added. With 2025.09 and later, you can use Red Hat OCP or OKE 4.18.*x* – 4.20.*x*. OpenShift must be running in one of the supported environments. These OKE and OCP versions align with Kubernetes 1.31.*x* – 1.33.*x*.

SAS Viya platform deployments on Red Hat OpenShift are no longer required to use the cert-utils-operator to manage certificate content in Route resources. The cert-utils-operator is still recommended for these deployments. For information about an alternative, see the "Example kustomization.yaml Files for the OpenShift Ingress Controller Without the Use of the cert-utils-operator" section of the README file located at **`$deploy/sas-bases/examples/security/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_network_security_and_encryption_using_sas_security_certificate_framework.htm`** (for HTML).

Critical Change: Ingress Controller

An ingress controller that the SAS Viya platform supports for deployment, ingress-nginx (or Ingress NGINX controller), is being retired by the Kubernetes community. You can replace ingress-nginx with Contour ingress controller.

Starting March 19, 2026, SAS provides support for Contour in all Stable and Long-Term Support (LTS) releases of the SAS Viya platform and solutions that are in Standard Support. You can replace the ingress controller with Contour in any SAS Viya version in Standard Support by:

- applying the latest patch updates while making the change
- making the change while performing a version update of your SAS Viya platform deployment

The deployment documentation includes information to assist you with the transition. See the Cluster Ingress Requirements and *Changing Ingress Controllers in a Deployment* for more information.

Using the Contour ingress controller requires a new command when updating a SAS Viya platform deployment that is using the Kubernetes commands method of deployment. The new command is included in the list of deployment commands in Deployment Using Kubernetes Commands.

After the retirement of ingress-nginx, the SAS Viya platform will continue to provide Standard Support for environments that use it; however, neither SAS nor the Kubernetes community will address bugs or security issues for that component. Continuing to use ingress-nginx after March 19, 2026 is at your own risk.

If you want to continue to use it, the SAS Viya platform now requires ingress-nginx 1.12.1 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.31.*x* - 1.33.*x*. With these versions of ingress-nginx, you might need to change the default configuration in order to mitigate breaking changes. For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Critical Change: Calico CNI Support

Deployments in upstream open-source Kubernetes clusters now require Calico 3.29.*x* or later. This change to the minimum supported version of Calico ensures compatibility with Kubernetes 1.31.*x* - 1.33.*x*.

Changes to SAS/ACCESS and SAS In-Database Requirements

- SAS/ACCESS Interface to SQL Server has added support for Microsoft Fabric Data Warehouse and Microsoft Fabric Lakehouse.
- SAS/ACCESS Interface to Hadoop has added support for Cloudera Data Platform (CDP) Public/Private Cloud, 7.3 or later. In addition, the Cloudera platforms that were supported previously are still supported.
- The baseline Teradata version for SAS In-Database Technologies for Teradata is now Teradata Vantage Advanced SQL Engine version 17.20 or later, with TTU 17.20 or later for Linux.

SAS Clinical Acceleration Repository Adds Platform Support

SAS Clinical Acceleration Repository can now be deployed in Amazon Web Services, with Amazon Elastic Kubernetes Service. Previously, it was only deployed in Microsoft Azure.

Pod Changes: Critical Changes

The following pod is removed:

- sas-redis-operator

Also, the following pods are removed because SAS Data Studio is retired in 2025.09:

- sas-data-plans
- sas-data-studio-app
- sas-discovery-services
- sas-transformations

For more information, see What's New in SAS Data Studio (LTS 2025.09).

Refer to the following table for pods that are merged into other pods. The pods to the left of the arrow are removed during the software update. The pods to the right of the arrow run the related servers and services after the software update is successful.

sas-decisions	→	sas-decisions-framework
sas-data-mining-models	→	sas-data-mining-project-resources
sas-feature-flags	→	sas-configuration
sas-model-management sas-model-repository	→	sas-model-manager

Deployment and Configuration Changes

Critical Change: Configuration File Revision and Reformatting

SAS has adopted a new format for the configuration files that are used by products for their deployment. The new format will simplify future updates. The revisions are being introduced for each product when that product makes other revisions to their existing configuration files. Attempting to use the previous method for configuration will result in failure to deploy or update. When products make revisions to their configuration files, they will be included both in this guide and in *SAS Viya Platform: Deployment Notes*.

Critical Change: Revised Configuration Files for Model Publish Service

The configuration files for controlling the size of the persistent volume claim used for the Model Publish service have been revised. The new format will simplify future updates. In order to use the new configuration files, follow the steps described in the README file at **`$deploy/sas-bases/examples/sas-model-publish/git/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_git_for_sas_model_publish_service.htm`** (for HTML).

Changes to SAS/CONNECT Spawner Security Context Constraint

Note: If you are deploying your software on a platform other than Red Hat OpenShift, skip this topic.

Before this release, deployments on Red Hat OpenShift were required to apply a security context constraint (SCC) for the SAS/CONNECT Spawner. Beginning with this release, however, the SCC is only required if you are attempting to mount NFS to the sas-connect-spawner pod. For more information, see Apply and Bind the Security Context Constraints.

Revised Configuration Files for SAS Data Quality

The configuration files for controlling the size of the persistent volume claim (PVC) used to store the Quality Knowledge Base have been completely revised. The new format will simplify future updates. In order to use the new configuration files, follow the steps described in the README file at **$deploy/sas-bases/examples/data-quality/storagesize/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/quality_knowledge_base_for_the_sas_viya_platform.htm** (for HTML).

Revised Transformers for SAS Workload Orchestrator

The sas-workload-orchestrator-statefulset-resources.yaml and sas-workload-orchestrator-daemonset-resources.yaml transformer files have been revised for SAS Workload Orchestrator. With the updated transformer files, you can provide both upper and lower limits for the memory and CPU use for statefulset and daemonset pods. For more information about the revised transformer files, see the README file located at **$deploy/sas-bases/examples/sas-workload-orchestrator/configure/README.md** (for README format) or at **$deploy/sas-bases/docs/configuration_settings_for_sas_workload_orchestrator_service.htm** (for HTML).

Change to SAS Configurator for Open Source Default Python Profile

SAS Configurator for Open Source has made changes to Python packages that are managed by means of the default Python profile.

The default Python profile is defined by parameters in the **$deploy/site-config/sas-pyconfig/change-configuration.yaml** transformer. If you want to include this support in your deployment, you can copy over the newest version of change-configuration.yaml from your deployment assets. Or, if you prefer to continue using a file that you have customized, follow the steps that are described in "Revised SAS Configurator for Open Source Transformer" in *SAS Viya Platform: Deployment Notes*.

Kaniko Container Images Deprecated in Favor of BuildKit

SAS Model Publish Service has deprecated Kaniko container images and replaced them with BuildKit. Follow the instructions in the README file located at **$deploy/sas-bases/examples/sas-decisions-runtime-builder/buildkit/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_buildkit_for_sas_decisions_runtime_builder_service.htm** (for HTML) to successfully deploy BuildKit.

Note: The SAS Container Runtime Kaniko feature flag was removed with the 2025.09 release, and Kaniko is no longer available. For more information, see "Configure Container Publishing Destinations" in *SAS Viya Platform: Publishing Destinations*.

Security Context Constraint for sas-model-publish

Note: This information applies only to deployments running on Red Hat OpenShift.

If you plan to use BuildKit to publish models to containers with SAS Model Manager or SAS Intelligent Decisioning, you must bind the sas-model-publish-buildkit, sas-decisions-runtime-builder-buildkit, and default service accounts to the sas-model-publish SCC. For details, see Apply and Bind the Security Context Constraints.

New Configuration File for Redis

Redis now has a transformer file that allows you to modify the PersistentVolumeClaim size or the StorageClass for nodes. The transformer file can be applied during the initial deployment of your SAS Viya platform software or after the software has been deployed. For details, see the README file located at **$deploy/sas-bases/examples/redis/server/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configuration_settings_for_redis.htm** (for HTML).

New Transformers for SAS Servers on OpenShift Using Kerberos

Note: This topic is repeated from version 2025.03 because of the timing of its arrival. The repetition is to ensure that users are aware of the new transformers and does not reflect a second set of new transformers.

Note: This information applies only to SAS Viya platform deployments that are running on Red Hat OpenShift.

SAS has introduced new transformers for SAS servers running on Red Hat OpenShift that use Kerberos. For more information about using the new transformers, see the README file located at **`$deploy/sas-bases/examples/kerberos/sas-servers/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configuring_sas_servers_for_kerberos_in_sas_viya_platform.htm`** (for HTML).

Configure OpenSearch for a Memory-Backed Temporary Directory

By default, OpenSearch creates its temporary directory within **`/tmp`** using an emptyDir volume mount. However, some hardened installations mount **`/tmp`** on emptyDir volumes with the `noexec` option, preventing JNA and libffi from functioning correctly. This configuration can cause start-up failures with exceptions like `java.lang.UnsatisfiedLinkerError` or messages indicating issues with mapping segments or allocating closures. In order to allow JNA loading without relaxing file system restrictions, OpenSearch can be configured to use a memory-backed temporary directory.

For instructions to use the new transformer that SAS has provided, see the README file located at **`$deploy/sas-bases/examples/configure-elasticsearch/internal/jna/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_a_temporary_directory_for_jna_in_opensearch.htm`** (for HTML).

LTS 2025.03 (May 2025)

About the Release

The Long-Term Support 2025.03 (May 2025) release is based on the Stable 2025.03 (March 2025) release and includes patch updates that were released since the Stable 2025.03 release. The Long-Term Support 2025.03 release includes all the features, enhancements, fixes, and security patches that are included in the Long-Term Support 2024.09 (September 2024) release and in the subsequent Stable releases through the Stable 2025.03 release.

Note: When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

New and Enhanced Offerings

SAS Data Quality for Payment Integrity Health Care Now Available

The first module of a new SAS health care offering, SAS Data Quality for Payment Integrity Health Care, is now available. This offering supports medical practices, insurers, and researchers seeking to mine valuable data from medical claims. Module 1 (Medical Claims Ingestion) of SAS Data Quality for Payment Integrity Health Care is designed to ingest, process, and transform medical claims data into a standardized, high-quality format that is ready for analysis and reporting. Taking in raw medical claims data from various sources, such as CSV files and insurance databases, SAS Data Quality for Payment Integrity Health Care enables organizations to make better decisions based on a deeper understanding of their medical claims data. It provides a robust and scalable platform for managing, reporting, and analyzing medical claims data for improved compliance and patient outcomes.

SAS Data Quality for Payment Integrity Health Care can be deployed with either Microsoft Azure Kubernetes Service or open-source Kubernetes. It supports only an external PostgreSQL database. Deploying SAS Common Data Store (CDS PostgreSQL) for this offering is recommended. If you decide to deploy CDS PostgreSQL, it can be used for data storage and management. For additional system requirements to support SAS Data Quality for Payment Integrity Health Care, see "Requirements for SAS Fraud Solutions" in *System Requirements for the SAS Viya Platform*.

SAS Real-Time Watchlist Screening Enhancements

SAS Real-Time Watchlist Screening for Entities and SAS Real-Time Watchlist Screening for Payments have added support for deployment on AWS, Google Cloud, and Red Hat OpenShift. As a result, these solutions can now be deployed on any of the supported cloud platforms.

Platform Enhancements

CAS Server Enhancement

The CAS server has been enhanced with a new management feature for MPP CAS deployments that include an optional graphics processing unit (GPU). To take advantage of additional capabilities that are provided by a GPU, CAS workers require scheduling to GPU-enabled nodes in the CAS node pool.

Previously, any resource requests or limits that you applied to nodes using a transformer always applied equally to the CAS controller and to all CAS worker nodes. These settings were always applied to the CAS node pool rather than to individual machines. You can now configure distinct node pools for CAS controller pods and CAS worker pods. With enhancements to the SAS GPU reservation service, CAS controller pods can be scheduled on nodes without GPUs, while CAS worker pods are scheduled on nodes that provide the more expensive GPU resources.

The SAS GPU reservation service enables GPU resource sharing by SAS processes. For more information about the service, see the README titled "SAS GPU Reservation Service," located at **`$deploy/sas-bases/examples/gpu/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/sas_gpu_reservation_service.htm`** (for HTML).

For instructions about setting up distinct node pools for CAS controllers and CAS workers, including configuration steps, see the README file located at **`$deploy/sas-bases/overlays/cas-server/auto-resources/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/auto_resources_for_cas_server_for_sas_viya.htm`** (for HTML).

Ingress Configuration Feature Now Available

SAS has streamlined the process for modifying the ingressClass that the SAS Viya platform uses in a deployment. This feature is useful for segregating traffic to different or non-default ingress-nginx instances. For details about this ingress-nginx configuration option, see the README file located at **`$deploy/sas-bases/examples/ingress-configuration/README.md`** (for Markdown format) and at **`$deploy/sas-bases/docs/configuring_general_ingress_options.htm`** (for HTML).

Note: This setting has no effect on a Contour ingress controller.

System Requirements: Critical Changes

Changes to Kubernetes and OpenShift Requirements

Support for Kubernetes 1.31.*x* has been added for all supported providers. The SAS Viya platform supports Kubernetes 1.29.*x* - 1.31.*x*. Kubernetes 1.28.*x* is no longer supported.

For OpenShift clusters, you can use either Red Hat OpenShift Kubernetes Engine (OKE) or Red Hat OpenShift Container Platform (OCP) 4.16.*x*, 4.17.*x*, or 4.18.*x*. OpenShift must be running in one of the supported environments. These OKE and OCP versions align with Kubernetes 1.29.*x*, 1.30.*x*, and 1.31.*x*.

As Red Hat adds support for newer versions of Kubernetes, SAS validates new OCP versions, designates an appropriate cadence to add support, and updates the documentation as needed.

Note: For OpenShift, the procedure for deploying from a mirror registry in OCR has changed. For more information, see "Create and Populate a Mirror in Red Hat OpenShift Container Registry" in *SAS Viya Platform: Deployment Guide*

Changes to Kustomize Requirement

Kustomize is required in order to generate Kubernetes manifest files for a deployment of the SAS Viya platform. A newer version of Kustomize is required: Kustomize 5.4.3.

The SAS Viya Platform Deployment Operator and the sas-orchestration command use resources that are delivered with the deployment assets. These resources now include Kustomize 5.4.3.

Critical Change: Ingress Controller

An ingress controller that the SAS Viya platform supports for deployment, ingress-nginx (or Ingress NGINX controller), is being retired by the Kubernetes community. You can replace ingress-nginx with Contour ingress controller.

Starting March 19, 2026, SAS provides support for Contour in all Stable and Long-Term Support (LTS) releases of the SAS Viya platform and solutions that are in Standard Support. You can replace the ingress controller with Contour in any SAS Viya version in Standard Support by:

- applying the latest patch updates while making the change
- making the change while performing a version update of your SAS Viya platform deployment

The deployment documentation includes information to assist you with the transition. See the Cluster Ingress Requirements and *Changing Ingress Controllers in a Deployment* for more information.

Using the Contour ingress controller requires a new command when updating a SAS Viya platform deployment that is using the Kubernetes commands method of deployment. The new command is included in the list of deployment commands in Deployment Using Kubernetes Commands.

After the retirement of ingress-nginx, the SAS Viya platform will continue to provide Standard Support for environments that use it; however, neither SAS nor the Kubernetes community will address bugs or security issues for that component. Continuing to use ingress-nginx after March 19, 2026 is at your own risk.

If you want to continue using it, the SAS Viya platform requires ingress-nginx 1.9.6 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.29.*x* - 1.31.*x*.

> **IMPORTANT** Version 1.13.0 of ingress-nginx is not supported. The Ingress Nginx community has fixed a bug in ingress-nginx 1.13.1 and later, enabling the SAS Viya platform to support these versions of the ingress controller.

With ingress-nginx 1.12.*x* or later, you might need to change the default configuration of the ingress controller in order to mitigate breaking changes from NGINX. For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Change to PostgreSQL Server Requirements

SAS now recommends that you use a block storage device for the PostgreSQL server persistent storage. This recommendation applies equally to an internal or an external PostgreSQL server.

For an internal PostgreSQL server, information about how to change the storage class to block storage after the initial deployment has completed is provided in "Change the Storage Class of the Data Pod" in *SAS Viya Platform: Infrastructure Servers*.

Changes to PostgreSQL Requirements (External PostgreSQL Only)

SAS Viya platform support for PostgreSQL 16 for external PostgreSQL servers was added. SAS offerings in the Retail and Consumer Goods category have added support for PostgreSQL 16.

External PostgreSQL servers that use PostgreSQL 12 are not supported.

A new plug-in for the sas-viya CLI is available to help you with data migration from an earlier version of SAS. This plug-in, named migrationmanagement, requires an additional PostgreSQL extension. The documentation has been updated to include this requirement.

For more information, see "External PostgreSQL Requirements" in *System Requirements for the SAS Viya Platform*.

Changes to Calico CNI Support

Deployments in upstream open-source Kubernetes clusters now require Calico 3.27.*x* and later. This change to the minimum supported version of Calico ensures compatibility with Kubernetes 1.29.*x* - 1.31.*x*.

Changes to Requirements for SAS Risk Solutions

The deployment process for SAS Risk solutions has significant enhancements that affect both requirements and configuration. SAS Risk solutions consume the SAS Risk Cirrus Core component. Previously, the Risk Cirrus Core component used transformers to manage configuration. Now generators are used instead.

The Risk Cirrus Core component no longer requires a Git repository. As a result, the processes for setting up SAS Risk solutions have been modified. The documentation has been updated with changes to the requirements for all SAS Risk

solutions. If you are updating SAS Risk solutions, be sure to consult the requirements that are described in Requirements for SAS Risk Solutions and in the solution-specific sections that follow.

A few configuration steps are required for all SAS Risk deployments that are updated. For details, see:

- "After Deployment Commands" in *SAS Viya Platform: Deployment Notes*
- "SAS Risk Cirrus Core" in *SAS Viya Platform: Deployment Notes*

Changes to SAS with SingleStore (now SAS SpeedyStore)

The SAS product formerly named SAS with SingleStore has a new name: SAS SpeedyStore.

SAS SpeedyStore now supports SCIM in addition to LDAP as a source of user identities.

The instance of SingleStoreDB that is included with SAS SpeedyStore has been updated from version 8.7 to 8.9.

Note: The database update is not backward-compatible. If you update the SAS Viya platform, the SingleStoreDB instance is automatically updated to version 8.9.*x*. Following the update, you cannot roll your SingleStoreDB databases back to version 8.7 or to an earlier version of SingleStoreDB. If you need to use databases from an earlier release, you must uninstall the SAS Viya platform and redeploy the earlier version.

Changes to SAS/ACCESS Requirements

The SAS Viya platform now includes Simba drivers with SAS/ACCESS software for database access.

- SAS/ACCESS Interface to Impala includes the Simba client by default for ODBC access. Obtaining and installing the client driver is no longer required. However, some changes to configuration files might be required. For more information, see the Deployment Note titled SAS/ACCESS Interface to Impala: Before Deployment Commands.
- Simba JDBC drivers from insightsoftware replace drivers from CData that were included with previous releases of SAS/ACCESS Interfaces to Hadoop and Spark. Some additional configuration is required. For more information, see:
  - "Requirements for SAS/ACCESS Interface to Hadoop" in *System Requirements for the SAS Viya Platform*.
  - "Requirements for SAS/ACCESS Interface to Spark" in *System Requirements for the SAS Viya Platform*.

SAS has validated SAS/ACCESS Interface to Teradata with Teradata Tools and Utilities (TTU) 20.00. SAS now recommends TTU 17.20 or 20.00 for use with Teradata Database 17.00 or later.

In addition, SAS/ACCESS Interface to Teradata now includes the required Teradata client by default. Teradata Wallet is not included with this client package, but it is supported if you install it in your environment.

SAS/ACCESS Interface to SQL Server has a new configuration requirement. For more information, see "SAS/ACCESS Interface to Microsoft SQL Server Configuration Requirement" on page 33.

Changes to Requirements for SAS In-Database Data Access Products

SAS In-Database Technologies for Azure Synapse Analytics now supports Microsoft Azure Synapse Analytics with Spark 3.3. Previously, Spark 2.4 and Spark 3.1 were supported.

Enhancements to SAS In-Database Technologies for Databricks have resulted in changes to requirements. SAS In-Database Technologies for Databricks now supports Databricks 10.4 LTS - 12.2 LTS for Microsoft Azure or Amazon Web Services. Previously, Databricks 13.3 LTS was also supported, but that version contains a software limitation.

SAS In-Database Technologies for Databricks requires a deployment of SAS Embedded Process for Spark. An additional RPM file is now available for a SAS Embedded Process for Spark deployment. The new deployment is referred to as the *accelserver* RPM file. The previous deployment, referred to as the *sepcorespark* RPM file, continues to be supported. When you deploy the accelserver RPM, additional functionality is available.

The two SAS Embedded Process deployments support different versions of Spark. For more information, see "Requirements for SAS In-Database Technologies for Databricks" in *System Requirements for the SAS Viya Platform*.

Changes to SMTP Server Requirements

In Google Cloud environments only, an (optional) SMTP server is not supported at this time. The SAS Viya platform mail service supports only Basic Authentication at this time. Third-party email providers are gradually deprecating Basic Authentication and enforcing OAuth 2.0 for enhanced security on mail servers.

This change in support occurred because Google has removed Gmail account support for connections that rely on Basic Authentication starting in March 2025.

SAS intends to restore support for a Google SMTP server in a future release.

Changes to SAS Configurator for Open Source

SAS Configurator for Open Source now supports Python 3.11.10. The Python version is determined by parameters in the SAS Configurator for Open Source transformer: **$deploy/site-config/sas-pyconfig/change-configuration.yaml**. The `default_py.python_signature` and `default_py.python_tarball` properties have been modified to support a newer version of Python. If you have enabled it and are using the most recent version of the transformer, the utility attempts to download and build this newer version of Python by default.

In order to preserve any modifications that you have made to change-configuration.yaml, follow the steps that are described in "Revised SAS Configurator for Open Source Transformer" in *SAS Viya Platform: Deployment Notes*. First-time deployments of the SAS Viya platform that use SAS Configurator for Open Source for Python integration are unaffected by this change. You can continue to use Python 3.10 with the SAS Viya platform, but support for this version will end in the near term.

For information about additional changes to support for integration with open-source languages, see:

- "Enhancements to Support for Open-Source Languages" on page 34
- "Changes and Enhancements to SAS Configurator for Open Source" on page 34

Changes to SAS Event Stream Processing Requirements

SAS Event Stream Processing requires a file-based persistent volume (PV) for running projects. For information about setting up the PV and PVC, see the README file located at **$deploy/sas-bases/examples/sas-event-stream-processing-studio-app/storage/README.md** (for Markdown format) and at **$deploy/sas-bases/docs/configuring_file_storage_for_sas_event_stream_processing_studio_projects.htm** (for HTML).

Pod Changes: Critical Changes

Refer to the following table for pod changes. The pods to the left of the arrow are removed during the software update. The pods to the right of the arrow run the related servers and services after the software update is successful.

sas-business-rules	→	sas-decisions-framework[1]
sas-reference-data		

sas-config-reconciler	→	sas-configuration
sas-links sas-visual-analytics-administration	→	sas-visual-analytics-app

1 A new pod name.

The following changes are for SAS Redis server.

Previous SAS Redis server stateful sets: sas-redis-server-0 sas-redis-server-1 sas-redis-server-2	→	New SAS Redis server stateful set: sas-redis-server
Previous SAS Redis server pods: sas-redis-server-0-0 sas-redis-server-0-1 sas-redis-server-1-0 sas-redis-server-1-1 sas-redis-server-2-0 sas-redis-server-2-1	→	New SAS Redis server pods: sas-redis-server-0 sas-redis-server-1

Note:

- The migration-manager pod was configured to scale to 0 replicas by default.
- The SAS Drive application and endpoint are deprecated and disabled by default. The related pod is available until the planned retirement of SAS Drive in the 2026.04 release.

Deployment and Configuration Changes

Critical Change: Time-to-Live Value for Kubernetes Jobs

All SAS Viya platform Kubernetes jobs now have a default time-to-live (TTL) value of 0. This change was made in order to improve the update experience. The requirement to manually delete certain jobs no longer applies to most deployments.

As a result of this change, Kubernetes jobs that are generated on the SAS Viya platform are automatically deleted once they have run to completion. When jobs are deleted, the associated log data is also deleted. SAS strongly recommends installing a log aggregator to retain and manage log messages from Kubernetes resources that are automatically deleted over time.

CronJobs, such as sas-start-all, sas-backup-job, and sas-restore-job, are not affected by this change.

Critical Change: Update Procedure for SAS SpeedyStore

A SAS Viya platform software update that includes SAS SpeedyStore no longer requires manual steps to pause the SingleStore cluster unless the deployment and updates are performed using Kubernetes commands.

For most deployment methods, the procedure to update deployments that include SAS SpeedyStore has been streamlined. For software updates using the SAS Viya Platform Deployment Operator or the sas-orchestration command, a manual step is no longer required to pause the SingleStore cluster. This pre-update step has been automated for those deployment methods.

This additional automation also enhances the `sas-stop-all` and `sas-start-all` CronJobs. If you use CronJobs to stop and start a SAS Viya platform deployment, the SingleStore pods are also managed by the CronJobs. When you execute the `sas-stop-all` CronJob, it pauses SingleStore, and when you execute the `sas-start-all` CronJob, it restarts SingleStore. Previously, you were required to pause SingleStore manually before executing the `sas-start-all` CronJob.

The documentation has been updated to reflect this enhancement.

New ClusterRole for sas-logon-app Service

The sas-logon-app service account requires permission to verify a service account token using the TokenReviews endpoint of the Kubernetes API Server. To grant this permision, the "system:auth-delegator" ClusterRole is now applied to the sas-logon-app service account.

SAS/ACCESS Interface to Microsoft SQL Server Configuration Requirement

A valid truststore must be configured for TLS/SSL connections to some instances of Microsoft SQL Server. This requirement stems from recent changes to a third-party driver. Failure to specify a valid truststore might result in an error when connecting through SAS/ACCESS Interface to Microsoft SQL Server.

The Data Access README has been updated with more information about the error and configuration steps to avoid it. Be sure to read the SAS/ACCESS Interface to Microsoft SQL Server section of the README, **`$deploy/sas-bases/examples/data-access/README.md`** (for Markdown) or **`$deploy/sas-bases/docs/configuring_sasaccess_and_data_connectors_for_sas_viya_4.htm`** (for HTML).

Enhancements to Support for Open-Source Languages

The SAS Viya platform includes enhancements to the SAS multi-language architecture. With these enhancements, you can harness the power of SAS analytics directly from Python by means of the new sasviya.ml Python package. SAS Configurator for Open Source now offers an option to include the required Python packages that enable users to take advantage of these new capabilities. The *SAS Viya Platform: Integration with External Languages* guide has been updated to describe these options.

SAS Model Manager added support for the CAS Gateway action set. This enhancement provides significant performance improvements for scoring open-source models. SAS Configurator for Open Source has added two R packages to the list of packages that it deploys by default. These two packages (arrow and logger) are required to support the scoring of R models using the CAS Gateway action set.

To take advantage of the enhancements for both Python and R, deploy SAS Configurator for Open Source to build Python and R from source and manage your Python and R packages. Be sure to use the most recent version of the **`$deploy/sas-bases/examples/sas-pyconfig/change-configuration.yaml`** file from your Deployment Assets. Existing deployments that have an older version of the YAML file will continue to work.

For more information, see *SAS Viya Platform: Integration with External Languages*.

Changes and Enhancements to SAS Configurator for Open Source

SAS Configurator for Open Source is dropping three Python packages that were previously managed by default. The default Python profile, which determines the version of Python and the packages that are downloaded and managed, is removing the following packages:

- hnswlib==0.7.0
- sas-ipc-queue
- pydantic

Removing these packages might improve the performance of the SAS Configurator for Open Source utility.

The default Python profile is defined by parameters in the **$deploy/site-config/sas-pyconfig/change-configuration.yaml** transformer. If you want to continue maintaining these packages as part of the SAS Configurator for Open Source default Python support, you can add them back to the newest version of change-configuration.yaml from your Deployment Assets. Or if you prefer to continue using a file that you have customized, previous versions of the YAML file will continue to work.

In addition, SAS Configurator for Open Source has two new options for using alternative locations for Python packages. You can now specify repository locations for the Pip package manager to use for Python packages. You can set these locations by modifying the values for *profile-name*.pip_index_url or *profile-name*.pip_extra_url in the configuration file for SAS Configurator for Open Source: **$deploy/site-config/sas-pyconfig/change-configuration.yaml**.

For more information, see *SAS Viya Platform: Integration with External Languages*.

New Transformers for SAS Servers on OpenShift Using Kerberos

Note: If your deployment will not be running on Red Hat OpenShift, the contents of this topic do not apply to your deployment.

SAS has introduced new transformers for SAS servers running on Red Hat OpenShift that use Kerberos. For more information about using the new transformers, see the README file located at **$deploy/sas-bases/examples/kerberos/sas-servers/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configuring_sas_servers_for_kerberos_in_sas_viya_platform.htm** (for HTML).

Change to CAS Backing Store Enablement

The method by which the CAS backing store is enabled has been changed. Previously, the backing store was enabled by modifying the custom resource for the CAS operator. Now, you enable the backing store in four different scenarios using patch transformer .yaml files. For information about the scenarios and using the transformer files, see "Configure a Backing Store for Memory Allocations" in *SAS Viya Platform: Deployment Guide*.

Enhancements to SAS Mirror Manager

SAS Mirror Manager includes the following enhancements:

- Support for verifying SAS container image signatures.

SAS container image signatures are available for Microsoft Azure and AWS. At this time, Google Cloud does not support the OCI distribution that SAS uses.

- Log messages now include dates in addition to times.

Note: For OpenShift, the procedure for deploying from a mirror registry in OCR has changed. For more information, see "Create and Populate a Mirror in Red Hat OpenShift Container Registry" in *SAS Viya Platform: Deployment Guide*

Enhancement to RabbitMQ Transformer

To maintain optimal I/O levels, RabbitMQ and SAS recommend that you configure a block storage device for RabbitMQ persistent storage. The transformer that was previously used to change the RabbitMQ PVC storage size has therefore been enhanced. The transformer file now provides parameters to help you change the storage type to use block storage. This file is included in your deployment assets: **`$deploy/sas-bases/examples/rabbitmq/configuration/rabbitmq-modify-pvc-size.yaml`**.

The accompanying README file has been updated to describe this change.

SAS Redis Server Dependency on SAS Redis Operator Is Removed

SAS Redis Server is no longer managed by SAS Redis Operator. Events that were handled by the operator will now be performed by the SAS Redis server pods. For details, see "SAS Redis Server" in *SAS Viya Platform: Infrastructure Servers*.

New and Updated Documentation

Enhancements and Documentation to Minimize Downtime during Updates

SAS continues to enhance rolling updates for the SAS Viya platform to minimize downtime and improve system resilience. Several improvements have been introduced to ensure a smoother update experience:

- Improved Stability for Compute Workloads:
  - Various enhancements have been made to reduce disruptions during software updates for workloads running on programming run-time servers.

  - If job failures occur during an update because of programming run-time server initialization, SAS Workload Orchestrator and SAS Launcher now relaunch the affected jobs automatically, ensuring uninterrupted processing.

- Recommendations for Minimizing CAS Workload Disruptions:
  - To further reduce downtime during CAS server updates, SAS strongly recommends that you enable the CAS state transfer feature. CAS state transfer helps to minimize disruptions during CAS server maintenance operations, enabling the transfer of the session state, data, and other relevant artifacts to newer CAS server instances while the previous instances continue to run temporarily.

    Note: The CAS server state transfer feature is available if you are using the SAS Viya Platform Deployment Operator or sas-orchestration to manage your deployment.

  - Read-Only access to global tables and other state components is now enabled by default during CAS state transfer. This change enables actions that read data to continue to run during a software update, providing a better user experience by minimizing disruptions.

For more information about minimizing downtime during software updates, see the new section of the SAS Viya platform deployment documentation titled "Reduce Downtime during Future Software Updates" in *Getting Started with SAS Viya Platform Operations*.

New Provisioning Resources Documentation

The *Provisioning Resources* documentation includes checklists for the SAS Viya Infrastructure as Code (IaC) GitHub projects. The IaC projects for Microsoft Azure, Amazon Web Services, and Google Cloud can be used to provision cloud infrastructure prior to the SAS Viya platform deployment. For more information, see *SAS Viya Platform Operations: Provisioning Resources*.

LTS 2024.09 (November 2024)

About the Release

The Long-Term Support 2024.09 (November 2024) release is based on the Stable 2024.09 (September 2024) release and includes patch updates that were released since the Stable 2024.09 release. The Long-Term Support 2024.09 release includes all the features, enhancements, fixes, and security patches that are included in the

Long-Term Support 2024.03 (May 2024) release and in the subsequent Stable releases through the Stable 2024.09 release.

Note: When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

New and Enhanced Offerings

New Offering: SAS Integrated Regulatory Reporting

A new SAS Risk offering, SAS Integrated Regulatory Reporting, is now available for deployment with the SAS Viya platform. SAS Integrated Regulatory Reporting enables financial institutions to manage the complexities of regulatory reporting processes and meet regulatory deadlines using a modern, scalable, and cloud-native architecture offered by SAS Viya. By means of the Quick Start feature, the solution supports reporting templates from the following European Banking Authority (EBA) frameworks:

- COREP framework under EBA Taxonomy 3.2
- IRRBB and MREL frameworks under EBA Taxonomy 3.4

SAS Integrated Regulatory Reporting can be deployed on all the supported cloud platforms. It requires SAS Common Data Store. For additional system requirements to support SAS Integrated Regulatory Reporting, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

New Offering: SAS Real-Time Watchlist Screening for Entities

A new offering, SAS Real-Time Watchlist Screening for Entities, is now available for deployment with SAS Viya. SAS Real-Time Watchlist Screening for Entities provides real-time and batch processing capabilities to perform watchlist screening. It seamlessly integrates with an industry-leading, third-party screening engine to provide efficient, robust watchlist screening.

The name-screening capabilities in SAS Real-Time Watchlist Screening for Entities are complemented by the ability to tune screening parameters and integrate custom allow lists and deny lists. Screening is processed using a REST API or Kafka integration and is fully audited to meet regulatory requirements.

SAS Real-Time Watchlist Screening for Entities can be deployed on Microsoft Azure or with upstream open-source Kubernetes.

New Offering: SAS Real-Time Watchlist Screening for Payments

A new offering, SAS Real-Time Watchlist Screening for Payments, is now available for deployment with SAS Viya. SAS Real-Time Watchlist Screening for Payments provides real-time and batch processing capabilities to perform watchlist screening. The payment screening capabilities are complimented with the ability to tune screening parameters and integrate customer-specific allow lists and deny lists. Screening is processed using REST API or Kafka integration and is fully audited to meet your regulatory needs.

Users of SAS Real-Time Watchlist Screening for Entities will find that SAS Real-Time Watchlist Screening for Payments has similar requirements. Both offerings can be deployed on Microsoft Azure or with upstream open-source Kubernetes.

Enhancements to SAS Fraud and Compliance Solutions

The following SAS Fraud and Compliance solutions have enhanced functionality:

- SAS Fraud Decisioning for Claims Analyze
- SAS Fraud Decisioning for Claims Decision
- SAS Fraud Decisioning for Claims Premier
- SAS Government Management Advanced
- SAS Government Management Premier
- SAS Government Management Professional
- SAS Government Management Standard
- SAS Payment Integrity for Health Care Analyze
- SAS Payment Integrity for Health Care Decision
- SAS Payment Integrity for Health Care Premier
- SAS Payment Integrity for Procurement Premier
- SAS Payment Integrity for Social Benefits Analyze
- SAS Payment Integrity for Social Benefits Decision
- SAS Payment Integrity for Social Benefits Premier
- SAS Tax Compliance Analyze
- SAS Tax Compliance Decision
- SAS Tax Compliance Premier

These solutions can be deployed in any of the environments that are supported by the SAS Viya platform. Some of the optional new functionality has system requirements, which are described in "Requirements for SAS Fraud Solutions" in *System Requirements for the SAS Viya Platform*.

Enhancements to SAS Business Orchestration Services

SAS Business Orchestration Services now includes a new, cloud-native engine that enables users to declare their orchestrations through a set of workloads and flows in YAML format. The classic engine, based on Apache Camel, is still available, but it will eventually be superseded by the cloud-native engine.

Both SAS Business Orchestration Services engines offer a customizable orchestration framework that enables you to implement enterprise integration patterns based on a set of high-level abstractions that require minimal coding. SAS Business Orchestration Services helps you rapidly integrate newer tools, technologies, and data flows into your organization so that supporting technologies evolve along with your business.

Existing customers can deploy either the classic engine or the cloud-native engine, which is provided in a standalone container. As a result, customers who have not yet migrated to SAS Viya 4 can still benefit from the latest software and security updates. Each engine has a README that describes configuration steps.

- For the classic engine, you should consult **`$deploy/sas-bases/examples/sas-boss/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/deploying_sas_business_orchestration_services.htm`** (for HTML).
- For the newer, cloud-native engine, consult **`$deploy/examples/sas-business-orchestration-worker/README.md`** (Markdown) or **`$deploy/sas-bases/docs/sas_business_orchestration_worker_configuration.htm`** (HTML).

SAS Business Orchestration Services can be deployed in any of the environments that are supported by the SAS Viya platform.

Enhancements to SAS/ACCESS Interface to Oracle

SAS/ACCESS Interface to Oracle now provides support for Oracle Autonomous Database.

In addition, the required 64-bit Oracle client is now included in the deployment.

Changes to SAS Health and Life Sciences Offerings

The SAS solution formerly named SAS Health Clinical Acceleration has been renamed. This solution is now named SAS Clinical Acceleration Repository.

In addition, the solution named SAS Health can now be deployed in an Amazon EKS cluster in AWS.

Enhanced Platform Support: SAS Retail and Consumer Goods

With the addition of support for deployment in Google Cloud and Google Distributed Cloud (software only) for VMware, SAS solutions from the Retail and Consumer Goods division can now be deployed on all the supported cloud platforms. This enhancement applies to all the following solutions:

- SAS Intelligent Performance Management for Cost and Profitability
- SAS Intelligent Performance Management for Finance
- SAS Intelligent Planning for Consumer Goods
- SAS Intelligent Planning for Retail
- SAS Intelligent Planning for Supply Chain
- SAS Intelligent Planning Cloud for Consumer Goods
- SAS Intelligent Planning Cloud for Retail

Enhanced Platform Support: Fraud and Risk Solutions

The following SAS solutions have added support for deployment in Red Hat OpenShift:

- SAS Anti-Money Laundering
- SAS Regulatory Capital Management

Platform Enhancements

Support for Web Proxy Servers

The SAS Configurator for Open Source utility now enables you to configure a web proxy server. If you need to use SAS Configurator for Open Source in an environment where a web proxy server is active, new global options have been provided in the change-configuration.yaml file so that you can configure the server host name and port. For more information about the `global.http_proxy` or

`global.https_proxy` options, see "(Optional) Web Proxy Server Support" in *SAS Viya Platform: Integration with External Languages*.

CAS Server Enhancements

Two new server options are available that help to minimize disruptions during state transfer for CAS servers. For more information, see cas.MAXSESSIONTRANSFERSIZE and cas.STATETRANSFERMODEL in *SAS Viya Platform: SAS Cloud Analytic Services*.

You can now set a backing store for CAS to support memory allocation. For a fuller explanation of the backing store and the benefits that it provides , see Backing Store for CAS Memory Allocations. For the steps to create the backing store, see Configure a Backing Store for Memory Allocations.

OpenSearch Audit Log Enhancement

Note: This topic applies to internal instances of OpenSearch only.

OpenSearch has added a new transformer file, audit-log-retention-transformer.yaml, to configure the retention of audit log indices. For details about using this new file, see the README file at **`$deploy/sas-bases/examples/configure-elasticsearch/internal/security-audit-logs/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/opensearch_security_audit_logs.htm`** (for HTML).

System Requirements: Critical Changes

Changes to Kubernetes Requirements

Support for Kubernetes 1.30.*x* has been added for all supported providers with the exception of Red Hat OpenShift. Kubernetes 1.27.*x* is no longer supported. SAS Viya platform 2024.09 supports Kubernetes 1.28.*x* - 1.30.*x*.

For OpenShift clusters, support for Red Hat OpenShift Container Platform (OCP) 4.16.*x* has been added. You can use either Red Hat OpenShift Container Platform (OCP) 4.15.*x* or 4.16.*x* in one of the supported environments. Support for OCP 4.14.*x* has been dropped.

As Red Hat adds support for newer versions of Kubernetes, SAS validates new OCP versions, designates an appropriate cadence to add support, and updates the documentation as needed.

Note: For OpenShift 4.16, a restriction on using the OpenShift Container Registry to deploy the SAS Viya platform from a mirror has been removed. A patch has been provided for this issue. Be aware that the procedure for deploying from a mirror in OCR has changed. For more information, see "Create and Populate a Mirror in Red Hat OpenShift Container Registry" in *SAS Viya Platform: Deployment Guide*.

Changes to Kustomize Requirement

In order to avoid a vulnerability, a newer version of Kustomize is required: Kustomize 5.4.3.

The documentation has been revised to reflect this change. A patch that became available in October 2024 includes Kustomize 5.4.3 along with the sas-orchestration image. That image is used by the SAS Deployment Operator and the sas-orchestration command.

Critical Change: Ingress Controller

An ingress controller that the SAS Viya platform supports for deployment, ingress-nginx (or Ingress NGINX controller), is being retired by the Kubernetes community. You can replace ingress-nginx with Contour ingress controller.

Starting March 19, 2026, SAS provides support for Contour in all Stable and Long-Term Support (LTS) releases of the SAS Viya platform and solutions that are in Standard Support. You can replace the ingress controller with Contour in any SAS Viya version in Standard Support by:

- applying the latest patch updates while making the change
- making the change while performing a version update of your SAS Viya platform deployment

The deployment documentation includes information to assist you with the transition. See the Cluster Ingress Requirements and *Changing Ingress Controllers in a Deployment* for more information.

Using the Contour ingress controller requires a new command when updating a SAS Viya platform deployment that is using the Kubernetes commands method of deployment. The new command is included in the list of deployment commands in Deployment Using Kubernetes Commands.

After the retirement of ingress-nginx, the SAS Viya platform will continue to provide Standard Support for environments that use it; however, neither SAS nor the Kubernetes community will address bugs or security issues for that component. Continuing to use ingress-nginx after March 19, 2026 is at your own risk.

If you want to continue using it, the SAS Viya platform requires ingress-nginx 1.9.0 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.28.*x* - 1.30.*x*.

IMPORTANT Version 1.13.0 of ingress-nginx is not supported. The Ingress Nginx community has fixed a bug in ingress-nginx 1.13.1 and later, enabling the SAS Viya platform to support these versions of the ingress controller.

With ingress-nginx 1.12.*x* or later, you might need to change the default configuration of the ingress controller in order to mitigate breaking changes from NGINX. For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Changes to Sizing Recommendations

The minimum resource recommendations that are provided in "Sizing Recommendations" in *System Requirements for the SAS Viya Platform* have been updated to reflect results from performance testing with SAS Viya platform 2024.03 (LTS).

The updated recommendations are based on a single node for the CAS server, a topology that has been thoroughly tested for environments with approximately 8 concurrent end users. The recommendations now provide node minimum and maximum estimates when using cluster autoscaling for the Compute, Stateful, and Stateless workload classes. Other changes include lower minimum requirements for CAS disk cache storage and SASWORK and additional, lower-resourced machines for Stateless workloads on most platforms.

Changes to PostgreSQL Requirements (Internal PostgreSQL Only)

The SAS Viya platform now uses PostgreSQL 16 for internal PostgreSQL servers. The internal PostgreSQL server has been upgraded to Crunchy 5.6.1 for PostgreSQL 16.

IMPORTANT If you deploy the SAS Viya platform manually, an additional step is required when you update to 2024.09 or later. For more information, see "Upgrade to PostgreSQL 16" in *SAS Viya Platform: Deployment Notes*.

With this upgrade, a manual change to add the secure computing mode (seccomp) to the securityContext is no longer required. Previously, the manual change had to be re-applied each time the PostgreSQL cluster underwent selected changes, including when StatefulSet attributes or pod attributes such as pod memory limits were changed or replicas were dropped or re-created.

Internal PostgreSQL servers that use PostgreSQL 12 are not supported with 2024.09 and later. For certain atypical deployment scenarios where PostgreSQL 12 and PostgreSQL 16 co-exist in different namespaces, some restrictions might apply.

For more information, see "PostgreSQL 16 Post-Upgrade Processing" in *SAS Viya Platform: Deployment Notes*.

SAS now recommends that you use a block storage device for the PostgreSQL server persistent storage. Information about how to change the storage class to block storage after the initial deployment has completed is provided in "Change the Storage Class of the Data Pod" in *SAS Viya Platform: Infrastructure Servers*.

Changes to PostgreSQL Requirements (External PostgreSQL Only)

The SharedServices database for an external PostgreSQL server is no longer created automatically during the initial deployment of the SAS Viya platform. Instead, you must manually create it before you start the SAS Viya platform deployment. The procedures to update your SAS Viya platform software are not affected by these changes.

The list of requirements for an external PostgreSQL database has been updated to include the requirements that are no longer fulfilled automatically by the deployment process. For more information, see "External PostgreSQL Requirements" in *System Requirements for the SAS Viya Platform*.

SAS now recommends that you use a block storage device for the PostgreSQL server persistent storage. This recommendation applies equally to an internal or an external PostgreSQL server.

Changes to Red Hat OpenShift Requirements

The requirements to deploy the SAS Viya Platform into a Red Hat OpenShift environment are now less restrictive. Red Hat OpenShift Kubernetes Engine (OKE) is supported in addition to Red Hat OpenShift Container Platform (OCP). SAS has assessed these Kubernetes distributions and determined that they function in a similar manner.

You can assume that requirements that apply to Red Hat OpenShift apply equally to OCP and OKE.

Change to Storage Requirements

Enhancements to the software update process have been added. These enhancements resulted in an additional requirement for a PVC that points to POSIX-compliant storage in order to store shared content and libraries. For more information about the Commonfiles PVC requirement, see "Persistent Storage Volumes, PersistentVolumeClaims, and Storage Classes" in *System Requirements for the SAS Viya Platform*.

Changes to OpenSearch Requirements

The SAS Viya platform uses an Apache 2.0-licensed distribution of OpenSearch to support search features. By default, it is deployed automatically and is currently at version 2.13.0. If you prefer to set up and maintain your own instance of OpenSearch, OpenSearch 2.13.0 is now supported. Additional requirements are described in "OpenSearch Requirements" in *System Requirements for the SAS Viya Platform*.

Changes to SAS with SingleStore

SAS with SingleStore (the product formerly named SAS Viya with SingleStore) has added support for deployment on Red Hat OpenShift.

Deploying SAS with SingleStore on Red Hat OpenShift requires a security context constraint. For more information, see "Apply and Bind the Security Context Constraints" in *SAS Viya Platform: Deployment Guide*.

Changes to Data Access Requirements

The SAS Viya platform now includes Simba drivers with SAS/ACCESS software for database access.

- SAS/ACCESS Interface to Impala includes the Simba client by default for ODBC access. Obtaining and installing the client driver is no longer required. However, some changes to configuration files might be required.
- Simba JDBC drivers from insightsoftware replace drivers from CData that were included with previous releases of SAS/ACCESS Interfaces to Hadoop and Spark. Some additional configuration is required. For more information, see:
  - "Requirements for SAS/ACCESS Interface to Hadoop" in *System Requirements for the SAS Viya Platform*.
  - "Requirements for SAS/ACCESS Interface to Spark" in *System Requirements for the SAS Viya Platform*.

The SAS Viya platform now supports MinIO Enterprise Object Store as a data source in AWS environments. You can use the CASLIB statement to connect the CAS server with an S3 or MinIO instance. The FILENAME statement lets you connect the Compute Server with your S3 or MinIO data source. At this time, the Parquet LIBNAME statement cannot be used with a MinIO data source. For more information, see "Support for Data Storage in Amazon S3 and MinIO" in *System Requirements for the SAS Viya Platform*.

Change to SAS Configurator for Open Source Requirements (OpenShift only)

SAS Configurator for Open Source is a utility that is used for installing and configuring R and Python. If you are performing a deployment on Red Hat OpenShift, SAS Configurator for Open Source now requires that you apply and bind a Security Context Constraint (SCC). For details, see "sas-pyconfig" in *SAS Viya Platform: Deployment Guide*.

Pods Removed or Merged Into Other Pods: Critical Changes

The following pods were removed:

- sas-text-concepts
- sas-drive
- sas-event-stream-processing-streamviewer-app

The following pods were merged into new or existing pods. The pods to the left of the arrow are removed during the software update. The pods to the right of the arrow run the related servers and services after the software update is successful.

sas-forecasting-data-definitions sas-forecasting-filters sas-forecasting-events sas-forecasting-models sas-forecasting-overrides	→	sas-forecasting
sas-category-taxonomy sas-concept-taxonomy	→	sas-text-analytics-taxonomies[1]
sas-folders sas-types	→	sas-file-store[1]
sas-geo-enrichment	→	sas-geography
sas-templates	→	sas-collaboration
sas-report-renderer	→	sas-report-renderers
sas-workflow	→	sas-workflow-engine[1]

sas-workflow-definition-history	→	sas-workflow-history[1]
sas-documents sas-terms-management sas-topic-management	→	sas-text-analytics-data[1]
sas-forecasting-data-definitions sas-forecasting-filters sas-forecasting-events sas-forecasting-models sas-forecasting-overrides	→	sas-forecasting
sas-activities	→	sas-content
sas-report-operations	→	sas-visual-analytics
sas-category-execution-provider sas-concept-execution-provider sas-parse-execution-provider sas-sentiment-execution-provider sas-topic-execution-provider	→	sas-text-analytics-execution
sas-business-rules-services	→	sas-business-rules[1] sas-reference-data[1]
sas-decisions-definitions	→	sas-decisions[1] sas-treatment-definitions[1]
sas-forecasting-comparison sas-forecasting-exploration sas-forecasting-gateway sas-forecasting-pipelines	→	sas-forecasting[1]

1 A new pod name.

Deployment and Configuration Changes

Changes for SAS Workload Orchestrator Services

Here is a summary of the changes:

- In previous releases, the sas-workload-orchestrator Kubernetes service routed all REST API requests to whichever SAS Workload Orchestrator pod is acting as the workload manager. The service now performs load balancing over newly available sas-workload-orchestrator-x statefulset pods.
- The sas-workload-orchestrator-**x** (where **x** is 0 through 9) Kubernetes services have been replaced by the sas-workload-orchestrator-manager Kubernetes service. The new service routes REST API requests from the daemons to the current SAS Workload Orchestrator manager statefulset pod.

File Used to Disable SAS Workload Orchestrator Moved

SAS Workload Orchestrator is deployed by default with every SAS Viya platform deployment. However, users could disable the deployment by referring to the **$deploy/sas-bases/examples/sas-workload-orchestrator/enable-disable/sas-workload-orchestrator-disable-patch-transformer.yaml** file in the base kustomization.yaml file (**$deploy/kustomization.yaml**). That file has been moved to **$deploy/sas-bases/overlays/sas-workload-orchestrator/enable-disable/sas-workload-orchestrator-disable-patch-transformer.yaml**. For details, see the README file at **$deploy/sas-bases/overlays/sas-workload-orchestrator/enable-disable/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/disabling_and_enabling_sas_workload_orchestrator_service.htm** (for HTML).

SAS Regulatory Capital Management Change

The rcm_transform.yaml file for SAS Regulatory Capital Management has been modified with new variables for additional functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-rcm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_regulatory_capital_management.htm** (for HTML).

SAS Allowance for Credit Loss Configuration Change

The acl_transform.yaml file for SAS Allowance for Credit Loss has been modified with new variables for increased additional functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-acl/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_allowance_for_credit_loss.htm** (for HTML).

SAS Asset and Liability Management Configuration Change

The alm_transform.yaml file for SAS Asset and Liability Management has been modified with new variables for additional functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-alm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_asset_and_liability_management.htm** (for HTML).

SAS Dynamic Actuarial Modeling Configuration Change

The pcpricing_transform.yaml file for SAS Dynamic Actuarial Modeling has been modified with new variables for additional functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-pcpricing/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/preparing_and_configuring_sas_dynamic_actuarial_modeling_for_deployment.htm** (for HTML).

SAS Expected Credit Loss Configuration Change

The ecl_transform.yaml file for SAS Expected Credit Loss has been modified with new variables for additional functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-ecl/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_expected_credit_loss.htm** (for HTML).

SAS Insurance Capital Management Configuration Change

The icm_transform.yaml file for SAS Insurance Capital Management has been modified with new variables for additional functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-icm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_insurance_capital_management.htm** (for HTML).

SAS Model Risk Management Configuration Change

The mrm_transform.yaml file for SAS Model Risk Management has been modified with a new variable for additional functionality with Git repositories, `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-mrm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_model_risk_management.htm** (for HTML).

SAS Risk Cirrus Core Configuration Change

The core_transform.yaml file for SAS Risk Cirrus Core has been modified with new variables for additional functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-mrm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/**

configure_connection_settings_for_sas_model_risk_management.htm (for HTML).

SAS Risk Factor Manager Configuration Change

The rfm_transform.yaml file for SAS Risk Factor Manager has been modified with a new variable for additional functionality with Git repositories, SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-rfm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_risk_factor_manager.htm** (for HTML).

SAS Risk Modeling Configuration Change

The rm_transform.yaml file for SAS Risk Modeling has been modified with a new variable for additional functionality with Git repositories, SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-rm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_risk_modeling.htm** (for HTML).

SAS Stress Testing Configuration Change

The st_transform.yaml file for SAS Stress Testing has been modified with new variables for additional functionality with Git repositories. The new fields are SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE and SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-st/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_stress_testing.htm** (for HTML).

End of Support and Deprecated Features

Changes to SAS/CONNECT Server and SAS/CONNECT Spawner

IMPORTANT Removed Feature

> The ability to locally spawn SAS/CONNECT server inside the SAS/CONNECT spawner is removed at 2024.09 Stable and Long-Term Support releases.

The ability to locally spawn a SAS/CONNECT server inside the SAS/CONNECT spawner pod was previously deprecated in the 2024.03 Stable and Long-Term Support release.

The following deployment changes apply as a result of the removal:

- SAS/CONNECT Spawner no longer requires a security context constraint when it is deployed on Red Hat OpenShift.

  The related README file, **`$deploy/sas-bases/examples/sas-connect-spawner/openshift/README.md`**, has been removed.
- SAS no longer recommends configuring a workload class or node pool for SAS/CONNECT.
- SAS/CONNECT workloads will be associated with the compute workload class in all cases.

You can now configure high availability (HA) for the SAS/CONNECT Spawner by applying the HA transformer: **`$deploy/sas-bases/overlays/scaling/ha/enable-ha-transformer.yaml`**.

Withdrawal of Support for Process Orchestration in Selected Solutions

Support for the Process Orchestration functionality in the SAS Viya platform is currently suspended for the following SAS solutions only:

- SAS Allowance for Credit Loss
- SAS Expected Credit Loss
- SAS Climate Risk Stress Testing
- SAS Credit Risk Stress Testing
- SAS Stress Testing

As a result, the Apache Airflow database that enables Process Orchestration, which is described in "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*, is not required for these solutions at this time.

SAS Event Stream Processing Streamviewer No Longer Supported

SAS Event Stream Processing Streamviewer is no longer supported. Users are encouraged to explore the SAS Event Stream Processing Data Source Plug-in for Grafana. Read more

New and Updated Documentation

Support Change When Updating Long-Term Support Versions

On the Long-Term Support cadence, you can update from a version in Standard Support to the next Long-Term Support version in Standard Support. You cannot skip versions when updating software on the Long-Term Support cadence. The documentation has been updated to reflect this change.

To view supported update paths, see "Quick Links for Versions in Standard Support" in *SAS Viya Platform Operations: Versions in Standard Support and Update Paths*.

New Documentation for External Languages

A new guide to assist you in setting up integration between the SAS Viya platform and external open-source programming languages is now available: *SAS Viya Platform: Integration with External Languages*. Open-source language integration enables SAS Viya platform users to use different programming languages for different projects. The programs that they write in Python or R can be run along with code written in the SAS programming language.

This new guide takes the place of the README files in the following locations:

- **`$deploy/sas-bases/examples/sas-pyconfig`**
- **`$deploy/sas-bases/examples/sas-open-source-config`**
- **`$deploy/sas-bases/examples/sas-open-source-config/python`**
- **`$deploy/sas-bases/examples/sas-open-source-config/r`**
- **`$deploy/sas-bases/examples/sas-microanalytic-score/astores`**

These files are still provided. However, *SAS Viya Platform: Integration with Open-Source Languages* provides ordered sets of instructions, contextual explanations,

and additional information for configuring the integration and enabling users to authenticate.

"Common Customizations" Divided into Two New Topics

In earlier versions of the *SAS Viya Platform: Deployment Guide*, the "Common Customizations" section listed all the customizations (outside of product-specific customizations) that should be considered for a deployment. The "Common Customizations" content has been divided into two new topics. The first, "Required Customizations" in *SAS Viya Platform: Deployment Guide*, describes the customization decisions that must be made for every deployment of the SAS Viya platform. It is in a checklist format. The second, "Optional Customizations" in *SAS Viya Platform: Deployment Guide*, contains the remainder of the customizations previously described in "Common Customizations" and describes the customizations that should be considered.

New Recommendations for Bare-Metal Machines

In selected Kubernetes cluster environments, the SAS Viya platform can be deployed on generic physical (or "bare-metal") machines running Red Hat Enterprise Linux. The documentation that is provided for SAS Viya platform deployments was written primarily with virtual machines in mind. The vast majority of this guidance is equally applicable to bare-metal machines. However, deployment and sizing guidance specific to bare-metal clusters has now been added to the *Tuning Guide*. Pre-installation guidelines related to the CAS workload class now incorporate information about deploying on physical machines. For more information, see Tuning Suggestions for Physical Machines.

Changes to Platform Names and Documentation

Google has changed two names in their cloud architecture that are relevant for a SAS Viya platform deployment:

- Google Cloud Platform (or "GCP") is now called "Google Cloud."
- GKE on VMware and, prior to that name change, Anthos clusters on VMware, has been renamed as "Google Distributed Cloud (software only) for VMware."

The documentation is being updated to reflect these name changes from Google.

Long-Term Support Releases in Limited Support

Note: For more information about Limited Support, see Support Levels for the SAS Viya Platform.

LTS 2024.03 (May 2024)

About the Release

The Long-Term Support 2024.03 (May 2024) release is based on the Stable 2024.03 (March 2024) release and includes patch updates that were released since the Stable 2024.03 release. The Long-Term Support 2024.03 release includes all the features, enhancements, fixes, and security patches that are included in the Long-Term Support 2023.10 (November 2023) release and in the subsequent Stable releases through the Stable 2024.03 release.

New Products

New SAS Risk Solutions Available

Multiple SAS Risk solutions are now available for deployment with the SAS Viya platform.

SAS Climate Risk Stress Testing enables organizations to address the requirements of the various climate risk stress-testing regulatory exercises, dedicated climate risk regulations, and different reporting standards (Pillar 3, CSRD, IFRS, SFDR, TCFD, and more). These factors require banks to establish effective and efficient processes to calculate forward-looking portfolio climate-related KRIs and KPIs and report on them. SAS Climate Risk Stress Testing also addresses business challenges related to climate scenario analysis; portfolio decarbonization simulations; assessment of various portfolio decarbonization pathways and strategies toward Net Zero Financed Emissions; and transition planning reporting.

SAS Credit Risk Stress Testing helps financial institutions to modernize both regulatory calculation (such as Provisioning) and internal planning in the scalable and cloud-native architecture offered by SAS Viya. Credit stress-testing

enablement assists banks in configuring their models, workflows, and reports to adequately address the specific requirements of credit risk analysis.

SAS Insurance Capital Management is a collection of computational and reporting logic that is designed to enable insurance and reinsurance companies to implement the European Union Solvency II standard model and ICS 2.0 – the International Insurance Capital Standard model for calculating risk-based capital. The solution facilitates the production of regulatory reports according to the various specifications in complex regulatory environments, such as QRTs for Solvency 2. SAS Insurance Capital Management includes an integrated insurance data model; data-management capabilities; advanced analytics; and reporting technologies for a comprehensive approach to a risk culture. The solution also supports customization capabilities that enable you to adapt the solution to meet the requirements of national regulators.

SAS Insurance Contract Valuation provides an integrated environment for managing, auditing, and tracing all steps of the IFRS 17 and LDTI compliance processes. This solution integrates risk and finance calculations into structured workflow processes that ensure data quality, transparency, and auditability. In addition, it provides robust reporting capabilities.

SAS Regulatory Capital Management enables financial institutions to manage the complexities of regulatory capital calculation and reporting processes in the banking sector in an integrated and reliable enterprise framework. The solution supports the calculation of credit risk and counterparty credit risk capital requirements under all applicable approaches defined by the Basel regulatory framework.

These solutions can be deployed on all the supported cloud platforms. They all require SAS Common Data Store.

For more information about the requirements for SAS Risk solutions, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

SAS Anti-Money Laundering Now Available

SAS Anti-Money Laundering is now available for deployment with the SAS Viya platform. This release is the latest iteration of SAS Anti-Money Laundering, which saw its first release in 2012. The current version on SAS Viya merges two previous offerings, SAS Anti-Money Laundering and SAS Customer Due Diligence, into a single offering.

SAS Anti-Money Laundering helps customers in the financial industry comply with regulations that aim to prevent and combat money laundering, terrorism financing, and corruption. Like its predecessor, SAS Anti-Money Laundering on SAS Viya 3.5, this version utilizes the SAS Visual Investigator framework.

SAS Anti-Money Laundering can be deployed with Microsoft Azure Kubernetes Service, Google Cloud Platform and GKE on VMware, or with upstream open source Kubernetes.

Platform Enhancements

Updated Source Base Image

SAS is using a newer version of the source base image for all SAS Viya 4 containers. The Iron Bank Red Hat universal base image (UBI) 8, based on Red Hat Enterprise Linux, contains security-hardening modifications from Platform One. These modifications to the base image conform to the technical guidelines of the U.S. Defense Information Systems Agency (DISA). The image has been approved for use within the US Department of Defense.

As a result of this change to the base image, you might need to update the TLS certificate on your LDAP server. The older SHA1 signature algorithms on remote certificates for an LDAP server are no longer supported.

You can read more about Platform One Iron Bank here: https://p1.dso.mil/services/iron-bank. You can read more about the collaboration between DISA and Red Hat here: https://www.redhat.com/en/blog/disa-has-released-red-hat-enterprise-linux-8-stig. And you can view the ubi8 container repository and find out more about its security modifications at https://repo1.dso.mil/dsop/redhat/ubi/8.x/ubi8.

SAS Data Studio Change

Access to SAS Data Studio in SAS Viya platform is no longer enabled by default. SAS administrators can enable SAS Data Studio using SAS Environment Manager.

1. In SAS Environment Manager, open the **Rules** page and search for "SASDataStudio."
2. Edit the SAS Data Studio rule in one of these ways:
   - Change the rule type from *Prohibit* to *Grant*. Then add the users who need access to SAS Data Studio.
   - Change the rule status to *Off*, which disables the rule.

For more information, see "Edit a Rule" in *SAS Environment Manager: User's Guide*.

SAS recommends that you move to SAS Studio for data preparation and data management. SAS Studio offers more extensive features for managing your data.

System Requirements

Changes to Kubernetes Requirements

Support for Kubernetes 1.28.*x* has been added for all supported providers with the exception of Red Hat OpenShift. Kubernetes 1.25.*x* is no longer supported. SAS Viya platform 2024.02 supports Kubernetes 1.26.*x* - 1.28.*x*.

Kubernetes 1.28 has implemented a change in behavior that could affect the CAS server if your cluster is configured with Linux cgroup v2. New behavior by the out-of-memory (OOM) killer might cause CAS pods to restart. Some configuration changes are recommended for certain environments. For more information, see "CAS Pods Restart in a Kubernetes 1.28 Cluster That Is Configured with Linux cgroup v2" in *SAS Viya Platform: SAS Cloud Analytic Services*.

For OpenShift clusters, continue to use Red Hat OpenShift Container Platform (OCP) 4.13.*x* - 4.14.*x* in one of the supported environments.

Change to Kustomize Requirement

In order to avoid a vulnerability, a newer version of Kustomize is required: Kustomize 5.4.3.

The documentation has been revised to reflect this change. A patch that became available in October 2024 includes Kustomize 5.4.3 along with the sas-orchestration image. That image is used by the SAS Deployment Operator and the sas-orchestration command.

Changes to Ingress Requirements

The SAS Viya platform now requires ingress-nginx 1.6.4 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.26.*x* - 1.28.*x*.

If you are using ingress-nginx 1.12.*x* and later for your Kubernetes cluster, you must change the default configuration of the ingress controller in order to mitigate breaking changes from NGINX.

For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Changes to Red Hat OpenShift Support

Support for Red Hat OpenShift Container Platform (OCP) 4.15.*x* has been added. Support for Red Hat OCP 4.12.*x* was dropped. SAS Viya platform 2024.03 supports Red Hat OCP 4.13.*x* - 4.15.*x*. These versions align with the supported versions of Kubernetes (1.26.*x* - 1.28.*x*).

In addition, the requirements to deploy the SAS Viya platform into a Red Hat OpenShift environment are now less restrictive. Red Hat OpenShift Kubernetes Engine (OKE) is supported in addition to Red Hat OpenShift Container Platform (OCP). SAS has assessed these Kubernetes distributions and determined that they function in a similar manner.

In this guide, you should assume that requirements that apply to Red Hat OpenShift apply equally to OCP and OKE.

For more information about Red Hat OpenShift support, see "Cluster Requirements for Red Hat OpenShift" in *System Requirements for the SAS Viya Platform*.

Change to Calico CNI Support

Deployments in upstream open-source Kubernetes clusters now require Calico 3.25.*x* and later. This change to the minimum supported version of Calico ensures compatibility with Kubernetes 1.26.*x* - 1.28.*x*.

Changes to OpenSearch Requirements

The SAS Viya platform uses an Apache 2.0-licensed distribution of OpenSearch to support search features. By default, it is deployed automatically and is currently at version 2.12.0. If you prefer to set up and maintain your own instance of OpenSearch, OpenSearch 2.12.0 is now supported. Additional requirements are described in "OpenSearch Requirements" in *System Requirements for the SAS Viya Platform*.

Changes to SAS Risk Solutions

The following SAS Risk offerings are newly available or have gained capabilities that use an Apache Airflow database and the Process Orchestration feature:

- SAS Allowance for Credit Loss
- SAS Expected Credit Loss
- SAS Stress Testing
- SAS Climate Risk Stress Testing
- SAS Credit Risk Stress Testing

Apache Airflow requires a dedicated PostgreSQL database. Apache Airflow can be installed on either an external or an internal instance of PostgreSQL.

Several SAS Risk offerings have had support for Apache Airflow in previous releases. For these offerings, the method for enabling Airflow has changed:

- SAS Insurance Capital Management
- SAS Insurance Contract Valuation Foundation
- SAS Regulatory Capital Management

If you are deploying SAS Risk solutions that include any of the offerings in these lists, consult the README titled "Configure Apache Airflow for Process Orchestration" for configuration instructions. These files are located at **`$deploy/sas-bases/examples/sas-airflow/metadata/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_apache_airflow_for_process_orchestration.htm`** (for HTML).

For more information about the requirements for SAS Risk solutions, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

Changes to SAS with SingleStore and SAS/ACCESS Interface to SingleStore

The instance of SingleStoreDB that is included with SAS with SingleStore (the product formerly named SAS Viya with SingleStore) has been updated from version 8.1 to 8.5. The update is not backward-compatible. If you update to 2024.03 or later, the SingleStoreDB instance is automatically updated to version 8.5. Following the update, you cannot use any SingleStoreDB databases (existing or new) in an earlier release.

The SAS with SingleStore README file includes updated instructions to configure the SAS SingleStore Cluster Operator for compatibility with the newer SingleStoreDB instance. In addition, deployment-related content has been updated. A step that is described in the README affects how the base kustomization.yaml file (**`$deploy/kustomization.yaml`**) should be revised before deployment. For more information, see the README for the operator, which is available at **`$deploy/sas-bases/ examples/sas-singlestore/README.md`** for Markdown format or **`$deploy/sasbases/docs/sas_singlestore_cluster_operator.htm`** for HTML.

The data connector that is included with SAS with SingleStore now supports SingleStore views. To support this feature, the data connector makes a copy of the view result set.

The SingleStore LIBNAME engine now supports single sign-on to Microsoft Entra ID (formerly Azure Active Directory). For more information, "Requirements for SAS/ACCESS Interface to SingleStore" in *System Requirements for the SAS Viya Platform*.

SAS/ACCESS Interface to SingleStore now supports SingleStoreDB 8.1 or later. Previously, SingleStoreDB 7.*x* was supported.

Changes to Data Access Requirements

The SAS Viya platform now includes Simba drivers with SAS/ACCESS software for database access.

- SAS/ACCESS Interface to Impala includes the Simba client by default for ODBC access. Obtaining and installing the client driver is no longer required. However, some changes to configuration files might be required.
- Simba JDBC drivers from insightsoftware replace drivers from CData that were included with previous releases of SAS/ACCESS Interfaces to Hadoop and Spark. Some additional configuration is required. For more information, see:
  - "Requirements for SAS/ACCESS Interface to Hadoop" in *System Requirements for the SAS Viya Platform*.
  - "Requirements for SAS/ACCESS Interface to Spark" in *System Requirements for the SAS Viya Platform*.

SAS/ACCESS Interface to Oracle now supports Oracle client and database 19c and later. Previously, Oracle 12c client and database were supported.

SAS In-Database Technologies for Hadoop Cloud Services now supports Amazon Elastic MapReduce (EMR) 5.*x* and 6.*x*. Previously, only Amazon EMR versions 5.3

and 6.0 were supported. This change does not affect the requirements for SAS/ACCESS Interface to Hadoop.

SAS/ACCESS Interface to MongoDB now supports versions of OpenSSL later than 1.0.2. Previously, OpenSSL 1.0.2 was supported, but the required libraries have now been removed from SAS images. Verify that your version of MongoDB supports a version of OpenSSL that is later than 1.0.2.

SAS/ACCESS Interface to MySQL now supports versions of OpenSSL later than 1.0.2. Previously, OpenSSL 1.0.2 was supported, but the required libraries have now been removed from SAS images. Verify that your version of MySQL supports a version of OpenSSL that is later than 1.0.2.

PostgreSQL Changes

PostgreSQL 11 is no longer supported for an external PostgreSQL server instance of SAS Infrastructure Data Server. PostgreSQL versions 12 - 15 are the only supported versions of PostgreSQL for an external instance.

As a result of this change, Microsoft Azure Database for PostgreSQL - Single Server, which was previously supported for PostgreSQL 11 only, is also no longer supported for an external PostgreSQL instance.

Changes to Data Access Support

SAS Data Connector for SingleStore now supports Microsoft Entra ID for single sign-on. For more information, see Enabling Single Sign-On for Microsoft Azure in *SAS Viya Platform with SingleStore: Administration and Configuration Guide*.

Deployment and Configuration

Change to PersistentVolumeClaim for ReadWriteMany Storage Class

The steps to include a storageclass.yaml file and modify the base kustomization.yaml file (**`$deploy/kustomization.yaml`**) to use it have been modified. If you are performing a new deployment, use the revised information at Specify PersistentVolumeClaims to Use ReadWriteMany StorageClass and the revised example kustomization.yaml file at "Initial kustomization.yaml File" in *SAS Viya Platform: Deployment Guide* to deploy your software. Existing deployments do not require any changes to the kustomization.yaml file.

OpenSearch Adds Configurable Parameters for Retaining Audit Log Indices

Note: This topic applies to internal instances of OpenSearch only.

OpenSearch has added a new transformer file, audit-log-retention-transformer.yaml, to configure the retention of audit log indices. For details about using this new file, see the README file at **$deploy/sas-bases/examples/configure-elasticsearch/internal/security-audit-logs/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/opensearch_security_audit_logs.htm** (for HTML).

New Transformers for SAS Event Stream Processing

SAS Event Stream Manager and SAS Event Stream Processing Studio each have a transformer that must be included in their deployment. The transformer enables direct file access to the persistent volume file system. For details, see the following README files:

- For SAS Event Stream Manager, see the README file located at **$deploy/sas-bases/overlays/sas-event-stream-manager-app/data/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configuring_file_storage_for_sas_event_stream_manager_projects.htm** (for HTML).
- For SAS Event Stream Processing Studio, see the README file located at **$deploy/sas-bases/overlays/sas-event-stream-processing-studio-app/data/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configuring_file_storage_for_sas_event_stream_processing_studio_projects.htm** (for HTML).

Changes to a Deployment Command

One kubectl command has been revised. If you deploy or update the SAS Viya platform using Kubernetes commands, you should be aware of this change.

The following command has changed:

```
kubectl apply --selector="sas.com/admin=namespace" -f site.yaml --prune --prune-whitelist=autos
```

The revised command is as follows:

```
kubectl apply --selector="sas.com/admin=namespace" -f site.yaml --
prune --prune-allowlist=autoscaling/v2/HorizontalPodAutoscaler
```

Security Context Constraint for SAS Detection Architecture

Deploying SAS Detection Architecture on Red Hat OpenShift requires a security context constraint. For more information, see "Apply and Bind the Security Context Constraints" in *SAS Viya Platform: Deployment Guide*.

New Transformer for CAS

CAS has introduced a new transformer file for deployments that use two node pools for CAS, one each for the `cascontroller` and `casworker` taints and labels. For more information, see the README file located at **$deploy/sas-bases/overlays/cas-server/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/cas_server_for_the_sas_viya_platform.htm** (for HTML).

Server and Service Management Change

Using Kustomize transformers to start or stop SAS Viya platform deployment is no longer supported. Use `sas-stop-all` and `sas-start-all` CronJobs to stop and start your SAS Viya platform deployments.

For more information, see "Starting and Stopping a SAS Viya Platform Deployment" in *SAS Viya Platform Operations: Servers and Services*.

Deprecated Features

Changes to SAS/CONNECT Server and SAS/CONNECT Spawner

> **IMPORTANT** Deprecation Warning
>
> The ability to locally spawn SAS/CONNECT server inside the SAS/CONNECT spawner was deprecated in the 2024.03 Stable and Long-Term Support releases. It was removed at 2024.09 Stable and Long-Term Support releases.

Documentation Changes

GKE on VMware Name Change

Google Cloud has changed the product name of Anthos Clusters on VMware. The new name is GKE on VMware. This guide acknowledges this name change and uses "GKE on VMware (formerly Anthos Clusters on VMware)" in order to provide continuity with previous releases.

Support Change When Updating Long-Term Support Versions

On the Long-Term Support cadence, you can update from a version in Standard Support to the next Long-Term Support version in Standard Support. You cannot skip versions when updating software on the Long-Term Support cadence. The documentation has been updated to reflect this change.

To view supported update paths, see "Quick Links for Versions in Standard Support" in *SAS Viya Platform Operations: Versions in Standard Support and Update Paths*.

LTS 2023.10 (November 2023)

About the Release

The Long-Term Support 2023.10 (November 2023) release is based on the Stable 2023.10 (October 2023) release and includes patch updates that were released since the Stable 2023.03 release. The Long-Term Support 2023.10 release includes all the features, enhancements, fixes, and security patches that are included in the Long-Term Support 2023.03 (May 2023) release and in the subsequent Stable releases through the Stable 2023.10 release.

New Products

New Retail and Planning Offerings and Offering Names

The names and licensing of some *SAS Retail* and *SAS Planning* offerings have been changed. SAS Assortment Planning, SAS Demand Planning, and SAS Financial Planning are now part of a new offering, *SAS Intelligent Planning*. Licensing changes enable you to combine the capabilities of each intelligent planning offering for the requirements of a specific enterprise (such as consumer items, logistics, and retail).

The following changes are reflected in the documentation:

- SAS Assortment Planning, SAS Demand Planning and SAS Financial Planning were renamed as *SAS Intelligent Planning*.
- Additional Planning offerings are now available: SAS® Intelligent Planning for Consumer Goods, SAS® Intelligent Planning for Retail, and SAS® Intelligent Planning for Supply Chain. These offerings have been added to the system requirements for the SAS Viya platform.
- These new offerings require SAS Common Data Store.
- These new offerings can be deployed with Microsoft AKS or with open source Kubernetes.

Previous releases of SAS retail products for SAS Viya 3.*x* and SAS 9® are not affected by these changes.

SAS Allowance for Credit Loss Now Available

SAS Allowance for Credit Loss is available for deployment with the SAS Viya platform. SAS Allowance for Credit Loss enables organizations to address the requirements of the Current Expected Credit Loss (CECL) and International Financial Reporting Standards 9 (IFRS 9) accounting standards. It also addresses business challenges that are related to the calculation of expected credit loss.

Using a role-based, workflow-driven process, participants contribute to the results and generate auditable artifacts.

You can deploy SAS Allowance for Credit Loss on any of the supported platforms.

SAS Asset and Liability Management Now Available

SAS Asset and Liability Management on SAS Viya is now available with a new architecture. This release creates a unified framework with Kamakura Risk Manager, a mature enterprise risk management system that focuses on credit risk, asset and liability management, liquidity risk, market risk, stress testing, and capital allocation. SAS Asset and Liability Management deploys in a unified framework with Kamakura Risk Manager. SAS Asset and Liability Management manages risk data, workflow, and analysis configuration and uses Kamakura Risk Manager as an analytics engine. SAS Visual Analytics provides reporting capabilities.

SAS Asset and Liability Management has added support for deployment on any of the supported cloud platforms. It requires SAS Common Data Store. You can deploy SAS Asset and Liability Management with an external PostgreSQL instance for SAS Infrastructure Data Server and SAS Common Data Store (CDS PostgreSQL).

SAS Cost and Profitability Management Enhancement

SAS Cost and Profitability Management now supports an external PostgreSQL instance for both SAS Infrastructure Data Server and SAS Common Data Store.

SAS Dynamic Actuarial Modeling Enhancements and Bundles

SAS Dynamic Actuarial Modeling now has three bundling options: SAS Dynamic Actuarial Modeling Analyze, SAS Dynamic Actuarial Modeling Decision, and SAS Dynamic Actuarial Modeling Premier. SAS Dynamic Actuarial Modeling Premier is the end-to-end bundle, proceeding from data, to premium model, to deployment. This bundle corresponds to the previous product. SAS Dynamic Actuarial Modeling Analyze is for customers who need the analytical side of the premium calculation and optimization. SAS Dynamic Actuarial Modeling Decision is focused on the deployment of premium models using SAS model format, PMML, Python, or ratebook. SAS Dynamic Actuarial Modeling Decision includes impact analysis and underwriting rules.

With the addition of support for deployment on GCP and Anthos Clusters on VMware and on Red Hat OpenShift, these products can be deployed on any of the supported cloud platforms.

All the SAS Dynamic Actuarial Modeling products require SAS Common Data Store (CDS PostgreSQL).

SAS Fraud Decisioning Now Available

SAS Fraud Decisioning detects, prevents, and manages evidence of fraud in real time. SAS Fraud Decisioning provides real-time decision processing and advanced analytic modeling. Functionality extends to decisions related to credit and debit cards, payments, authentication, identity verification, and merchant transactions.

SAS Fraud Decisioning can be deployed only with AKS or with upstream open source Kubernetes.

SAS Intelligent Inventory Management Now Available

SAS Intelligent Inventory Management is now available for deployment with the SAS Viya platform. The new inventory management platform replaces all previous inventory management solutions on SAS Viya and SAS 9.*x*, including SAS Size Optimization, SAS Size Profiling, SAS Pack Optimization, and SAS Inventory Optimization.

SAS Intelligent Inventory Management can be deployed on Microsoft Azure and Amazon Web Services. SAS Intelligent Inventory Management requires SAS Common Data Store.

SAS Intelligent Performance Management Now Available

SAS Intelligent Performance Management is now available for deployment with the SAS Viya platform. The new performance management platform replaces all previous performance management solutions on SAS Viya and SAS 9.*x*, including SAS Financial Management, SAS Cost and Profitability Advanced, and SAS Cost and Profitability Standard.

SAS Intelligent Performance Management can be deployed on Microsoft Azure and Amazon Web Services. SAS Intelligent Performance Management requires SAS Common Data Store.

SAS Intelligent Planning Now Available

SAS Intelligent Planning is now available for deployment with the SAS Viya platform. The new planning platform replaces all previous planning solutions on SAS Viya and SAS 9.*x*, including SAS Demand Planning, SAS Assortment Planning, SAS Financial Planning, SAS Merchandise Financial Planning, SAS Merchandise In-Season Management, and SAS for Demand-Driven Planning and Optimization (SAS Forecast Analyst Workbench, SAS Collaborative Planning Workbench, SAS Demand Signal Repository).

SAS Intelligent Planning can be deployed on Microsoft Azure and Amazon Web Services as a managed service or a Software as a Service option available on SAS Cloud. SAS Intelligent Planning requires SAS Common Data Store.

SAS Intelligent Pricing Now Available

SAS Intelligent Pricing is now available for deployment with the SAS Viya platform. The new pricing platform replaces all previous pricing solutions on SAS Viya and SAS 9.*x*, including SAS Markdown Optimization and SAS Promotion Optimization.

SAS Intelligent Pricing can be deployed on Microsoft Azure and Amazon Web Services. SAS Intelligent Pricing requires SAS Common Data Store.

SAS Market Risk Management Now Available

SAS Market Risk Management is now available on SAS Viya. SAS Market Risk Management deploys in a unified framework with Kamakura Risk Manager, an

enterprise risk management system. It provides advanced analytics for interest-rate risk, earnings risk, economic value of equity, and liquidity risk management. SAS Market Risk Management covers a wide range of trading-book and banking-book products. Users can perform scenario, sensitivity, and simulation analyses of portfolio P/L and accounting. SAS Visual Analytics provides reporting capabilities.

SAS Market Risk Management can be deployed on Microsoft Azure and Google Cloud Platform. It requires SAS Common Data Store.

Platform Enhancements

SAS Workload Orchestrator Included in Deployment by Default

SAS Workload Orchestrator is now deployed and enabled, by default, as part of the SAS Viya platform deployment. A license is no longer required.

For more information about SAS Workload Orchestrator, see "Configure SAS Workload Orchestrator" in *SAS Viya Platform: Deployment Guide*.

FIPS Compliance

The SAS Viya platform supports the use of FIPS 140-2 validated cryptographic modules when executed on Kubernetes nodes that are running in FIPS mode.

A few SAS components and products do not support running in a FIPS-enabled environment at this time. For more information, see "Support for Federal Information Processing Standards (FIPS)" in *System Requirements for the SAS Viya Platform*.

Support for Anthos Clusters on VMware

The SAS Viya platform can be deployed in Anthos Clusters on VMware (GKE on-prem). These clusters are managed by the version of Google Kubernetes Engine for on-premises data centers. Anthos Clusters run in customer-managed data centers rather than in Google Cloud Platform (GCP).

Enhanced Support for Long-Running Tasks

The SAS Compute server provides the ability to execute SAS Refresh Token, which works as a silent partner to the main container, refreshing the client token as needed. Using the sidecar is valuable for long-running tasks that exceed the default life of the client token, which in turn inhibits the successful completion of such tasks. The sidecar seamlessly refreshes the token so that these tasks can continue running unimpeded.

Note: Currently, only the SAS/CONNECT server uses this facility.

The SAS Refresh Token facility is disabled by default. For the instructions to enable the SAS Refresh Token, see the README file located at `$deploy/sas-bases/`

overlays/sas-programming-environment/refreshtoken/README.md (for Markdown format) or at **$deploy/sas-bases/docs/configure_sas_compute_server_to_use_sas_refresh_token_sidecar.htm** (for HTML).

Table Rebalancing for CAS Nodes Now Available

Administrators can more easily control the number of workers for a distributed (MPP) CAS server without disrupting running jobs. Changing the number of worker nodes helps you manage cloud costs by keeping the CAS server right-sized for your workloads. When you enable the automatic table-balancing feature, the CAS server can load-balance tables among nodes when CAS worker nodes are added to or removed from an MPP CAS configuration.

Enabling table rebalancing requires an administrator to set some environment variables. For more information, see "Change the Number of Workers for MPP CAS" in *SAS Viya Platform: Deployment Guide*.

nss_wrapper Now Available

nss_wrapper is now available as an alternative to System Security Services Daemon (SSSD). Unlike SSSD, nss_wrapper does not require being run in a more restrictive Pod Security Standard (PSS). For details, see "Use Kerberos Connections to Connect to the CAS Server" in *SAS Viya Platform: Deployment Guide*.

System Requirements

Kubernetes Support

SAS Viya platform LTS 2023.10 supports Kubernetes 1.25.*x* - 1.27.*x*.

(Open Source Kubernetes Only) Changes to Kubernetes CNI Requirement

Deployments in open source Kubernetes clusters now require Calico 3.24*x* and later.

Kustomize Support

Kustomize is a client tool that is required in order to generate Kubernetes manifest files for a deployment of the SAS Viya platform. A newer version of Kustomize is required: Kustomize 5.0.3.

Each SAS Viya platform release and cadence is optimized for and tested with a single version of Kustomize.

Changes to PostgreSQL

Additional products have added support for an external PostgreSQL instance. All products that can be deployed on the SAS Viya platform support external PostgreSQL for SAS Infrastructure Data Server and SAS Common Data Store, which is required by some products.

All SAS Viya products can now be deployed with an external instance of the required PostgreSQL database.

For an external PostgreSQL instance, PostgreSQL 12 - 15 are now supported. With the end of support for PostgreSQL 11 also came the end of support for Microsoft Azure Database for PostgreSQL - Single Server. This PostgreSQL product was previously supported for PostgreSQL 11 only.

Change to Ingress Requirements

The SAS Viya platform now requires ingress-nginx 1.4.0 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.25 - 1.27.

> **IMPORTANT** For ingress-nginx versions prior to 1.9.0, `allow-snippet-annotations=true` was the default setting. The default behavior changed with ingress-nginx 1.9.0 and later. If necessary, you can make this modification at the same time as you make the pre-installation changes that are described in ingress-nginx Vulnerability Mitigation.

Changes to Red Hat OpenShift Support

The SAS testing and support partnership with Red Hat has enabled expanded support for SAS Viya platform deployments on Red Hat OpenShift Container Platform (OCP). For more information, see "Cluster Requirements for Red Hat OpenShift" in *System Requirements for the SAS Viya Platform*.

The SAS Viya platform now requires Red Hat OCP 4.12.*x* - 4.14.*x*. Previous releases of SAS Viya supported OCP 4.10.*x* and 4.11.*x*. The supported versions align with the supported versions of Kubernetes.

Some SAS offerings support processing-intensive features that can leverage a GPU for improved performance. You can now take advantage of these features with GPU-capable VMs in a Red Hat OCP cluster for OpenShift on VMware. For more information, see "Offerings and Action Sets that Support GPU Capabilities" in *System Requirements for the SAS Viya Platform*.

Changes to Data Access and Data Source Support

- The requirements to use SAS In-Database Technologies for Hadoop Cloud Services have been reduced. Previously, users could publish only scoring models to a location on AWS EMR HDFS, and only if the SAS Viya platform had been

deployed in AWS. Users can publish scoring models to a table in Hive. AWS EMR allows optional external connections to Hive through a JDBC connection.

However, parallel data transfer activities with the Hadoop data connector for Amazon EMR still require the SAS Viya platform to be deployed in AWS.

- Simba JDBC drivers from insightsoftware replace drivers from CData that were included with previous releases of SAS/ACCESS Interfaces to Hadoop and Spark. Some additional configuration is required. For more information, see:
  - Requirements for SAS/ACCESS Interface to Hadoop in *System Requirements for the SAS Viya Platform*
  - Requirements for SAS/ACCESS Interface to Spark in *System Requirements for the SAS Viya Platform*
- SAS/ACCESS Interface to Vertica now includes the required Vertica ODBC client software. Obtaining and installing the driver are no longer required.
- SAS/ACCESS Interface to Informix has added support for Informix engine bulk loading. A required Informix utility requires some additional configuration. For more information, see "Requirements for SAS/ACCESS Interface to Informix" in *System Requirements for the SAS Viya Platform*.
- The SAS Viya platform can access data that is stored in Amazon Simple Storage Service (S3). SAS Technical Support has clarified that for the S3 procedure, FILENAME S3, a CAS S3 data source, and the CAS S3 action set, only AWS is supported. SAS cannot provide direct technical support for other S3-compatible providers. For more information about Amazon S3 support, see "Support for Data Storage in Amazon S3 and MinIO" in *System Requirements for the SAS Viya Platform*.
- SAS/ACCESS Interface to MongoDB now supports MongoDB client 1.23 or later and server 6.0 or later.
- SAS/ACCESS Interface to Teradata now supports Teradata TTU 17.20 or later.
- SAS/ACCESS Interface to Spark has added support for single sign-on to Databricks in Microsoft Azure. A few additional requirements apply to this feature.
- SAS In-Database Technologies for Databricks now supports Databricks 10.4 LTS or later (with Spark 3.2.*x* or later) for Microsoft Azure or Amazon Web Services. The newer versions of Databricks include fixes for issues with Spark SQL.

  Previously, SAS In-Database Technologies for Databricks supported Databricks 6.*x* - 9.*x*.
- SAS In-Database Technologies for Hadoop Cloud Services now supports Microsoft Azure HDInsight 5.*x*.

SAS Viya with SingleStore Updates

The instance of SingleStoreDB that is included with SAS Viya with SingleStore has been updated from version 7.8 to 8.1. The SingleStore DB is automatically updated when you update the SAS Viya platform software. Following the update, you cannot use the databases in earlier releases.

The default value for the SingleStore `--overpack-factor` option is 0.15.

Changes to Supported Browsers for SAS for Microsoft 365

The minimum browser versions that are required for SAS for Microsoft 365 have changed. These changes are necessary in order to accommodate an enhanced content security policy setting.

SAS recommends always using the latest versions of web browsers.

Changes to SAS Risk Modeling Requirements

SAS Risk Modeling can now take advantage of workflow service tasks. As a result, it requires you to set certain values in the SAS Risk Cirrus Core configuration file, **`$deploy/sas-bases/examples/sas-risk-cirrus-rcc/resources/core_transform.yaml`**:

For more information, see the README file located at **`$deploy/sas-bases/examples/sas-risk-cirrus-rcc/resources/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/preparing_and_configuring_risk_cirrus_core_for_deployment.htm`** (for HTML).

SAS Risk Modeling now requires a Git repository. The requirements for the repository are described at "Requirements for SAS® Risk Modeling" in *System Requirements for the SAS Viya Platform*.

Deployment and Configuration

New Workload Classes

To increase the granularity for scheduling CAS workloads, SAS has introduced cascontroller and casworker classes. For more information, see "Workload Classes" in *SAS Viya Platform: Deployment Guide*.

Revised Deployment Command

In order to accommodate a change in Kubernetes 1.26 and later, the required command to prune additional resources while performing an update using Kubernetes commands has been revised. For details, see "Deployment Using Kubernetes Commands" in *SAS Viya Platform: Deployment Guide*.

Kubernetes Pod Security Standards

Kubernetes 1.25 and later have deprecated pod security policies and have implemented pod security standards and a pod security admission controller to enforce the standards. Three pod security levels are defined by the pod security standards in order to control the level of the restrictions that are applied to pods: privileged, baseline, and restricted. These admission standards control the level of restrictions that are applied to pods.

Pod security standards are supported by most SAS Viya pods.

New File Required for Deployments Using OpenShift Container Registry

If you are deploying on Red Hat OpenShift and using OpenShift Container Registry, you should add a reference to a new file in the base kustomization.yaml file (`$deploy/kustomization.yaml`) . For more information, see "New File Required for OpenShift Container Registry" in *SAS Viya Platform: Deployment Notes*.

SAS Mirror Manager Support for Additional Registry Options

SAS Mirror Manager now offers support for deploying from an image registry in Red Hat OpenShift or JFrog Artifactory.

Minor enhancements to SAS Mirror Manager, testing, and documentation updates were required in order to enable this support.

Note: At the present time, only new deployments of the SAS Viya platform can be performed on OpenShift using SAS Mirror Manager. Existing deployments of the SAS Viya platform on OpenShift do not support adding a mirror registry (as a method of updating the software, for example). SAS might add that functionality in a future release.

For more information, see "Create and Populate a Mirror in Red Hat OpenShift Container Registry" in *SAS Viya Platform: Deployment Guide*.

Changes to Deployment for SAS In-Database Technologies

In SAS Embedded Process for Hadoop, security updates have been introduced by a newer version of the Java Runtime Environment. With this update, SAS In-Database Technologies no longer uses the Java API that is provided in the set of Hadoop JAR files. SAS Embedded Process jobs run on Spark only. Jobs are now dispatched using the REST API that is provided by Apache Livy. The execution of SAS Embedded Process jobs on MapReduce is no longer supported.

- The deployment of SAS Embedded Process for Cloudera and Amazon EMR is now delivered from a SAS Viya platform repository. In previous releases, the deployment was delivered from a SAS Viya 3.5 repository. Only manual installation is supported. If you previously used a parcel (Cloudera Manager) or a stack (Ambari) to deploy SAS Embedded Process, you must uninstall the software by using that method and then install the software by using the manual method.

  The installation now uses one RPM file. In addition, a new configuration task requires you to copy two configuration files, spark-defaults.conf and sparkep-defaults.conf, to a client-side location. For more information, see *SAS Viya In-Database Technologies: Deployment and Administration Guide*.

- Changes to the code for parallel data transfer and in-database model scoring are required. For more information, see "Publishing and Running Models in Hadoop" in *SAS In-Database Products: User's Guide*.

Forward Proxy Configuration Instructions

Content describing how to configure the environment for forward proxies during the deployment of your software has been added to the deployment guide. For details, see "Add Forward Proxy Settings" in *SAS Viya Platform: Deployment Guide*.

Multi-Tenant Environments

Withdrawal of Support for Application Multi-Tenancy

Support for application multi-tenancy for the SAS Viya platform is currently suspended. Customers who support use cases that require separate tenants are encouraged to deploy the SAS Viya platform into more than one namespace on the same Kubernetes cluster. For more information, see "Multiple Deployments" in *Getting Started with SAS Viya Platform Operations*.

Updating Software: Documentation Improvements and Updates

- A new topic lists the SAS Viya platform versions that are in Standard Support and the recommended update paths to the latest version.
- On the Long-Term Support cadence, you can update from a version in Standard Support to the next Long-Term Support version in Standard Support. You cannot skip versions when updating software on the Long-Term Support cadence. The documentation has been updated to reflect this change.

  To view supported update paths, see "Quick Links for Versions in Standard Support" in *SAS Viya Platform Operations: Versions in Standard Support and Update Paths*.
- A Pre-update Checklist is included to help you get started with updating to a new version or to apply a patch update. Through a Q&A format, the Pre-update Checklist highlights prerequisites, best practices, specific scenarios, and the required documentation to update the software.
- Additional best practices are included. Before each software update, you should perform an inventory scan of the current Kubernetes environment. After updating the software, a comparison report can be generated to validate the content of the updated deployment. Also, for an update to a new version using the deployment operator, it is a best practice to reduce the size of the **`$deploy`** directory before creating the custom resource.
- Additional information about using the `cadence-release` flag is provided in the "Update to a New Version Using the Deployment Operator" and "Apply a Patch Update Using the Deployment Operator" topics.

- For multi-tenant environments, re-onboarding tenants is no longer required after a software update. Each topic in the "Update to a New Version" and "Apply a Patch Update" categories was updated to reflect this change, and the related section in the "Guidance for Updating a Multi-tenant Environment" topic was removed.
- Additional guidance is provided for changing deployment methods at the same time that a software update is performed. In a related change, the "Option 2 — Create and Apply the SASDeployment Custom Resource" sections were removed from the "Update to a New Version Using the Deployment Operator" and "Apply a Patch Update Using the Deployment Operator" topics.

SAS Conversation Designer End of Life

SAS Conversation Designer has reached end of life. If you formerly had SAS Conversation Designer included in your SAS Viya platform deployment, it is no longer available after this update.

In order to avoid errors, you must remove a reference to a SAS Conversation Designer transformer from your base kustomization.yaml file (**`$deploy/kustomization.yaml`**). For more information, see "Remove Transformer from kustomization yaml File" in *SAS Viya Platform: Deployment Notes*

SAS Viya Release Notes

The SAS Viya Release Notes interface now includes the option to show only deprecated and obsolete features under the type What's New.

LTS 2023.03 (May 2023)

About the Release

The Long-Term Support 2023.03 (May 2023) release is based on the Stable 2023.03 (March 2023) release and includes patch updates that were released since the Stable 2023.03 release. The Long-Term Support 2023.03 release includes all the features, enhancements, fixes, and security patches that are in the Long-Term Support 2022.09 (November 2022) release and in the subsequent Stable releases through the Stable 2023.03 release.

New Products and Features

Changes to Offering Names

Documentation for previous releases of SAS Viya 4 used the term *SAS Viya* to refer to the totality of SAS components that supported compatible SAS product offerings. These offerings ran in and interacted with a deployment of the *SAS Viya platform*, which was referred to as "SAS Viya." With the January Stable release, the name *SAS Viya* has been applied to multiple SAS product offerings:

- SAS Visual Machine Learning was renamed as *SAS Viya*
- SAS Visual Data Science was renamed as *SAS Viya Advanced*
- SAS Visual Data Science Decisioning was renamed as *SAS Viya Enterprise*
- SAS Visual Data Science Programming was renamed as *SAS Viya Programming*

To avoid confusion, the term *platform* has been applied to SAS Viya 4. The documentation has been updated to reflect these changes.

Releases of SAS Viya 3.*x* are not affected by these changes.

SAS® Asset Performance Analytics Now Available

SAS Asset Performance Analytics can now be deployed along with SAS Viya.

Designed for capital-intensive industries or anywhere that equipment performance is critical, SAS Asset Performance Analytics captures and analyzes data from sensors on equipment and in facilities to help predict failures and avoid downtime. With advanced analytics and data-mining and visualization tools, SAS Asset Performance Analytics enables engineers to identify root causes and rapidly develop corrective action plans. In addition to monitoring and alerting, the product assists you in developing predictive and prescriptive maintenance strategies to address known sources of failure and performance degradation.

SAS® Business Orchestration Services Now Available

SAS Business Orchestration Services is now available for deployment with SAS Viya. SAS Business Orchestration Services provides a customizable orchestration framework that enables you to implement enterprise integration patterns based on a set of high-level abstractions that require minimal coding. SAS Business Orchestration Services helps you rapidly integrate newer tools, technologies, and data flows into your organization so that supporting technologies evolve along with your business.

In an upcoming release, SAS plans to provide an option to deploy SAS Business Orchestration Services in a stand-alone container. As a result, existing customers who have not yet migrated to SAS Viya 4 will still benefit from the latest software and security updates.

SAS Business Orchestration Services can be deployed with Microsoft Azure Kubernetes Service or with upstream open source Kubernetes.

SAS® Cost and Profitability Management Now Available

SAS Cost and Profitability Management is now available for deployment with SAS Viya. SAS Cost and Profitability Management is derived from the discipline of activity-based management. It enables managers to analyze the costs and profits that are associated with a product, customer, service, or business process, and it supports profitability analysis, cost-management initiatives, shared-services management, planning and budgeting efforts, and capacity optimization.

SAS Cost and Profitability Management can be deployed with Microsoft Azure Kubernetes Service or with upstream open source Kubernetes.

SAS Data Engineering Now Available

SAS Data Engineering is a new offering for the SAS Viya platform that provides enhanced programming, workload and job management, data-management, and analytics. It includes the following SAS components: SAS Studio Engineer, SAS Information Governance, SAS Workload Management and SAS In-Database Technologies.

SAS® Expected Credit Loss Now Available

A new offering, SAS Expected Credit Loss, is now available for deployment with SAS Viya.

SAS Expected Credit Loss addresses accounting requirements and business challenges related to the calculation of Expected Credit Loss (ECL) by integrating a set of powerful analytics for process management and model execution. The accounting requirements that SAS Expected Credit Loss applies include both the International Financial Reporting Standard of accounting for financial instruments, published by the International Accounting Standards Board (IFRS 9), and Current Expected Credit Losses (CECL), issued by the Financial Accounting Standards Board (FASB).

SAS Expected Credit Loss can be deployed with Microsoft Azure Kubernetes Service or with upstream open source Kubernetes.

SAS® Revenue Optimization Suite Now Available

Multiple product offerings from the SAS Revenue Optimization Suite are now available for deployment with SAS Viya. You can deploy SAS® Markdown Optimization, SAS® Promotion Optimization, and SAS® Regular Price Optimization in a Kubernetes cluster with SAS Viya. These products assist you by boosting your productivity through automated plan creation and execution using default pricing rules, promotion settings and product life cycle dates; predicting consumer demand at individual stores and crafting the most effective customer offers; and implementing optimal pricing at a store, within a zone, or for an entire market.

These offerings can be deployed with Microsoft Azure Kubernetes Service or with upstream open source Kubernetes.

SAS® Stress Testing Now Available

A new offering, SAS Stress Testing, is now available for deployment with SAS Viya.

SAS Stress Testing lets you expand the utility of regulatory stress testing programs to enhance your understanding of portfolio dynamics; improve your planning processes; and better prepare for and avoid future crises. It creates an enterprise-wide view of scenario analysis and uses sophisticated analytics to perform advanced modeling and projections. Integration with other SAS Risk offerings enables you to draw all key ratios and metrics from a single source.

SAS Stress Testing can be deployed with Microsoft Azure Kubernetes Service or with upstream open source Kubernetes.

Cloud Data Exchange Now Available

Cloud Data Exchange provides data connection capability for a variety of SAS Viya offerings. To take advantage of Cloud Data Exchange, co-located SAS Data Agent is configured during the SAS Viya platform deployment. Also, remote SAS Data Agent is run as a Docker container to access, copy, and load data between on-premises data sources and data sources that are available to the SAS Viya platform. Cloud Data Exchange also includes:

- A microservice that provides a set of REST interfaces for SAS Data Agent administration and data access.
- A CAS data connector for interfacing with a SAS Viya CAS server, and a CAS Action Set to move data sets both to and from the cloud.
- A LIBNAME that is used to interface with a SAS Viya Compute Server.

For more information, see "What is the deployment process for SAS Data Agent?" in *Getting Started with SAS Viya Platform Operations*.

Additional SAS/ACCESS Engines Now Available

Three new SAS/ACCESS engines are now included with the SAS Viya platform:

- SAS/ACCESS Interface to Informix
- SAS/ACCESS Interface to SAP IQ
- SAS/ACCESS Interface to SingleStore

The ability to access a SingleStore instance using SAS/ACCESS Interface to MySQL has been deprecated. You can instead use SAS/ACCESS Interface to SingleStore.

New User Interface for My SAS (my.sas.com)

My SAS (my.sas.com) has a new user interface. My SAS is the location where users access and manage software orders, and download assets for deploying and updating the software.

SAS Viya Platform Includes Redis

SAS Viya now uses Redis to provide a distributed cache technology. Redis and the Redis Operator replace Apache Geode and SAS Cache Server.

Not all SAS Viya offerings require the cache server functionality. With the addition of Redis, you might notice that the sas-cacheserver and sas-cachelocator stateful sets are still in your cluster but are not running. This behavior is expected. The sas-cacheserver and sas-cachelocator services are still included in deployments but are not enabled unless another service (such as services that are used by the SAS Intelligent Planning Suite) requires them.

Support for Confidential Computing

Confidential computing is supported in Microsoft AKS deployments. Confidential computing encrypts data in memory and performs verification, providing an additional layer of protection for data in use. At this time, AKS is the only SAS Viya platform deployment environment that supports confidential computing.

For more information, see "Requirements for Confidential Computing" in *System Requirements for the SAS Viya Platform*.

System Requirements

Changes to Kubernetes Requirements

Support for Kubernetes 1.24.*x* and 1.25.*x* has been added. Kubernetes 1.21.*x* and 1.22.*x* are no longer supported. As a result, SAS Viya platform 2023.03 supports Kubernetes 1.23.*x* - 1.25.*x*.

Change to Kustomize Support

Kustomize is a client tool that is required in order to generate Kubernetes manifest files for a deployment of the SAS Viya platform. A newer version of Kustomize is required: Kustomize 5.0.0.

Each SAS Viya platform release and cadence is optimized for and tested with a single version of Kustomize. Previous releases of SAS Viya platform can continue to use Kustomize 3.7.0 or 4.5.7.

Changes to PostgreSQL

SAS has made changes that affected both an external and an internal PostgreSQL database instance. SAS recommends that you gain a full understanding of these changes.

The internal instance of SAS Infrastructure Data Server has been upgraded from Crunchy Data PostgreSQL 4 to Crunchy Data PostgreSQL 5. Crunchy Data PostgreSQL supports an internal instance of SAS Infrastructure Data Server and

also supports SAS Common Data Store. Manual steps are required in order to update SAS Viya from an earlier release, even if you use the SAS Viya Deployment Operator. Follow the steps that are described in the Deployment Notes to perform the update.

For an external instance of SAS Infrastructure Data Server, PostgreSQL 11 - 14 are supported.

When SAS upgraded the version of PostgreSQL to Crunchy Data PostgreSQL 5, some aspects of cluster configuration and some default settings changed. Be aware of the following changes to the PostgreSQL cluster:

- Crunchy Data PostgreSQL version 5 offers significant improvements over the previous version. Crunchy Data 5 is more declarative than version 4 and also requires fewer containers. It includes a new Custom Resource Definition (CRD) named PostgresCluster.
- Cluster deletion behavior has changed.

  The command to delete the CustomResource, `kubectl delete postgrescluster`, affects the cluster differently. With Crunchy Data PostgreSQL 4, this command ignored PVCs and deleted only the cluster objects. However, this behavior has changed with the upgrade to Crunchy Data PostgreSQL 5. Now the PVCs are deleted along with the CR and other cluster objects, permanently deleting the data that was stored in the corresponding storage volumes.

  > **IMPORTANT** Crunchy Data PostgreSQL uses persistent volumes that are dynamically created by the storageClass that is defined in each PostgreSQL persistentVolumeClaim (PVC). Crunchy Data PostgreSQL 5 responds to the command to delete the PostgreSQL cluster CustomResource by deleting the PostgreSQL PVCs, potentially causing data loss. You might run this command during an uninstallation. Avoid this risk by setting the reclaimPolicy to `retain`. In previous versions of SAS Viya with Crunchy Data PostgreSQL 4, deleting the CustomResource did not affect the associated PVCs.
  >
  > For more information, see "Retaining the PVCs When the PostgreSQL Cluster Is Deleted" in *SAS Viya Platform: Infrastructure Servers*.

- Many pgo client commands have been removed.

  Crunchy Data implemented a different method of supporting the pgo client, pgo kubectl plug-in. The change streamlined the installation, but it supports only a limited number of pgo client commands. Many back-level pgo client commands are now handled by native Kubernetes reconciliation processes. As a result, they have been removed from the pgo client. For more information about the installation and how to use the pgo client commands, see "Configure the PostgreSQL Operator (pgo) Client Using kubectl Plug-in" in *SAS Viya Platform: Infrastructure Servers*.

- Several example YAML files and their accompanying README files now have new file names or new locations in your deployment assets directory tree.
- The file name and directory location for the server log have changed.

The PostgreSQL server log is generated by the PostgreSQL server and is separate and independent from the PostgreSQL pod log. Previously, the PostgreSQL server log file name for Crunchy Data PostgreSQL 4 included a timestamp and was created under **`/pgdata/name-of-cluster/pg_log`** along with the pod. With Crunchy Data PostgreSQL 5, the log file name indicates the day on which it was created, and it is created under the **`/pgdata/pg12/log/`** directory. Because its file name includes the day of the week, the log files are rotated or replaced every seven days.

Note: The previous directory still contains the Crunchy Data PostgreSQL 4 log files. The new Crunchy Data PostgreSQL 5 log files are created in the new directory.

- Component names have been changed.

  Because some component names have been changed in Crunchy Data PostgreSQL 5, any custom tools that have dependencies on the names of PostgreSQL deployment objects, such as pods, secrets, and configMaps, require configuration changes.

- With the update to Crunchy 5, the PostgreSQL server no longer requires an SCC for deployments on Red Hat OpenShift.

- Crunchy Data pgAdmin has been disabled. Changes to pgAdmin by Crunchy Data have caused it to stop functioning correctly.

- pgBackRest backup with retention policy is now automatic.

  With Crunchy Data PostgreSQL 5, one aspect of cluster management has been streamlined. An automatic pgBackRest backup is scheduled by default, and it includes a predefined retention policy. Every Sunday morning at 06:00 UTC, a full backup is taken. This backup truncates existing full and incremental backups as well as all WAL archive data. On the other days of the week, an incremental backup that truncates the WAL data is taken. You can adjust the backup schedule or the retention policy by following the steps in the README file. After you have downloaded and uncompressed the deployment assets, it is located in **`$deploy/sas-bases/examples/crunchydata/backups/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/configuration_settings_for_postgresql_backups.htm`** (for HTML).

- The following changes were made to the internal PostgreSQL instance, which is based on Crunchy Data PostgreSQL 5:

  - The comprehensive tuning transformer, **`$deploy/sas-bases/examples/crunchydata/tuning/crunchy-tuning-transformer.yaml`**, was divided into separate, more granular transformers. The additional transformers have been provided in order to target specific configuration changes.

    The **`$deploy/sas-bases/examples/crunchydata/tuning`** directory now contains the following transformers:

    - crunchy-tuning-connection-params-transformer.yaml - modifies PostgreSQL connection parameters
    - crunchy-tuning-log-params-transformer.yaml - modifies PostgreSQL log parameters so that they resemble the logging behavior of Crunchy Data PostgreSQL 4

        - crunchy-tuning-patroni-params-transformer.yaml - modifies Patroni parameters
        - crunchy-tuning-pg-hba-no-tls-transformer.yaml - lets you disable TLS by changing the entry for the pg_hba.conf file

      For more information, see **$deploy/sas-bases/examples/crunchydata/tuning/README.md** (for Markdown format) or **$deploy/sas-bases/docs/postgres_configuration_settings_for_tuning.htm** (for HTML).

    - The existing transformer for tuning backup settings, **$deploy/sas-bases/examples/crunchydata/backups/crunchy-backup-transformer.yaml**, has been enhanced and renamed as crunchy-pgbackrest-backup-config-transformer.yaml.

      This transformer can be used to change the backup schedule and the retention policy for backups and for WAL data archives.

      For more information, see **$deploy/sas-bases/examples/crunchydata/backups/README.md** (for Markdown format) or **$deploy/sas-bases/docs/postgres_configuration_settings_for_backup.htm** (for HTML format).

- The "PostgreSQL and Crunchy Data Appendix" that included documentation for previous versions of PostgreSQL and Crunchy Data has been removed from *SAS Viya Operations*.

Default Memory Increased for RabbitMQ

RabbitMQ supports the required SAS Message Broker component. It is deployed with HA by default and three replicas. Each replica is now deployed with a memory limit set to 8 Gi.

Previously, each replica was limited to 2 Gi by default.

Changes to Red Hat OpenShift Requirements

- SAS Viya now supports Red Hat OpenShift Container Platform (OCP) 4.10.*x* - 4.12.*x*. Previous releases of SAS Viya supported OCP 4.9.*x* - 4.11.*x*.
- You can now deploy SAS Viya with multi-tenancy in a Kubernetes cluster running in Red Hat OpenShift on VMware. Previously, multi-tenant deployments could be performed only in the other supported cloud environments.

Additional Data Source Support

SAS/ACCESS Interface to Hadoop has added support for Google Dataproc 2.0.45 and Microsoft Azure HDInsight 5.0.

SAS/ACCESS Interface to Spark has added support for Microsoft Azure HDInsight 5.0.

SAS/ACCESS Interface to MySQL has dropped support for MySQL 5.6.

SAS Event Stream Processing

Enhancements to SAS Event Stream Processing are available. These enhancements resulted in an additional requirement for a PVC to support SAS Event Stream Processing Studio. For more information, see "Persistent Volumes for Applications" in *System Requirements for the SAS Viya Platform*.

Deployment and Configuration

New Deployment Method Now Available

An enhancement to the SAS orchestration tool enables you to run a new command to launch the "deploy" operation. Like the SAS Viya Deployment Operator, the `sas-orchestration deploy` command automates the steps that deploy SAS Viya in the Kubernetes cluster.

Unlike the SAS Viya Deployment Operator or a manual deployment, the `sas-orchestration deploy` command launches SAS Viya deployment automation from outside the cluster. The user session that invokes the deployment from the external CLI automatically exits when the deployment has completed. Another distinction is that this type of deployment does not perform updates automatically. However, you can run the deploy command again, specifying the target release, in order to update SAS Viya.

The `sas-orchestration-deploy` command runs under the user account that is specified in your kubeconfig file. Docker is a prerequisite. As with the SAS Viya Deployment Operator, elevated permissions are required so that CRDs and other cluster-wide resources are applied. For more information about this new command, see "Deployment Methods" in *Getting Started with SAS Viya Platform Operations*.

Note: Although the `sas-orchestration deploy` command is available in the SAS orchestration tool with earlier versions of SAS Viya, it is not supported for use with any release earlier than the Stable 2022.12 (December 2022) release.

SAS Mirror Manager Support for OpenShift

SAS Mirror Manager now offers support for deploying from an image registry in Red Hat OpenShift.

Minor enhancements to SAS Mirror Manager, testing, and documentation updates were required in order to enable this support. These efforts were completed shortly after the general availability of the March release of the SAS Viya platform (2023.03).

Note: At the present time, only new deployments of the SAS Viya platform can be performed on OpenShift using SAS Mirror Manager. Existing deployments of the SAS Viya platform on OpenShift do not support adding a mirror registry (as a

method of updating the software, for example). SAS might add that functionality in a future release.

For more information, see "Create and Populate a Mirror in Red Hat OpenShift Container Registry" in *SAS Viya Platform: Deployment Guide*.

Option to Deploy External OpenSearch Instance

OpenSearch, an Apache 2.0-licensed distribution of OpenSearch with enhanced security, provides search features for software that runs on the SAS Viya platform. The platform supports the use of an external OpenSearch instance that you administer and maintain yourself. Previously, an internal instance of OpenSearch was automatically included in the deployment and could not be modified.

The decision whether to use the default (internal) OpenSearch instance or to supply your own instance is made at deployment time. After the deployment has completed, you cannot modify your deployment to use a different OpenSearch instance.

You must modify the kustomization.yaml file in order to set up the connection to the external OpenSearch cluster. For more information, see Configure OpenSearch.

Additional SAS Viya with SingleStore Deployment Option

The SAS Viya with SingleStore offering provides integration with a highly scalable distributed relational database. The integration provides reduced data movement and seamless access to SingleStore features. You can now deploy SAS Viya with SingleStore using the SAS Viya Infrastructure as Code (IaC) tools for AWS. Previously, only the IaC projects for Microsoft Azure and for open source Kubernetes were supported for this type of deployment. For more information, see https://github.com/sassoftware/viya4-iac-aws.

SAS Viya with SingleStore system requirements are described in Requirements for SAS Viya with SingleStore.

Auto-Resourcing Enhancements

Previously, the CAS Operator applied the Kubernetes Guaranteed Quality of Service (QoS) setting when auto-resourcing was enabled. A change was made in order to enable supplementary container resources to increase when auto-resourcing is configured, and when a burst of activity is required.

For example, the SAS Viya platform is backed up by default every Sunday morning, when the CAS server typically is not running. With this change, the backup agent and other component containers can autoscale to temporarily use a larger share of CPU resources that are available on the node. Backups complete more rapidly as a result.

The CAS operator applies auto-resourcing by default in order to manage the RAM and CPU resources of the nodes where CAS is running. When you instead want to allocate node resources manually, you can disable auto-resourcing and manually modify resourcing requests. If you disable auto-resourcing, you might instead apply guaranteed QoS by configuring the manage CPU and RAM transformer: **`$deploy/sas-bases/examples/cas/configure/cas-manage-cpu-and-memory.yaml`**.

Guaranteed QoS places the CAS pods in the category of pods that are the last to be evicted by Kubernetes when available resources become insufficient on the node.

In order to determine whether auto-resourcing is enabled in your deployment, check the main kustomization.yaml file for the following overlay in the resources section:

```
sas-bases/overlays/cas-server/auto-resources
```

If the overlay is present, auto-resourcing is enabled. See "Adjust RAM and CPU Resources for CAS Servers" in *SAS Viya Platform: Deployment Guide* for more information about enabling or disabling auto-resourcing.

Changes to SAS Startup Sequencer

Previously, users of SAS Startup Sequencer had to make changes to YAML files in order to deploy the application. Now, users must make changes to prevent SAS Startup Sequencer from being deployed. For more information, see the README file at **`$deploy/sas-bases/overlays/startup/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/disabling_the_sas_viya_start-up_sequencer.htm`** (for HTML format).

Launcher Service Authentication

The OAuth tokens with the client credential 'grant' type and which do not have 'sasapp' authority are not allowed by the Launcher service to create Launcher processes directly. These client credentials are allowed only to create processes with the use of a stored credential.

Multi-tenant Environments

Tenants Require Pod Templates

All tenants in a multi-tenant deployment now require SAS Programming Environment pod templates. For more information, see the "Create Kubernetes Resources" section of the README file located at **`$deploy/sas-bases/examples/sas-tenant-job/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/onboard_or_offboard_tenants.htm`** (for HTML format).

Multi-Tenancy Available with Red Hat OpenShift

You can now deploy SAS Viya with multi-tenancy in a Kubernetes cluster running in Red Hat OpenShift on VMware. Previously, multi-tenant deployments could be performed only in the other supported cloud environments.

Enhancements to Auditing in a Multi-Tenant Deployment

Auditing is now tenant-specific in deployments with multi-tenancy enabled. Individual tenant administrators can now view audit records that were generated within the scope of their tenant in User Activity reports.

IMPORTANT In previous releases of SAS Viya, the provider tenant managed the process of archiving and purging audit configuration data for all tenants. Now, tenant administrators can set their own values for archiving and purging and all tenant-specific configurations are automatically restored to their default settings.

Updating Software Documentation

Make sure to read the Updating Software documentation when you update to a new version, apply a patch update, update with a new software order, update a multi-tenant environment, or apply a new license. Documentation improvements and changes include the following:

- New Best Practices and Guidelines for Updating to a New Version
- A new command to delete the sas-pyconfig job is documented in the "Update to a New Version Using Kubernetes Commands" and "Apply a Patch Update Using Kubernetes Commands" topics.
- On the Long-Term Support cadence, you can update from a version in Standard Support to the next Long-Term Support version in Standard Support. You cannot skip versions when updating software on the Long-Term Support cadence. The documentation has been updated to reflect this change.

  To view supported update paths, see "Quick Links for Versions in Standard Support" in *SAS Viya Platform Operations: Versions in Standard Support and Update Paths*.
- A command to delete the sas-risk samples job is documented in the "Update to a New Version Using Kubernetes Commands" and "Apply a Patch Update Using Kubernetes Commands" topics.
- The "Update to a New Version Using the sas-orchestration Command" topic is available.
- The "Apply a Patch Update Using the sas-orchestration Command" topic is available.
- The "Guidance for Updating a Multi-tenant Environment" topic was revised to include more information about the update process for a multi-tenant environment.

New Documentation for SAS Viya Monitoring for Kubernetes

The documentation for this solution has been redesigned and is now located in the SAS Viya Monitoring for Kubernetes Help Center.

Revision to "Change Deployment Methods" Appendix

The steps to change your deployment method from the SAS Viya Platform Deployment Operator to any other method have been expanded. For details, see "SAS Viya Platform Deployment Operator to Any Other Method" in *SAS Viya Platform: Deployment Guide*.

Deprecated and Removed Functionality

Removed Functionality in SAS® Visual Investigator

The native entity-resolution feature in SAS Visual Investigator offered limited functionality, including support for a reduced set of external data sources and limited data volumes. This feature has been removed. SAS recommends that you use an external resource, such as RTENG or SAS® Data Management, to perform entity resolution, and make the resolved entities available to SAS Visual Investigator. The resolved entities can then be indexed and accessed using SAS Visual Investigator.

If you are migrating data from a previous version of SAS Visual Investigator, be aware that the native entity-resolution feature has been removed. If you experience difficulties with entity resolution using an external resource, contact SAS Technical Support.

Deprecation Warning for Start/Stop Transformers

The option of starting and stopping your SAS Viya platform deployment using Kustomize transformers is deprecated, and it is removed at Long-Term Support 2024.03. SAS recommends that you use `sas-stop-all` and `sas-start-all` CronJobs to stop and start your SAS Viya platform deployments.

Deprecated Access to SingleStore Using SAS/ACCESS

The ability to access a SingleStore instance using SAS/ACCESS Interface to MySQL has been deprecated. Use SAS/ACCESS Interface to SingleStore in order to access data in SingleStore, or use the separately licensed SAS Viya with SingleStore product.

Removal of Commands from pgo Client

SAS upgraded the version of PostgreSQL that underpins SAS Infrastructure Data Server to Crunchy Data PostgreSQL 5. In that version, Crunchy Data implemented a different method of supporting the pgo client, pgo kubectl plug-in. The change

streamlined the installation, but it supports only a limited number of pgo client commands.

Many back-level pgo client commands are now handled by native Kubernetes reconciliation processes. As a result, they have been removed from the pgo client. For more information about the installation and how to use the pgo client commands, see "Configure the PostgreSQL Operator (pgo) Client Using kubectl Plug-in" in *SAS Viya Platform: Infrastructure Servers*.

LTS 2022.09 (November 2022)

About the Release

The Long-Term Support 2022.09 (November 2022) release is based on the Stable 2022.09 (September 2022) release and includes patch updates that were released since the Stable 2022.09 release. The Long-Term Support 2022.09 release includes all the features, enhancements, fixes, and security patches that are in the Long-Term Support 2022.1 (May 2022) release and in the subsequent Stable releases through the Stable 2022.09 release.

New Versioning Format for SAS Viya Releases

To make it easier to identify when the software is released, the version numbers now use the `yyyy.mm` format. Also, to help identify the cadence for a version, the cadence name can precede the version number in the product documentation and application user interfaces. SAS Viya and SAS product offerings that deploy with SAS Viya have adopted this new convention. For more information, see "Release Schedule and Versions" in *Getting Started with SAS Viya Platform Operations*.

This change does not apply to software that was released prior to September 2022.

New Products Are Available

SAS® Dynamic Actuarial Modeling

A new offering, SAS Dynamic Actuarial Modeling, is now available for deployment with SAS Viya.

SAS Dynamic Actuarial Modeling was designed and architected for the insurance industry. It addresses the problem of siloed and inefficient systems and modeling that does not align with business needs. It provides a guided process to enable actuaries to more accurately calculate and model insurance premiums. SAS

Dynamic Actuarial Modeling is integrated with SAS® Risk Cirrus. It can be deployed on Microsoft Azure or AWS.

SAS® Law Enforcement Intelligence

A new offering, SAS Law Enforcement Intelligence, is now available for deployment with SAS Viya.

SAS Law Enforcement Intelligence is a public security solution that supports law enforcement, criminal justice, and corrections institutions with industry-leading analytics and evidence-based practices. SAS Law Enforcement Intelligence (LEI) integrates multiple SAS products, including SAS Visual Investigator and SAS Mobile Investigator, SAS Visual Analytics, and SAS Visual Text Analytics.

SAS Visual Investigator

SAS Visual Investigator, a flexible solution that can be tailored for a variety of industries, enables you to uncover suspicious activity or hidden behaviors as you search your data, triage alerts, investigate fraud, and monitor for security, risk, and compliance. SAS Visual Investigator is available for deployment with SAS Viya 2022.1.3 and later.

SAS Visual Investigator runs in all the environments that SAS Viya supports for deployment. A few additional requirements apply. For more information, see "Requirements for SAS® Visual Investigator" in *System Requirements for the SAS Viya Platform*.

SAS® Viya® with SingleStore

SAS Viya integration with SingleStoreDB, formerly MemSQL, is now available. The SAS Viya with SingleStore offering includes SingleStoreDB 7.0 and later.

SAS Viya with SingleStore provides a highly scalable distributed relational database that powers a platform for AI, analytics, and data management. The integration results in reduced data movement and seamless access to SingleStore features.

SAS Viya with SingleStore system requirements are described in "Requirements for SAS SpeedyStore" in *System Requirements for the SAS Viya Platform*.

System Requirements

Changes to Kubernetes Requirements

Support for Kubernetes 1.23.*x* and 1.24.*x* has been added. As of this release, Kubernetes 1.20 is no longer supported. With this additional support, SAS Viya 2022.09 (Long-Term Support) can be deployed with Kubernetes 1.21.*x* – Kubernetes 1.24.*x*.

If you are upgrading from Kubernetes 1.21 or earlier, consult A Note on Upgrading Kubernetes in order to avoid issues with an existing cluster.

Be aware that some components, such as ingress-nginx, might require upgrades to newer releases. Check the appropriate third-party documentation for these compatibility requirements. Verify that your version of kubectl falls within the Kubernetes version skew policy.

> **IMPORTANT** For ingress-nginx versions prior to 1.9.0, `allow-snippet-annotations=true` was the default setting. The default behavior changed with ingress-nginx 1.9.0 and later. If necessary, you can make this modification at the same time as you make the pre-installation changes that are described in ingress-nginx Vulnerability Mitigation.

If you want to use cert-manager for TLS certificate management, check the cert-manager documentation to select a release of cert-manager that is compatible with your version of Kubernetes: https://cert-manager.io/docs/installation/supported-releases/.

Changes to Red Hat OpenShift Requirements

SAS Viya now supports Red Hat OpenShift Container Platform (OCP) 4.8 – 4.11. The previous Long-Term Support release of SAS Viya supported OCP 4.7 – 4.9. VMware vSphere 7.0.1 or later is required.

Support for Upstream Open Source Kubernetes

SAS Viya offerings are delivered as a set of container images that can be deployed into an upstream open source Kubernetes cluster. The cluster for this type of deployment can run on physical machines or on VMs in VMware vSphere or vCenter.

SAS provides tools to help administrators create and configure a cluster that meets SAS Viya system requirements. The scripts that are included in the SAS Viya 4 Infrastructure as Code (IaC) for Open Source Kubernetes project can help you provision cloud infrastructure resources for VMware or prepare physical machines with a Kubernetes cluster that is ready for a SAS Viya deployment.

Changes to SAS/ACCESS Interface to MySQL

SAS/ACCESS Interface to MySQL no longer supports SingleStoreDB 6.**x** (formerly MemSQL 6.**x**). The new baseline is now SingleStoreDB 7.0.

Updates to SAS/ACCESS Interface to Spark

Requirements for SAS/ACCESS Interface to Spark have changed. Hortonworks HDP 3.1 is no longer supported. Databricks 10.4 and later are now supported. Spark SQL 3.1 or later is required.

In addition, SAS/ACCESS Interface to Spark now redistributes JDBC drivers from CData Software. Downloading and configuring JAR files to make a basic connection to Spark with SAS/ACCESS software is no longer required. For more information, see "Requirements for SAS/ACCESS Interface to Spark" in *System Requirements for the SAS Viya Platform*.

Changes to SAS® In-Database Technologies Offerings

In previous releases of SAS Viya, advanced features such as parallel loading of data and model publishing and scoring were available only in SAS Data Science Programming or SAS Visual Data Science Decisioning offerings. Now customers can perform those tasks with any relevant data source. The advanced features are made available through granular packaging whose names indicate supported data sources.

The following table summarizes the changes to SAS In-Database Technologies software offerings:

Table 1.2 *Changes to SAS In-Database Technologies Package Names*

Former Package Name	New Package Name
SAS® In-Database Technologies for Hadoop Cloud Services	SAS® In-Database Technologies for Hadoop Cloud Services SAS® In-Database Technologies for Cloudera Data Platform
SAS® In-Database Technologies for Spark	SAS® In-Database Technologies for Databricks SAS® In-Database Technologies for Azure Synapse Analytics
SAS® In-Database Technologies for Teradata	SAS® In-Database Technologies for Teradata (no change)

These packaging changes also enable SAS to deliver future capabilities. For information about the specific data sources that these products support, see "Requirements for SAS In-Database Technologies" in *System Requirements for the SAS Viya Platform*.

Deployment and Customization

Updated Manual Deployment Commands

The commands to perform a manual deployment of SAS Viya have been revised in order to simplify them. The new commands are available at "Deployment Using Kubernetes Commands" in *SAS Viya Platform: Deployment Guide*.

Connect Workload Class Changes

Beginning in version 2021.2.6, SAS/CONNECT Spawner is deployed in the stateless work class by default. The connect workload class is required only if you are not

using dynamically launched pods. If you choose not to use dynamically launched pods, you must add a transformer to your base kustomization.yaml file. For more information, see "Assign Nodes by Class" in *SAS Viya Platform: Deployment Guide*.

Changes for Internal Instances of PostgreSQL Deployment

The required customizations in the base kustomization.yaml file for internal instances of PostgreSQL have changed. For the full list of customizations, see Internal Instance of PostgreSQL.

Kubernetes Server-Side Apply

SAS Viya now uses Kubernetes server-side apply (SSA) for select resources deployed to the Kubernetes cluster. SSA is a Kubernetes feature that provides improved field management for applied resources and addresses issues with increasingly large resource specifications.

The SAS Deployment Operator now uses SSA where appropriate. Also, the manual deployment steps for SAS Viya have been modified to enable SSA. For the revised manual deployment steps, see "Deployment Using Kubernetes Commands" in *SAS Viya Platform: Deployment Guide*, especially step 2.

For more information about SSA, see the official Kubernetes SSA documentation.

Default Certificate Generator Is Now openssl

SAS has replaced the default certificate generator used in the SAS Viya deployment with openssl. SAS Viya recommends the use of the openssl certificate generator instead of cert-manager because it is provided by SAS specifically to meet the needs of the SAS Viya software and is tested for compatibility with each release of SAS Viya. On the other hand, cert-manager is an open source project. It releases on its own schedule and is not specifically tested for compatibility with SAS prior to being released.

For more information, see Configure TLS. More details are also available at the "Certificate Generators" section of the security README file located at **`$deploy/sas-bases/examples/security/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/configure_network_security_and_encryption_using_sas_security_certificate_framework.htm`** (for HTML format).

Addition of SAS Startup Sequencer

Although SAS Viya comprises components that are designed to start in any order, in some scenarios it is more efficient for the components to start in an ordered sequence. SAS Startup Sequencer ensures that certain components start before others and allows Kubernetes to pull container images in a priority-based sequence. It also provides a degree of resource optimization, in that resources are more efficiently spent during SAS Viya start-up with a priority given to starting essential components first.

For more information, see Deploy SAS Startup Sequencer.

SAS® Event Stream Processing Uninstall Steps No Longer Required

The special steps for SAS Event Stream Processing used during the removal of your software from a Kubernetes cluster are no longer required. The content has been removed from the documentation.

Multi-Tenant Environments

Product Offerings That Support Multi-Tenancy

Multiple SAS Viya offerings have added support for deployments with multi-tenancy enabled.

Only the following offerings do not support multi-tenant capabilities at this time:

- SAS Asset and Liability Management
- SAS Model Risk Management
- SAS Viya with SingleStore

Automation for Multi-Tenancy

Starting with SAS Viya 2022.09 (September 2022), the viya4-deployment tools provide automated support for a SAS Viya deployment with multi-tenancy enabled. The scripts and other resources in this deployment-as-code project can now onboard tenants and CAS servers as part of the SAS Viya deployment process. This same automation can also be reused in subsequent onboarding and offboarding of tenants and CAS servers.

Change in Tenant Job Name

In SAS Viya Platform Multi-tenancy, the name of the job that onboards and offboards tenants has changed from tenant-job to sas-tenant-job.

New Documentation for Open Source Integration

SAS Viya provides integration points with a variety of open source languages, including Python, R, Lua, and Java. Required components and configuration to enable integration with external programs were previously documented in separate README files that were stored in different locations. A new README file describes the steps that are required in order to configure and deploy Python, R, external access to the CAS server, Git integration, and more. An additional section of the System Requirements now summarizes requirements for external open source integration and directs you to the location of the README.

For more information, see "Integrating Open Source Tools" in *System Requirements for the SAS Viya Platform*.

Updates to SAS Configurator for Open Source

The SAS Configurator for Open Source utility now supports R in addition to Python. The utility simplifies the download, configuration, building, and installation of Python and R from source. The utility also now uses a CronJob instead of a Kubernetes Job.

Both changes led to modifications in the utility's configuration (YAML) files. For details about the configuration and usage of this utility, see the README file located at **`$deploy/sas-bases/examples/sas-pyconfig/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/sas_configurator_for_open_source_options.htm`** (for HTML format).

SAS Viya Monitoring for Kubernetes

The SAS Viya Monitoring for Kubernetes solution no longer deploys Elasticsearch and Kibana. Instead, OpenSearch and OpenSearch Dashboards are deployed. For more information, see SAS Viya Platform Operations: Logging.

My SAS Order Management Updates

The order management features of My SAS have been restructured. Relevant content in the *SAS Viya Operations Guide* has been revised to accommodate the new structure. If you are working with older versions of SAS Viya, then any instructions that are specific to My SAS might be out of date.

Offerings with Enhanced Processing Capabilities Using GPUs

The SAS Programming Environment container image can now make the SAS GPU reservation service available, providing additional processing power for selected action sets. Previously, the GPU reservation service was used only by the CAS server. This service assists SAS processes in resource sharing and utilization of GPUs that are available in your cluster. To see a list of procedures and action sets that can now take advantage of GPUs, see "Offerings and Action Sets that Support GPU Capabilities" in *System Requirements for the SAS Viya Platform*.

Some configuration is required in order to enable the reservation service. Not all GPU environments are supported. For more information, see "Requirements for GPU Support" in *System Requirements for the SAS Viya Platform*.

New User Interface for My SAS (my.sas.com)

As of 31 January 2023, My SAS (my.sas.com) has a new user interface. My SAS is the location where users access and manage software orders, and download assets for deploying and updating the software. The instructions related to using My SAS were updated to reflect the new user interface.

LTS 2022.1 (May 2022)

The 2022.1 long-term support release is based on the 2021.2.5 stable release. It includes all features in the 2021.2 long-term support release plus all stable releases from 2021.2.1 to 2021.2.5.

My SAS Order Management Updates

The order management features of My SAS have been restructured. Relevant content in the *SAS Viya Operations Guide* has been revised to accommodate the new structure. If you are working with older versions of SAS Viya, then any instructions that are specific to My SAS might be out of date. Check the 2021.2.5 version of the guide for details.

Replacing Elasticsearch with OpenSearch

Previous versions of SAS Viya included Open Distro for Elasticsearch as a distributed search engine. Starting with 2021.2.5, it is being replaced with OpenSearch, an Apache 2.0 licensed search and analytics suite. Most references to Elasticsearch and Open Distro for Elasticsearch in the documentation (including the READMEs) have been replaced with references to OpenSearch. There are some caveats:

- The Elasticsearch and Kibana distributions that are used in the Monitoring and Logging GitHub projects are unaffected.
- The directory structure in the deployment assets includes “elasticsearch” in directories and file names. Those names are not being changed in order to avoid requiring manual changes during updates to the latest versions of SAS Viya.
- In previous releases, SAS Viya included ODFE. Many Kubernetes resources continue to use these names for backward compatibility.

NGINX Ingress Vulnerability Mitigation

SAS Viya 2021.2.5 steps to mitigate CVE-2021.25742, a vulnerability in the NGINX ingress. For the details and the steps to mitigate the CVE, see "ingress-nginx Controller Vulnerability Mitigation" in *SAS Viya Platform: Deployment Guide*.

NGINX Support

Your cluster now requires NGINX Ingress Controller 0.50.0 and later or 1.1.0 and later. Version 0.41.0 is no longer supported.

SAS® for Microsoft® 365 Enhancement

SAS for Microsoft 365 now supports Microsoft Outlook 365, in addition to Microsoft Excel 365. If you want to use the web application with Microsoft Outlook, an Apple Safari browser is not supported at this time.

Updates to Data Source Support

SAS/ACCESS Interface to JDBC now supports JDBC drivers from CData that let you make secure connections to third-party sites and manipulate data as if it were in a relational database. Supported sites include Twitter, Facebook, and more.

SAS/ACCESS Interface to PostgreSQL now supports CockroachDB 21.1.5 or later. Bulk load and bulk unload are not supported at this time.

SAS/ACCESS Interface to Teradata now supports Teradata Vantage SQL Engine version 17.10, and it requires Teradata CLIv2 client libraries, TTU 17.10 or later.

For more information about data source access and support, see "Data Source Requirements" in *System Requirements for the SAS Viya Platform*.

Updated Manual Deployment Commands

The commands to perform a manual deployment of SAS Viya have been revised in order to simplify them. The new commands are available at "Deployment Using Kubernetes Commands" in *SAS Viya Platform: Deployment Guide*.

In-Database Name Change

The SAS In-Database Technologies for Hadoop product name has changed. It is now referred to as SAS In-Database Technologies for Hadoop Cloud Services. If you are updating SAS Viya 2021.2.4, you should see this change.

Kubernetes Support

Support for Kubernetes 1.22 has been added. As of this release, Kubernetes 1.19 is no longer supported.

When you have selected a new version of Kubernetes, consult A Note on Upgrading Kubernetes in order to avoid issues with an existing cluster.

Be aware that some components, such as NGINX Ingress Controller, require upgrades to newer releases for use with Kubernetes 1.22.x. Check the appropriate third-party documentation for these compatibility requirements. Verify that your version of kubectl falls within the Kubernetes version skew policy.

If you want to use cert-manager for TLS certificate management, check the cert-manager documentation to select a release of cert-manager that is compatible with your version of Kubernetes: https://cert-manager.io/docs/installation/supported-releases/.

New Guidance for Database Modes in Multi-tenancy

SAS Viya Operations: System Requirements now contains information that addresses the selection of the database mode in multi-tenancy. The mode can be database-per-tenant or schema-per-tenant. Also provided is information that helps determine the maximum number of PostgreSQL connections that are needed to support the onboarding of tenants.

Also be aware that SAS Risk Engine now supports SAS Viya multi-tenancy.

Updates to Data Source Support

SAS/ACCESS Interface to Impala is now supported on Cloudera Data Platform (CDP) Public and Private cloud.

SAS/ACCESS Interface to Netezza now supports only versions 11.2.0.0 and 11.2.1.*x* of IBM Netezza Performance Server.

SAS/ACCESS Interface to Microsoft SQL Server no longer supports Microsoft SQL Server 2012. Microsoft SQL Server 2017 and later and its cloud variants are supported.

SAS In-Database Technologies for Spark now supports Databricks 7 and 9.

For more information about data source access and support, see "Data Source Requirements" in *System Requirements for the SAS Viya Platform*.

Ability to Change the OpenSearch UID

The OpenSearch pods that support the SAS Viya search capabilities must be owned by a fixed user ID (UID) so that the search indices that are written to storage can be read after a restart. By default, the OpenSearch processes run under the fixed UID of 1000. If you do not want OpenSearch to run with UID 1000, you can change the run user for the OpenSearch pods by applying a transformer that changes the UID to another value.

LTS 2021.2 (November 2021)

The 2021.2 long-term support release is based on the 2021.1.6 stable release. It includes all features in the 2021.1 long-term support release plus all stable releases from 2020.1.5 to 2021.1.6.

My SAS Updates

My SAS has been updated. Content in the 2021.2 SAS Viya Operations Guide has been revised to accommodate the new design. If you are working with older versions of SAS Viya, then any instructions that are specific to My SAS might be out of date. Check the 2021.2 version of the guide for details.

Support for Red Hat OpenShift

SAS Viya can now be deployed in a Red Hat OpenShift on VMware environment. The documentation has been updated with system requirements and pre-installation tasks that are specific to OpenShift deployments.

External Instances of PostgreSQL and Red Hat OpenShift

SAS Viya deployments on Red Hat OpenShift now support external instances of PostgreSQL.

Deprecated Kubernetes API Versions

SAS Viya has dropped support for the Kubernetes API versions deprecated in the Kubernetes 1.18 release in preparation for future support of Kubernetes 1.22. The deployment guide and READMEs include updated content for its use.

Security

OpenSSL Support

SAS has added a second certificate generator for the SAS Viya deployment: openssl. The openssl certificate generator is proprietary SAS software that uses the OpenSSL open-source project. This option for TLS certificate management is available in addition to the cert-manager utility.

Support for Multi-tenancy

SAS Viya can be enabled to support multi-tenancy at the time of deployment. The documentation has been updated with system requirements, workload planning information, and customization requirements that are specific to multi-tenancy enablement. The documentation also describes the steps for onboarding and administering tenants after multi-tenancy is enabled.

Data Server Operator

The deployment and maintenance of PostgreSQL is now managed by the SAS Data Server Operator. PostgreSQL can still be deployed as either an external instance (your own version and instance of PostgreSQL to which SAS Viya connects) or as an internal instance using Crunchy Data. The internal instance is included with your SAS Viya software.

Cloud Analytic Services

CAS Auto-Restart Option

By default, CAS does not automatically restart during version updates performed by the SAS Viya Deployment Operator. To change the default to enable auto-restart, see the "CAS Auto-Restart During Version Updates" section of the README file located at **$deploy/sas-bases/overlays/cas-server/README.md** (for Markdown format) or **$deploy/sas-bases/docs/mpp_cas_server_for_sas_viya.htm** (for HTML format).

Host Launch for CAS

CAS can be configured to allow for host identity launches by including a patch transformer in the base kustomization.yaml file. For more information, see the "Enable Host Launch in the CAS Server" section of the README file located at **$deploy/sas-bases/examples/cas/configure/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configuration_settings_for_cas.htm** (for HTML format).

SAS Mirror Manager

The option to mirror a specific version of the SAS Viya software has been enhanced. If deployment assets have been downloaded, you can use the new `--deployment-assets` flag to automatically extract the information that is required in order to populate the mirror with an exact cadence version and release.

SAS/ACCESS

Enhancements to SAS/ACCESS Interface to Spark

SAS/ACCESS Interface to Spark now supports Spark Server 3.1 and no longer requires you to collect the Spark client JAR files from the Hadoop cluster.

Where previously it supported only Hortonworks HDP 3.1, SAS/ACCESS Interface to Spark now supports four data sources.

Enhancement to SAS/ACCESS Interface to Snowflake

SAS/ACCESS Interface to Snowflake no longer requires the installation of a driver. The required client software is now included automatically.

Support for Additional Data Sources

SAS/ACCESS Interface to Microsoft SQL Server now supports Microsoft Azure SQL Server Big Data Clusters.

SAS In-Database Products

SAS In-Database Technologies for Hadoop now supports additional Hadoop distributions. SAS In-Database Technologies for Spark is now supported and enables you to connect to a Databricks or Microsoft Azure Synapse Analytic data source.

SAS In-Database Technologies for Spark now supports Databricks 6.x and 7.x for Microsoft Azure or Amazon Web Services.

SAS Workload Orchestrator

SAS Workload Orchestrator extends the workload management capabilities of Kubernetes by adding priority-based queues.

SAS Image Staging

By default, SAS Image Staging starts pods on nodes via a daemonset at approximate two-minute intervals to ensure that relevant images have been pulled to hosts. Although this behavior accomplishes the goal of pulling images to nodes and decreasing start-up times, some users might want more intelligent and specific control with less churn in Kubernetes. To accomplish these goals, configure SAS Image Staging to take advantage of a node list to further decrease start-up times and target specific nodes for pulling.

For information about both methods of using SAS Image Staging, including a comparison of their relative advantages and disadvantages, see the README file at **`$deploy/sas-bases/examples/sas-prepull/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/sas_image_staging_configuration_option.htm`** (for HTML format).

SAS Micro Analytic Service

Microsoft Azure PostgreSQL and Microsoft Azure SQL Database (via ODBC) are now additional data source options if you publish content to destinations on SAS Micro Analytic Service. Several offerings that include SAS Micro Analytic Service now offer this support. Consult the corresponding user documentation for more information.

Documentation Changes

SAS Model Risk Management

SAS Model Risk Management requires a few pre-deployment steps and has unique requirements. For more information, see "Requirements for SAS® Model Risk Management" in *System Requirements for the SAS Viya Platform*.

Updates and Improvements

The following information is included:

- In *System Requirements for SAS Viya*, the virtual machine recommendations for Google Cloud Platform have been updated.
- In *SAS Viya Operations: Updating Software*, additional guidance has been provided for first-time use of the deployment operator when applying a patch update and updating to a new version.

LTS 2021.1 (May 2021)

The 2021.1 long-term support release is based on the 2020.1.4 stable release. It includes all features in the stable releases 2020.1.1 through 2020.1.4.

Support for Amazon Elastic Kubernetes Service

SAS Viya is now supported on Amazon Web Services (AWS). The documentation has been updated with system requirements that are specific to EKS environments.

Support for Google Kubernetes Engine

SAS Viya is now supported on Google Cloud Platform (GCP). The documentation has been updated with system requirements that are specific to GKE environments.

Microsoft Azure Instance Type Recommendations

For Microsoft Azure, VM instance type recommendations have changed slightly. The section titled Sizing Recommendations for Selected Offerings on Microsoft Azure recommended using the same example VM, Microsoft Azure E16ds_v4, for all combinations of vCPUs and memory. The corrected examples recommend selecting

the Standard_E8ds_v4 instance for 64 GB and 8 vCPUs, which more accurately reflects the available Microsoft Azure instance types.

Bug Fix for Azure Kubernetes Service

Microsoft fixed a bug in mid-February that affected SAS Viya MPP CAS deployments with AKS 1.19.x. One symptom is that load table actions on MPP CAS servers consistently fail with the following message: `A send or receive operation failed because the requested peer node is no longer present`. In order to avoid the issue, use a more recent (supported) level of AKS. For more information, see https://github.com/Azure/AKS/issues/2031.

Guidance for Infrastructure Provisioning by Cloud Provider

To help prepare the cloud-provider infrastructure prior to deploying SAS Viya, references to the SAS Viya Infrastructure as Code (IaC) projects are included. These GitHub projects contain scripts and configuration files that can automatically provision the infrastructure components that are required in order to deploy SAS Viya on Microsoft Azure and on Amazon Web Services.

New Software Offerings

- SAS Analytics for IoT
- SAS Assortment Planning
- SAS Demand Planning
- SAS Financial Planning
- SAS Markdown Optimization
- SAS Production Quality Analytics
- SAS Risk Cirrus: Asset and Liability Management (pre-production, Limited Availability)
- SAS Risk Engine
- SAS Risk Modeling
- SAS Size Optimization
- SAS Studio Analyst

Every SAS Viya order automatically includes all the SAS/ACCESS offerings. The following new SAS/ACCESS interfaces are available in order to add support for the corresponding data sources:

- SAS/ACCESS Interface to the PI System

- SAS/ACCESS Interface to Yellowbrick

If you plan to integrate data from these data sources, check the System Requirements: Data Source Requirements section to make sure your environment is configured appropriately.

Integration with Microsoft Excel

SAS for Microsoft 365 is now included with most software orders. SAS for Microsoft 365 enables SAS analytics to access reports directly from Microsoft Excel 365 and Microsoft Outlook 365 and provides integrated features.

This integration is available to you unless your order consisted of SAS Event Stream Processing only.

SAS Micro Analytic Service Data Sources

Microsoft SQL Server is now an additional data source option if you publish content to destinations on SAS Micro Analytic Service. Several offerings that include SAS Micro Analytic Service now offer this support. Consult the corresponding user documentation for more information.

System Requirements for SAS/ACCESS Interface to Impala

System Requirements for SAS/ACCESS Interface to Impala have been simplified. For more information, see " Requirements for SAS/ACCESS Interface to Impala" in *System Requirements for the SAS Viya Platform*.

Emphasis on the SAS Viya Deployment Operator

The documentation about *SAS Viya Operations* has been revised to emphasize the use of the SAS Viya Deployment Operator. After extensive testing, SAS is ready to promote the operator as the automated method for deploying your SAS Viya software.

As a result, the documentation contains new information that emphasizes the use of the operator. In *SAS Viya: Deployment Guide*, the steps to deploy with the operator have been moved from an appendix and integrated with the guide along with the steps for a manual deployment. Other documents about *SAS Viya Operations* were reorganized and new sections were added as well.

Personal CAS Server Now Available

A single-user CAS server is now available for deployment. For more information, see "Create a Personal CAS Server" in *SAS Viya Platform: Deployment Guide*.

New SAS LOCALE and SAS ENCODING Functionality

New functionality is available that allows the specification of a single set of default SAS LOCALE and SAS ENCODING values for all SAS Compute Server, SAS/CONNECT, and SAS Batch server instances using a Kubernetes ConfigMap in the SAS Launcher Service. This default is initially set to en_US for LOCALE and utf8 for ENCODING. To change the default values, see the "Locale and Encoding Defaults" section of the README file at **$deploy/sas-bases/examples/sas-launcher/configure/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configuration_settings_for_sas_launcher_service.htm** (for HTML format).

Before this change, the effective SAS LOCALE and SAS ENCODING were derived based on the `export LANG=<RedHat LANG values>` statement inside the startup_commands instance for configurations of sas.compute.server, sas.connect.server, and sas.batch.server. For backward compatibility, as of 2020.1.4, any such LANG values are still honored, and the derived LOCALE and ENCODING values are used and override the defaults from the Kubernetes ConfigMap described earlier.

New Pod to Support Search

A pod that contains Open Distro for Elasticsearch is automatically deployed, starting with this release. SAS Viya uses the Elasticsearch distributed search cluster in infrastructure and solution services. If your environment does not allow privileged containers, the Kubernetes administrator must make manual changes to the nodes that host stateful workloads. The pod includes a PVC of 128 Gi.

SAS Operational Qualification Tool

The SAS 9.4 Operational Qualification Tool can now be used with SAS Viya. For more information, see "The SAS Viya Platform and the SAS Operational Quality Tool" in *SAS Viya Platform: Deployment Guide*.

Orchestration Tool deploy Command Available

The orchestration tool now includes the `deploy` command. For more information, see the README file at **`$deploy/sas-bases/examples/kubernetes-tools/README.md`** (for Markdown) or **`$deploy/sas-bases/docs/using_kubernetes_tools_from_the_sas-orchestration_image.htm`** (for HTML).

Changes to storageclass.yaml Content

Before version 2021.1, the creation of a storageclass.yaml file and its addition to the example kustomization.yaml file were treated as optional. Beginning in version 2021.1, they should be considered required.

Also, the content of the storageclass.yaml reference to be included in the example kustomization.yaml file has been revised. The new reference includes `sas-commonfiles` in the `annotationSelector` line.

See Specify PersistentVolumeClaims to Use ReadWriteMany StorageClass and the example kustomization.yaml file in "Create the File" in *SAS Viya Platform: Deployment Guide* for more information.

Change in the Default Value for Write-Ahead Log In PostgreSQL

Prior to version 2021.1, no setting was specified for the Write-Ahead Log (WAL) in the wal_keep_segments variable for internal instances of PostgreSQL. Therefore, the default setting of 8 was used, which caused the pg_wal subdirectory to consume 512 MB. Beginning with version 2021.1, wal_keep_segments is set to 500, which causes the pg_wal subdirectory to consume 8 GB. However, users can adjust this setting by revising and applying the postgres_custom_config.yaml generator.

For more information about changing the wal_keep_segments value, see the README file located at **`$deploy\sas-bases\examples\configure-postgres\internal\custom-config\README.md`** (for Markdown format) or at **`$deploy\sas-bases\examples\docs\configuration_settings_for_postgresql_database_cluster.htm`** (for HTML format). For information about how PostgreSQL uses WAL, see Write-Ahead Logging (WAL).

Update Checker

A new set of environment variables is now available to enable you to use the Update Checker in an environment that is protected by a proxy server. For more

information, see "(Optional) Define Proxy Environment Variables " in *SAS Viya Platform: Deployment Guide*.

When updating software, new topics are provided for updating to a new version and creating an ad hoc report when using the Update Checker.

Reorganized "PostgreSQL and Crunchy Data" Appendix

The provider of the internal PostgreSQL database, Crunchy Data, has modified the organization of its pods. This reorganization is reflected in the organization of the "Available Pods" section in the "PostgreSQL and Crunchy Data Appendix." Here is a summary of the changes:

- The topics about the sas-crunchy-data-backrest-restore, sas-crunchy-data-pgdump, and sas-crunchy-data-pgrestore pods have been removed.
- The content from the removed topics is now included in the content for sas-crunchy-data-postgres.
- References to the sas-crunchy-data-postgres-12 pod have been replaced with "sas-crunchy-data-postgres".

LTS 2020.1 (November 2020)

Restrictions on Kubernetes Support

SAS internal testing discovered a problem with versions of Microsoft Azure Kubernetes Service (AKS) that are later than version 1.18.*x*. These versions of Kubernetes include an unsupported container runtime. Therefore, these versions are not supported by this release of SAS Viya. SAS also determined that only the Docker container runtime is supported. The System Requirements documentation reflects these restrictions. Note that later versions of SAS Viya support later versions of Kubernetes.

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Stable Releases

2026.05 (May 2026)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Kubernetes Requirements

Support for Kubernetes 1.35.*x* has been added for all supported providers. Kubernetes 1.32.*x* is no longer supported. SAS Viya platform 2026.05 supports Kubernetes 1.33.*x* - 1.35.*x*.

Note: For SAS Viya platform deployments in Microsoft Azure Kubernetes Service (AKS) clusters, see the special note regarding container network interface (CNI) plug-ins in Cluster Requirements for Microsoft Azure.

For SAS Viya platform deployments in OpenShift clusters, starting with 2026.05, Red Hat OCP or OKE 4.19.*x* is not supported. You can use Red Hat OCP or OKE 4.20.*x* or 4.21.*x*. These OCP and OKE versions align with Kubernetes 1.33.*x* and 1.34.*x*.

As Red Hat adds support for newer versions of Kubernetes, SAS validates new OCP versions, designates an appropriate cadence to add support, and updates the documentation as needed.

Critical Change: Ingress Controller Requirements

The SAS Viya platform now requires Contour ingress controller 1.32.0 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.33.*x* - 1.35.*x*.

The SAS Viya platform also supports ingress-nginx 1.14.*x* or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.33.*x* - 1.35.*x*.

After the retirement of ingress-nginx in March, 2026, the SAS Viya platform will continue to provide Standard Support for environments that use it; however, neither SAS nor the Kubernetes community will address bugs or security issues for that component. Continuing to use ingress-nginx is at your own risk.

SAS provides documentation to assist you in replacing ingress-nginx with Contour ingress controller. For more information, see "Cluster Ingress Requirements" in *System Requirements for the SAS Viya Platform*.

Critical Change: Calico CNI Support

Deployments in upstream open-source Kubernetes clusters now support Calico 3.30.*x* and later. This change to the minimum supported version of Calico ensures compatibility with Kubernetes 1.33.*x* - 1.35.*x*.

Critical Change: CAS REST API Authentication

By default, the CAS server now uses OAuth for connections from external resources to the REST API. Previously, HTTP Basic Authentication was enabled by default for the CAS REST port. No pre-deployment steps are required to enable OAuth.

Some post-deployment steps are required for the new default OAuth authentication or for situations in which you want to enable Basic Authentication. For more information, see "Configure Authentication for REST APIs" in *SAS Viya Platform: Deployment Guide*.

Updated SAS Support Policy for CNCF-Certified Kubernetes Distributions

Starting with 2026.05, SAS supports SAS Viya platform deployments on Kubernetes distributions or hosted services that are certified under the Cloud Native Computing Foundation (CNCF) Kubernetes Software Conformance program (or "CNCF-certified Kubernetes distributions"), provided that all published system and cluster requirements are met.

Previously, support for the operation of the SAS Viya platform in a Kubernetes distribution or environment that was not specifically mentioned in the official documentation received Limited Support from SAS. Vendor-packaged upstream Kubernetes distributions that were not installed from the CNCF Kubernetes repository fell under this policy.

Now SAS provides Standard Support for deployments on CNCF-certified Kubernetes distributions or hosted services that meet SAS requirements. SAS does not validate or test every certified distribution or version. Support is provided on a best-effort basis using SAS internal environments. If issues cannot be reproduced, customers might be asked to perform additional diagnostics or engage their Kubernetes vendor.

Customers are responsible for ensuring their Kubernetes distribution and deployed Kubernetes version maintain CNCF certification to remain in Standard Support. Kubernetes distributions, hosted services, or versions that are not CNCF-certified are not supported. Full requirements and policy details are documented in this guide and in the SAS Support for Kubernetes policy. For more information, see "Cluster Requirements for CNCF-Certified Kubernetes Distributions and Hosted Services" in *System Requirements for the SAS Viya Platform*.

Changes to SAS Asset and Liability Management

SAS Fast Execution Resource Management Infrastructure (FERMI) is available for use with SAS Asset and Liability Management.

FERMI was designed to support SAS Risk solutions by orchestrating job flows and is gradually replacing the Process Orchestration functionality.

FERMI has additional requirements. For more information, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

Changes to SAS SpeedyStore

Starting with 2026.05, the instance of SingleStoreDB that is included with SAS SpeedyStore is updated from version 8.9 to 9.0. The database update is not backward-compatible. If you update to 2026.05 or later, the SingleStoreDB instance is automatically updated to version 9.0. Following the update to 2026.05 or later, you cannot roll your SingleStoreDB databases back to version 8.9 or to an earlier version of SingleStoreDB. If you need to use databases from an earlier release, you must uninstall the SAS Viya platform and redeploy the earlier version. SAS recommends creating a backup of the database before starting the SAS Viya platform update.

This newer version has a default collation of `utf8mb4_bin`, which causes string comparisons to be case-sensitive. Previous versions had a default collation of `utf8mb4_general_ci`, which is not case-sensitive. New clusters have the new default setting. Existing clusters continue to use your previous collation setting or the previous default setting if the collation was not set.

For older versions of SingleStoreDB, SAS recommended setting the server collation to `utf8mb4_bin` before any data was loaded into SingleStore. If you followed that recommendation, or if you are not using data that was previously loaded into SingleStore, no changes are required. If you did not set the collation and used the default, the difference can lead to unexpected result sets if case distinctions are significant. You can change the setting for existing tables. For more information, see "Character Set Considerations" in *SAS SpeedyStore: Administration and Configuration Guide*.

SAS has also made changes that affect SAS SpeedyStore operator installation. If you are deploying using Kubernetes commands, be aware that the ClusterRoleBinding for the SAS SpeedyStore operator is now applied during the cluster-wide phase of the SAS Viya deployment, which occurs earlier in the installation sequence. This change affects deployment timing only. RBAC permissions, operator behavior, and configuration requirements are unchanged.

SAS has also made an enhancement to the SAS SpeedyStore default core dump configuration. This change ensures that Linux core dumps that might be generated by SingleStore processes are written to a persistent, SAS SpeedyStore-backed location using a predictable naming pattern. The new configuration sets the Linux kernel core dump file pattern that is used for SingleStore (memsqld) processes. The new setting replaces any value that might be applied on the SingleStore node. For more information, see the README file located at **`$deploy/sas-bases/examples/sas-singlestore-osconfig/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/sas_speedystore_cluster_os_configuration.htm`** (for HTML).

2026.04 (April 2026)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Changes to SAS/CONNECT Spawner Security Context Constraint

Note: If you are deploying your software on a platform other than Red Hat OpenShift, skip this topic.

Note: This content is repeated from 2026.01 due to the timing of its inclusion in the software. The change being described has been applied to several releases at the same time.

Before this release, deployments on Red Hat OpenShift were required to apply a security context constraint (SCC) for the SAS/CONNECT Spawner. Starting with this release, however, the SCC is only required if you are attempting to mount NFS to the sas-connect-spawner pod. For more information, see Apply and Bind the Security Context Constraints.

Critical Change: SAS In-Database Technologies for Azure Synapse Analytics

Microsoft has announced an end of support for Apache Spark 3.4 with Azure Synapse Runtime, effective March 31, 2026. As a result, SAS In-Database Technologies for Azure Synapse Analytics supports only Spark 3.5 in 2026.04 and later. In addition, the following requirements and configuration steps now apply to your deployment:

- You can no longer deploy the SAS Embedded Process from the sepcorespark RPM in Azure Synapse.
- You must perform a one-time pre-installation task to download an additional object library and create a wheel file. Then you must install that wheel file when you install the sasindb wheel.
- The `SCOREACCEL` procedure, the Model Publishing and Scoring action set, and the SAS Embedded Process for Spark action set are no longer supported for Azure Synapse.

  Use the `ACCELERATOR` procedure for in-database scoring and to stop and start the SAS Embedded Process instead.
- When you deploy the accelserver RPM, you can also use the in-database `DATA` step, which was not supported under the sepcorespark RPM.

For more information about these changes, see "Requirements for SAS In-Database Technologies for Azure Synapse Analytics" in *System Requirements for the SAS Viya Platform*.

Changes to SAS In-Database Technologies for Databricks

SAS In-Database Technologies for Databricks has added support for Spark 4.0 and Databricks runtime (All-purpose compute) 17.

2026.03 (March 2026)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Ingress Controller

An ingress controller that the SAS Viya platform supports for deployment, ingress-nginx (or Ingress NGINX controller), is being retired by the Kubernetes community. You can replace ingress-nginx with Contour ingress controller.

Starting with Stable 2026.03, SAS provides support for Contour in all Stable and Long-Term Support (LTS) releases of the SAS Viya platform and solutions that are in Standard Support. You can replace the ingress controller with Contour in any SAS Viya version in Standard Support by:

- applying the latest patch updates while making the change
- making the change while performing a version update of your SAS Viya platform deployment

The deployment documentation includes information to assist you with the transition. See the Cluster Ingress Requirements and *Changing Ingress Controllers in a Deployment* for more information.

Using the Contour ingress controller requires a new command when updating a SAS Viya platform deployment that is using the Kubernetes commands method of deployment. The new command is included in the list of deployment commands in Deployment Using Kubernetes Commands.

After the retirement of ingress-nginx, the SAS Viya platform will continue to provide Standard Support for environments that use it; however, neither SAS nor the Kubernetes community will address bugs or security issues for that component. Continuing to use ingress-nginx after March, 2026 is at your own risk.

Critical Change: Red Hat OpenShift Support

For SAS Viya platform deployments in OpenShift clusters, support for Red Hat OpenShift Container Platform (OCP) and OpenShift Kubernetes Engine (OKE) 4.21.*x* has been added. With 2026.03 and later, you can use Red Hat OCP or OKE 4.19.*x* – 4.21.*x*.

OpenShift must be running in one of the supported environments. These OKE and OCP versions align with Kubernetes 1.32.*x* – 1.34.*x*.

New Transformer to Enable FIPS for OpenSearch

SAS Viya platform now includes a predefined transformer file that enables FIPS for instances of OpenSearch. Earlier versions required a workaround in order to enable FIPS for OpenSearch.

IMPORTANT The new transformer file is intended for use with new, initial deployments. Do not attempt to use the new transformer with an existing deployment.

For more information, see "Additional Configuration for FIPS Compliance" in *SAS Viya Platform: Deployment Guide*.

Changes to SAS/CONNECT Spawner Security Context Constraint

Note: If you are deploying your software on a platform other than Red Hat OpenShift, skip this topic.

Note: This content is repeated from 2026.01 due to the timing of its inclusion in the software. The change being described has been applied to several releases at the same time.

Before this release, deployments on Red Hat OpenShift were required to apply a security context constraint (SCC) for the SAS/CONNECT Spawner. Beginning with this release, however, the SCC is only required if you are attempting to mount NFS to the sas-connect-spawner pod. For more information, see Apply and Bind the Security Context Constraints.

Changes to SAS Configurator for Open Source

SAS Configurator for Open Source now manages an additional Python package by default. The pandas package has been added to the default Python profile in the SAS Configurator for Open Source configuration file: **`$deploy/site-config/sas-pyconfig/change-configuration.yaml`**. If you have enabled the transformer and are using the most recent version of it, the SAS Configurator for Open Source utility attempts to download this package when it builds Python.

The change-configuration.yaml transformer file for SAS Configurator for Open Source has been revised to manage a newer list of supported Python versions. The transformer is replaced when you update to 2026.03. Be sure to follow the steps in the Deployment Notes to apply the newer file.

SAS is adding a new PROC to enable end users to execute R code. This new procedure is called PROC R. The Programming documentation has been updated to describe its use, and the deployment documentation for external languages has been updated with additional steps to enable and configure this new PROC. For more information, see "Configure R Integration Using SAS Configurator for Open Source" in *SAS Viya Platform: Integration with External Languages*.

A new example file has been included with your deployment assets to help you enable PROC R functionality. For more information, see "New PROC R Requires Revisions to Resource File" in *SAS Viya Platform: Deployment Notes*.

Changes to SAS Regulatory Capital Management Requirements

SAS Fast Execution Resource Management Infrastructure (FERMI) is available for use with an additional SAS Risk solution in 2026.03 and later: SAS Regulatory Capital Management. FERMI was designed to support SAS Risk solutions by orchestrating job flows and is gradually replacing the Process Orchestration functionality, which uses an Apache Airflow database.

FERMI has additional requirements. For more information, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

Changes to SAS/ACCESS Interface to Hadoop

Starting with 2026.03, SAS/ACCESS Interface to Hadoop has added support for Amazon EMR 7. This support has been added in addition to support for Amazon EMR 5.13 and EMR 6.

2026.02 (February 2026)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Ingress Controller

The ingress controller that the SAS Viya platform supports for deployment, ingress-nginx (or Ingress NGINX controller), directs network traffic to workloads running in Kubernetes and routes traffic to internal services. In November 2025, the Kubernetes community announced that it would retire ingress-nginx.

Starting March 19, 2026, SAS provides support for Contour ingress controller in all Stable and Long-Term Support (LTS) releases of the SAS Viya platform and solutions that are in Standard Support. In 2026.02, you can replace the ingress controller with Contour 1.31.0 or later by:

- applying the latest patch updates while making the change
- making the change while updating your SAS Viya platform deployment

The deployment documentation has been updated with information to assist you with the transition. See the Cluster Ingress Requirements and *Changing Ingress Controllers in a Deployment* for more information.

Using the Contour ingress controller requires a new command when updating a SAS Viya platform deployment that is using the Kubernetes commands method of deployment. The new command is included in the list of deployment commands in Deployment Using Kubernetes Commands.

SAS will continue to provide information about this transition promptly. After the retirement of ingress-nginx, the SAS Viya platform will also continue to provide Standard Support for environments that use it; however, neither SAS nor the Kubernetes community will address bugs or security issues for that component. Continuing to use ingress-nginx after March, 2026 is at your own risk.

Critical Change: Kubernetes Requirements

Support for Kubernetes 1.34.*x* has been added for all supported providers. Kubernetes 1.31.*x* is no longer supported. SAS Viya platform 2026.02 supports Kubernetes 1.32.*x* - 1.34.*x*.

For SAS Viya platform deployments in OpenShift clusters, starting with 2026.02, Red Hat OCP or OKE 4.18.*x* is not supported. You can use Red Hat OCP or OKE 4.19.*x* or 4.20.*x*. These OCP and OKE versions align with Kubernetes 1.32.*x* and 1.33.*x*.

Red Hat has recently added support for OCP 4.21. SAS is validating the new OCP version and will designate an appropriate cadence to add support and update the documentation as needed at that time.

Critical Change: Pod Change

The sas-device-management pod was removed.

Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

Critical Change: Revised Configuration Files for Backup and Restore

The deployment configuration files for backup, restore, and migration have been revised. The new format simplifies future updates and maintenance of backup and restore configurations.

If you plan to modify any backup or restore deployment configuration values, you can use the new configuration format by following the steps described in the following README files:

- Backup: **`$deploy/sas-bases/examples/backup/configure/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/configuration_settings_for_backup_using_the_sas_viya_backup_and_restore_utility.htm`** (for HTML)
- Restore: **`$deploy/sas-bases/examples/restore/configure/README.md`** (for Markdown) or **`$deploy/sas-bases/docs/configuration_settings_for_restore_using_the_sas_viya_backup_and_restore_utility.htm`** (for HTML)

- Migration: **$deploy/sas-bases/examples/migration/configure/README.md** (for Markdown) or **$deploy/sas-bases/docs/configuration_settings_for_sas_viya_platform_migration.htm** (for HTML)

Users with existing deployments should perform the steps that are described at "New Configuration File Format for Backup and Restore" in *SAS Viya Platform: Deployment Notes*.

Changes to SAS Configurator for Open Source

SAS Configurator for Open Source now manages two additional packages for R by default. The R6 and knitr packages have been added to the default R profile in the SAS Configurator for Open Source configuration file: **$deploy/site-config/sas-pyconfig/change-configuration.yaml**. If you have enabled the transformer and are using the most recent version of it, the SAS Configurator for Open Source utility attempts to download these R packages when it builds R.

In order to preserve any modifications that you have made to change-configuration.yaml, follow the steps that are described in "Revised SAS Configurator for Open Source Transformer" in *SAS Viya Platform: Deployment Notes*. First-time deployments of the SAS Viya platform that use SAS Configurator for Open Source for Python integration are unaffected by this change.

Changes to SAS/CONNECT Spawner Security Context Constraint

Note: If you are deploying your software on a platform other than Red Hat OpenShift, skip this topic.

Note: This content is repeated from 2026.01 due to the timing of its inclusion in the software. The change being described has been applied to several releases at the same time.

Before this release, deployments on Red Hat OpenShift were required to apply a security context constraint (SCC) for the SAS/CONNECT Spawner. Beginning with this release, however, the SCC is only required if you are attempting to mount NFS to the sas-connect-spawner pod. For more information, see Apply and Bind the Security Context Constraints.

Stable Releases in Limited Support

Note: For more information about Limited Support, see Support Levels for the SAS Viya Platform.

2026.01 (January 2026)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Ingress Controller

An ingress controller that the SAS Viya platform supports for deployment, ingress-nginx (or Ingress NGINX controller), is being retired by the Kubernetes community. You can replace ingress-nginx with Contour ingress controller.

Starting March 19, 2026, SAS provides support for Contour in all Stable and Long-Term Support (LTS) releases of the SAS Viya platform and solutions that are in Standard Support. You can replace the ingress controller with Contour in any SAS Viya version in Standard Support by:

- applying the latest patch updates while making the change
- making the change while performing a version update of your SAS Viya platform deployment

The deployment documentation includes information to assist you with the transition. See the Cluster Ingress Requirements and *Changing Ingress Controllers in a Deployment* for more information.

Using the Contour ingress controller requires a new command when updating a SAS Viya platform deployment that is using the Kubernetes commands method of deployment. The new command is included in the list of deployment commands in Deployment Using Kubernetes Commands.

After the retirement of ingress-nginx, the SAS Viya platform will continue to provide Standard Support for environments that use it; however, neither SAS nor the Kubernetes community will address bugs or security issues for that component. Continuing to use ingress-nginx after March 19, 2026 is at your own risk.

Critical Change: Pod Changes

The sas-studio-development pod is merged into the sas-data-flows pod. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

sas-studio-development	→	sas-data-flows

Changes to SAS Micro Analytic Service and External Language Support

A new example YAML file and accompanying README describe customizations that the SAS Viya administrator can perform in order to enable optional access to data from an external Databricks source. Starting with 2026.01, a Python package, databricks-sql-connector, enables Python code in SAS Micro Analytic Service to connect to and query Databricks SQL warehouses. SAS Configurator for Open Source is recommended to provision Python for this integration.

The README explains how to configure SAS Micro Analytic Service to enable access to Databricks and provides example code. For more information, see **`$deploy/sas-bases/examples/sas-microanalytic-score/databricks/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/configure_sas_micro_analytic_service_to_enable_access_to_databricks`** (for HTML).

Name Change: Model Studio Is Now SAS Model Studio

SAS Model Studio is now a trademarked product for SAS. SAS Model Studio provides a common user interface with functionality shared among SAS Viya: Machine Learning, SAS Visual Text Analytics, and SAS Visual Forecasting. The new

name appears in the product user interface and documentation starting with 2026.01.

Changes to SAS/CONNECT Spawner Security Context Constraint

Note: If you are deploying your software on a platform other than Red Hat OpenShift, skip this topic.

Before this release, deployments on Red Hat OpenShift were required to apply a security context constraint (SCC) for the SAS/CONNECT Spawner. Beginning with this release, however, the SCC is only required if you are attempting to mount NFS to the sas-connect-spawner pod. For more information, see Apply and Bind the Security Context Constraints.

Changes to SAS Insurance Contract Valuation Requirements

SAS Fast Execution Resource Management Infrastructure (FERMI) is available for use with SAS Insurance Contract Valuation in 2026.01. FERMI was designed to support SAS Risk solutions by orchestrating job flows and is gradually being adopted by SAS Risk offerings.

Over the longer term, FERMI will replace the Process Orchestration functionality for SAS Risk that uses an Apache Airflow database. It has additional requirements. For more information about SAS Fast Execution Resource Management Infrastructure and its requirements, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

2025.12 (December 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Ingress Controller

An ingress controller that the SAS Viya platform supports for deployment, ingress-nginx (or Ingress NGINX controller), is being retired by the Kubernetes community. You can replace ingress-nginx with Contour ingress controller.

Starting March 19, 2026, SAS provides support for Contour in all Stable and Long-Term Support (LTS) releases of the SAS Viya platform and solutions that are in Standard Support. You can replace the ingress controller with Contour in any SAS Viya version in Standard Support by:

- applying the latest patch updates while making the change
- making the change while performing a version update of your SAS Viya platform deployment

The deployment documentation includes information to assist you with the transition. See the Cluster Ingress Requirements and *Changing Ingress Controllers in a Deployment* for more information.

Using the Contour ingress controller requires a new command when updating a SAS Viya platform deployment that is using the Kubernetes commands method of deployment. The new command is included in the list of deployment commands in Deployment Using Kubernetes Commands.

After the retirement of ingress-nginx, the SAS Viya platform will continue to provide Standard Support for environments that use it; however, neither SAS nor the Kubernetes community will address bugs or security issues for that component. Continuing to use ingress-nginx after March, 2026 is at your own risk.

Critical Change: New Architecture for SAS Workload Orchestrator

SAS Workload Orchestrator has been modified so that it now uses both a manager/StatefulSet (sas-workload-orchestrator) and a server/DaemonSet (sas-workload-orchestrator-server). For more information about the changes, see "Configure SAS Workload Orchestrator" in *SAS Viya Platform: Deployment Guide*.

In addition, the files used to configure SAS Workload Orchestrator have been revised to match the ongoing configuration file changes. The new format will simplify future updates.

Critical Change: Pod Changes

The sas-workload-orchestrator pod is renamed to sas-workload-orchestrator-server. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

SAS Viya Copilot Now Available

SAS Viya Copilot is now available for use with the SAS Viya platform.

SAS Viya Copilot is a GenAI-powered assistant built into the SAS Viya platform, designed to accelerate productivity across the analytics life cycle. It uses large language models (LLMs) that are stored on a SAS tenant and accessed through a secure gateway to enable conversational, AI-driven assistance. For more information about SAS Viya Copilot, including requirements and limitations, see *SAS Viya Copilot: Foundation Overview*.

SAS Viya Copilot is deployed as part of the SAS Viya platform. After you have deployed the SAS Viya platform, and if you have the combination of products currently supported by SAS Viya Copilot, SAS Environment Manager includes a new SAS Viya Copilot page, from which you can activate the copilot. If you do not have the products that enable the activation of SAS Viya Copilot, the SAS Viya Copilot page is not available. For more information about activating the deployed SAS Viya Copilot, see "Set Up the Credential and Secrets for SAS Viya Copilot" in *SAS Viya Platform: Licensing*.

SAS Viya Copilot will be added to more products in the future.

CAS Server Optional for Programming-Only Deployments

If your software order includes the SAS Viya Programming offering, you can exclude the default CAS server from your deployment. You must be able to run all of your programming use cases using only Programming Runtime servers such as SAS Compute Server. Excluding the CAS server allows your SAS programmers to access the SAS Viya analytics using familiar PROC interfaces. For more information, see "Configure CAS" in *SAS Viya Platform: Deployment Guide*.

SAS/CONNECT Spawner Requires SCC for Red Hat OpenShift

All deployments on Red Hat OpenShift require binding and applying a security context constraint (SCC). For more information, including the required commands, see "Security Context Constraints and Service Accounts" in *SAS Viya Platform: Deployment Guide*.

Storage Classes Can Be Used with SAS Configuration Server

Until this release, SAS Configuration Server uses a persistent volume claim with no storage class specified by default. With this release, if you are performing the initial deployment of your software, you can configure the storage class for the persistent volume claims used by SAS Configuration Server to meet your environment's requirements.

For more information, see the README file located at **`$deploy/sas-bases/examples/sas-consul-server/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_storage_class_for_sasconfiguration_server.htm`** (for HTML format).

> **IMPORTANT** Configuring the storage class for SAS Configuration Server is intended for new deployments only. Do not attempt this configuration with an existing deployment. It will result in data loss.

Changes to SAS Configurator for Open Source

SAS Configurator for Open Source now supports Python 3.12.12 and R 4.4.3. The Python and R versions are determined by parameters in the SAS Configurator for Open Source transformer: **`$deploy/site-config/sas-pyconfig/change-configuration.yaml`**. The `default_py.python_signature` and `default_py.python_tarball` properties have been modified to support a newer version of Python, and `default_r.r_tarball` has been modified for R. If you have enabled the transformer and are using the most recent version of it, the utility attempts to download and build the newer versions of Python and R by default.

In order to preserve any modifications that you have made to change-configuration.yaml, follow the steps that are described in "Revised SAS Configurator for Open Source Transformer" in *SAS Viya Platform: Deployment Notes*. First-time deployments of the SAS Viya platform that use SAS Configurator for Open Source for Python integration are unaffected by this change.

An enhancement to SAS Configurator for Open Source has also been added to 2025.12 and later. By default, the `--upgrade` option in each Python profile ignores any pinning of specific package versions that you might have added to the change-configuration.yaml file. Starting with 2025.12, you can disable the `--upgrade` functionality so that pinning is preserved. To disable this option, specify "`none`" as the value for `pip_install_opts` in the Python profile that you are using.

If you upgrade your cluster to Red Hat OCP 4.20, an additional step is required to configure the fsGroup. For more information, see "Enable SAS Configurator for Open Source to Function in OpenShift" in *SAS Viya Platform: Integration with External Languages*.

SAS SpeedyStore Enhancement

SAS SpeedyStore has added support for deployment on Google Cloud or Google Distributed Cloud (software only) for VMware. As a result, SAS SpeedyStore can now be deployed on any of the supported cloud platforms.

Changes to SAS Insurance Capital Management Requirements

A new component, SAS Fast Execution Resource Management Infrastructure (FERMI), is available for SAS Insurance Capital Management in 2025.12. FERMI was designed to support SAS Risk solutions by orchestrating job flows with explicit task dependencies, scalable execution, and fault tolerance. It operates as a standalone component for the SAS Viya platform and is gradually being adopted by additional SAS Risk offerings.

Over the longer term, FERMI will replace the Process Orchestration functionality for SAS Risk that uses an Apache Airflow database. It has additional requirements. For more information about SAS Fast Execution Resource Management Infrastructure and its requirements, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

Enhancement to Support for Deployment into Multiple Availability Zones

SAS supports deploying the SAS Viya platform in a single availability zone. In 2025.10 and later, you can deploy the SAS Viya platform into a cluster that spans multiple availability zones in Microsoft Azure and AWS. Starting with 2025.12, you can also deploy with multiple availability zones in the supported Google Cloud environments. Multiple availability zones can enhance the high availability (HA) that is provided by Kubernetes and by your SAS workload placement strategy.

SAS intends to address existing limitations to multi-zone support in a future release of the SAS Viya platform. For detailed requirements and limitations, see

"Requirements for Environments with Multiple Availability Zones" in *System Requirements for the SAS Viya Platform*.

Changes to Data Access Requirements

SAS In-Database Technologies for Azure Synapse Analytics no longer supports Spark 3.3. An additional RPM file that became available for a SAS Embedded Process for Spark deployment in 2024.11 is now compatible with SAS In-Database Technologies for Azure Synapse. The new deployment is referred to as the *accelserver* RPM file. The previous deployment, referred to as the *sepcorespark* RPM file, continues to be supported. When you deploy the accelserver RPM, additional functionality is available.

The two SAS Embedded Process deployments support different versions of Spark. For more information, see "Requirements for SAS In-Database Technologies for Azure Synapse Analytics" in *System Requirements for the SAS Viya Platform*.

2025.11 (November 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Revised Configuration Files for SAS Detection Architecture

The files used to configure SAS Detection Architecture have been revised. The new format will simplify future updates. In order to use the new configuration files, follow the steps described in the README file at **`$deploy/sas-bases/examples/sas-detection/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/sas_detection_engine_configuration.htm`** (for HTML format).

Critical Change: Requirements for External Language Integration

SAS Viya platform integration with open-source languages requires compatible binary files for your language source. Starting with 2025.11, your Python or R source installation must consist of Linux binaries that are compatible with Red Hat Universal Base Image 9 (UBI9). Previously, Red Hat UBI8 was used as the source base image for the SAS Viya platform.

SAS Viya is not compatible with Windows binaries.

Crunchy Postgres for Kubernetes Upgrade

Crunchy Postgres for Kubernetes, the version of Kubernetes that is included for internal instances of PostgreSQL, is being upgraded from 5.7.5 to 5.8.3. As part of the upgrade, the source base image is being upgraded from the Red Hat Universal Base Image 8 (UBI8) to the Red Hat Universal Base Image 9 (UBI9). No user intervention is required.

Default Resource Restrictions for BuildKit with SAS Model Publish Service

BuildKit with SAS Model Publish Service now has default resource restrictions:

Table 2.1 *Default Restrictions for BuildKit*

Minimum CPU	1 core
Minimum memory	1Gi
Maximum memory	1Gi
Maximum replicas	1 replica

For more information about the resource restrictions, including how to revise them, see the README file located at **`$deploy/sas-bases/examples/sas-model-publish/buildkit/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_buildkit_for_sas_model_publish_service.htm`** (for HTML format).

Changes to Data Source Support

SAS In-Database Technologies for Cloudera Data Platform has added support for an additional distribution: Cloudera CDP 7.3. Both Public Cloud and Private Cloud deployments are supported. Additional configuration might be required for backward compatibility with existing SAS programs. For more information, see "Requirements for SAS In-Database Technologies for Cloudera Data Platform" in *System Requirements for the SAS Viya Platform*.

Bug Fix: SAS Mirror Manager

Some administrators who deployed the SAS Viya platform from a mirror registry reported an issue with Artifactory registries. Each time that they ran the `mirrormgr mirror` command for any reason, SAS Mirror Manager attempted to pull and push a subset of images to the target container registry. This behavior occurred despite the fact that the images were already available in the registry.

This issue has been resolved with the latest version of SAS Mirror Manager.

Changes Related to External Language Support

Starting with 2025.11, SAS Configurator for Open Source requires Python and R binary files that are compatible with Red Hat Universal Base Image 9 (UBI9). As a result of this change to SAS Viya platform base images, SAS Configurator for Open Source will automatically rebuild all content that it manages in order to use UBI9-compatible libraries. In 2025.11 and later, SAS Configurator for Open Source detects UBI8 related content in the shared storage volume (at the mountPath **`/opt/sas/viya/home/sas-pyconfig`**) and rebuilds it automatically.

> **IMPORTANT** Any content in the shared storage volume at **`/opt/sas/viya/home/sas-pyconfig`** should be strictly for the use of SAS Configurator for Open Source to support SAS Viya integration with open-source languages. Move any content that was not produced by SAS Configurator for Open Source out of this storage volume before you update your deployment to 2025.11 or later

2025.10 (October 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Upgraded Source Base Image

Starting with 2025.10, the source base image for the SAS Viya platform is being upgraded from the Red Hat Universal Base Image 8 (UBI8) to the Red Hat Universal Base Image 9 (UBI9). Containers based on UBI9 are no longer supported on Red Hat Enterprise Linux 7. Therefore, SAS does not support running SAS Viya platform 2025.10 or later on clusters with nodes that are running Red Hat Enterprise Linux 7.*x*.

This change might affect you if your deployment is running in open-source Kubernetes. Red Hat Enterprise Linux and other versions of Linux that are used by the supported cloud providers are supported. The basic requirement is an operating system that is compatible with Red Hat UBI9. This Compatibility Matrix from Red Hat provides a summary.

Note: Red Hat UBI9 is not yet in use by all SAS Viya platform components. As a result, if you are configuring the optional support for open-source programming languages, your Python or R source installation must consist of Linux binaries that are compatible with Red Hat Universal Base Image 8 (UBI8). The change to UBI9 will occur in 2025.11.

Critical Change: Pod Changes

The sas-decisions-runtime-builder pod is merged into the sas-model-publish pod. Also, the buildkitd pod was renamed to sas-buildkitd. Pod changes might affect the software update process and the tuning and configuration of pods. For more

information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

Critical Change: Revised Configuration Files for SAS Risk Cirrus KRM Service

The SAS Risk Cirrus KRM service provides a REST API for starting and managing KRM runs associated with Risk Cirrus analysis runs and comes with default settings that may be changed. The files used to configure SAS Risk Cirrus KRM Service have been revised. The new format will simplify future updates. In order to use the new configuration files, follow the steps described in the README file at **`$deploy/sas-bases/examples/sas-risk-cirrus-krm/resources/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_the_sas_risk_cirrus_krm_service.htm`** (for HTML format).

Support for Disabling Private IP Address Filtering

To prevent the exposure of internal infrastructure information to the casual user, SAS Viya platform events are configured by default to filter out IP addresses that are designated as private. However, in cases where the filtered IP address ranges are needed for auditing, the SAS Viya platform now lets you disable that filtering. For more information, see the README file located at **`$deploy/sas-bases/examples/security/private-ip-filtering/README.md`** (for Markdown format) or at **`$directory/sas-bases/docs/private_ip_filtering.htm`** (for HTML).

Support for Deployment into Multiple Availability Zones

SAS supports deploying the SAS Viya platform in a single availability zone. In 2025.10 and later, you can deploy the SAS Viya platform into a cluster that spans multiple availability zones in Microsoft Azure and AWS. Multiple availability zones can enhance the high availability (HA) that is provided by Kubernetes and by your SAS workload placement strategy.

SAS intends to address existing limitations to multi-zone support in a future release of the SAS Viya platform. For detailed requirements and limitations, see "Requirements for Environments with Multiple Availability Zones" in *System Requirements for the SAS Viya Platform*.

New Warning Messages for Crunchy Postgres for Kubernetes Can Be Ignored

Note: If you are using an external instance of PostgreSQL for your SAS Viya platform deployment, you can skip this What's New topic.

Crunchy Postgres for Kubernetes is the version of PostgreSQL that is used for internal instances of SAS Infrastructure Data Server for the SAS Viya platform. SAS is in the process of automating the process for an update to Crunchy Postgres for Kubernetes. As a result of some code changes, you might receive the following warning message:

```
WARNING:  database "postgres" has a collation version mismatch
DETAIL:  The database was created using collation version 2.28, but the operating
system provides version 2.34.
```

If you receive this message, it can be safely ignored.

Note: For more information, see Warning messages occur after you apply the SAS Viya 2025.10 update with internal PostgreSQL.

Updates to SAS SpeedyStore Documentation: Default Collation

Documentation has been added about a default SingleStore setting that can affect string comparisons. For case-sensitive comparisons, you might need to change the server collation setting in the SingleStore deployment. For more information and instructions to change the default setting, see "Setting or Modifying the Collation" in *SAS SpeedyStore: Administration and Configuration Guide*.

Retired Product

SAS In-Database Technologies for Hadoop Cloud Services has been retired. The relevant documentation has been removed, starting with 2025.10.

For more information, contact your SAS Customer Support representative.

2025.09 (September 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Kubernetes Requirements

Support for Kubernetes 1.33.*x* has been added for all supported providers. Kubernetes 1.30.*x* is no longer supported. SAS Viya platform 2025.05 supports Kubernetes 1.31.*x* - 1.33.*x*.

For SAS Viya platform deployments in OpenShift clusters, support for Red Hat OpenShift Container Platform (OCP) and OpenShift Kubernetes Engine (OKE) 4.20.*x* has been added. With 2025.09 and later, you can use Red Hat OCP or OKE 4.18.*x* – 4.20.*x*. OpenShift must be running in one of the supported environments. These OKE and OCP versions align with Kubernetes 1.31.*x* – 1.33.*x*.

Critical Change: Ingress Requirements

The SAS Viya platform now requires ingress-nginx 1.12.1 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.31.*x* - 1.33.*x*.

Using later versions of third-party components is a best practice. In the case of ingress-nginx, SAS strongly recommends using recent versions that include fixes for known CVEs.

With ingress-nginx 1.12.*x* or later, you might need to change the default configuration of the ingress controller in order to mitigate breaking changes from NGINX.

For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Critical Change: Calico CNI Support

Deployments in upstream open-source Kubernetes clusters now require Calico 3.29.*x* and later. This change to the minimum supported version of Calico ensures compatibility with Kubernetes 1.31.*x* - 1.33.*x*.

Critical Change: Pod Changes

The sas-decisions pod is merged into the sas-decisions-framework pod. Also, multiple pods are removed. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

sas-decisions	→	sas-decisions-framework

The following pods are removed because SAS Data Studio is retired in 2025.09:

sas-data-plans

sas-data-studio-app

sas-discovery-services

sas-transformations

For more information, see What's New in SAS Data Studio (2025.09).

Critical Change: Configuration File Revision and Reformatting

SAS has adopted a new format for the configuration files that are used by products for their deployment. The new format will simplify future updates. The revisions are being introduced for each product when that product makes other revisions to their existing configuration files. Attempting to use the previous method for configuration will result in failure to deploy or update. When products make revisions to their configuration files, they will be included both in *What's New in Operations* and in *SAS Viya Platform: Deployment Notes*.

Critical Change: Revised Configuration Files for Model Publish Service

The configuration files for controlling the size of the persistent volume claim used for the Model Publish service have been revised. The new format will simplify future updates. In order to use the new configuration files, follow the steps described in the README file at **`$deploy/sas-bases/examples/sas-model-publish/git/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_git_for_sas_model_publish_service.htm`** (for HTML format).

Security Enhancement to External Language Support

You can now use TLS to secure the connections that SAS Configurator for Open Source makes when managing Python or R. Starting with 2025.08, SAS Configurator for Open Source automatically uses the CA certificates that are already trusted by the SAS Viya platform when it configures Python and R integration. As a result, the procedure for adding a custom Certificate Authority is the same as it is for other SAS Viya platform applications. No additional configuration is required.

SAS Clinical Acceleration Offering Now Available

A new solution from SAS Health and Life Sciences, SAS Clinical Acceleration, is now available for deployment with the SAS Viya platform.

SAS Clinical Acceleration provides a modular, open, cloud-native content repository and statistical compute environment for managing, analyzing, reporting, and reviewing clinical research and medical data. It represents the modernization of SAS Life Science Analytics Framework, bringing features and benefits from SAS®9 to the SAS Viya platform.

SAS Clinical Acceleration can be deployed in Microsoft Azure. For additional system requirements to support SAS Clinical Acceleration, see "Requirements for SAS Clinical Acceleration Solutions" in *System Requirements for the SAS Viya Platform*.

Connect to SMTP Server with Enhanced Security

The SAS Viya platform now provides a method of connecting to selected mail servers with security other than Basic Authentication. For more information, see

"Microsoft 365/Office 365 with OAuth 2.0" in *SAS Viya Platform: Deployment Guide*.

2025.08 (August 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Pod Changes

The sas-data-mining-models pod was merged into the sas-data-mining-project-resources pod. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

sas-data-mining-models	→	sas-data-mining-project-resources

Critical Change: Ingress Requirements

For your cluster ingress, ingress-nginx 1.13.*x* is now supported. Previously, not all 1.13 versions of ingress-nginx were supported.

Critical Change to OpenShift Support

For SAS Viya platform deployments in OpenShift clusters, support for Red Hat OpenShift Container Platform (OCP) and OpenShift Kubernetes Engine (OKE) 4.19.*x* has been added for 2025.08 and later. OCP 4.19 corresponds to Kubernetes 1.32.

With 2025.08 and later, you can use Red Hat OCP or OKE 4.17.*x* – 4.19.*x*. OpenShift must be running in one of the supported environments. These OKE and OCP versions align with Kubernetes 1.30.*x* – 1.32.*x*.

As Red Hat adds support for newer versions of Kubernetes, SAS validates new OCP versions, designates an appropriate cadence to add support, and updates the documentation as needed.

Revised Configuration Files for SAS Data Quality

The configuration files for controlling the size of the persistent volume claim (PVC) used to store the Quality Knowledge Base have been completely revised. The new format will simplify future updates. In order to use the new configuration files, follow the steps described in the README file at **`$deploy/sas-bases/examples/data-quality/storagesize/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/quality_knowledge_base_for_the_sas_viya_platform.htm`** (for HTML format).

Revised Transformers for SAS Workload Orchestrator

The sas-workload-orchestrator-statefulset-resources.yaml and sas-workload-orchestrator-daemonset-resources.yaml transformer files have been revised for SAS Workload Orchestrator. With the updated transformer files, you can provide both upper and lower limits for the memory and CPU use for statefulset and daemonset pods. For more information about the revised transformer files, see the README file located at **`$deploy/sas-bases/examples/sas-workload-orchestrator/configure/README.md`** (for README format) or at **`$deploy/sas-bases/docs/configuration_settings_for_sas_workload_orchestrator_service.htm`** (for HTML format).

Security Enhancement to External Language Support

You can now use TLS to secure the connections that SAS Configurator for Open Source makes when managing Python or R. Starting with 2025.08, SAS Configurator for Open Source automatically uses the CA certificates that are already trusted by the SAS Viya platform when it configures Python and R integration. As a result, the procedure for adding a custom Certificate Authority is the same as it is for other SAS Viya platform applications. No additional configuration is required.

SAS Governance and Compliance Manager Offerings Now Available

New Risk offerings, SAS Governance and Compliance Manager and SAS Governance and Compliance Manager Advanced, are now available for deployment with the SAS Viya platform.

SAS Governance and Compliance Manager enables your organization to respond promptly to regulatory requirements and internal initiatives in an ever-changing regulatory landscape. Changes in regulations often mean that potential customers are consistently looking for updated systems using the most recent technologies. SAS Governance and Compliance Manager helps you simplify internal processes, record-keeping, policy management, and risk/control assessments for multi-industry clients. It establishes a baseline for robust risk and compliance management and provides a foundation for market leadership in operational risk governance.

SAS Governance and Compliance Manager and SAS Governance and Compliance Manager Advanced can be deployed on all the platforms that are supported by SAS Viya. For additional system requirements to support SAS Governance and Compliance Manager, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

SAS Health Offering Renamed and Enhanced

The SAS Health Episode Builder offering has been renamed to SAS Health Cost of Care Analytics. SAS Health Cost of Care Analytics now includes a user interface. You can point and click in order to construct episodes and create analysis jobs.

SAS Health Cost of Care Analytics can be deployed on Microsoft Azure and AWS. For additional system requirements to support SAS Health Cost of Care Analytics, see "Requirements for SAS Health Solutions" in *System Requirements for the SAS Viya Platform*.

Change to SAS Configurator for Open Source Default Python Profile

SAS Configurator for Open Source has made changes to Python packages that are managed by means of the default Python profile.

The default Python profile is defined by parameters in the **`$deploy/site-config/sas-pyconfig/change-configuration.yaml`** transformer. If you want to include this support in your deployment, you can copy over the newest version of change-configuration.yaml from your deployment assets. Or, if you prefer to continue using a file that you have customized, follow the steps that are described in "Revised SAS

Configurator for Open Source Transformer" in *SAS Viya Platform: Deployment Notes*.

2025.07 (July 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Ingress Requirements

For your cluster ingress, ingress-nginx 1.13.0 is not supported. NGINX has fixed a bug in ingress-nginx 1.13.1 and later, enabling the SAS Viya platform to support these versions of the ingress controller.

Critical Change: Pod Changes

The sas-feature-flags pod was merged into the sas-configuration pod. Also, the sas-redis-operator pod was removed. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

sas-feature-flags → sas-configuration
The following pod was removed: sas-redis-operator

Additional SAS/ACCESS Engine Now Available

A new SAS/ACCESS engine is now included with the SAS Viya platform: SAS/ACCESS Interface to DuckDB. All the standard data types supported by SAS Viya platform applications are supported. DuckDB 1.2.0 and later are supported.

SAS/ACCESS Interface to DuckDB supports data sources in Amazon S3, Azure blob store, and Google Cloud Storage. For more information, see "Requirements for SAS/ACCESS Interface to DuckDB" in *System Requirements for the SAS Viya Platform*.

2025.06 (June 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Ingress Requirements

For your cluster ingress, ingress-nginx 1.13.0 is not supported. NGINX has fixed a bug in ingress-nginx 1.13.1 and later, enabling the SAS Viya platform to support these versions of the ingress controller.

Kaniko Container Images Deprecated in Favor of BuildKit

SAS Model Publish Service is deprecating Kaniko container images and replacing them with BuildKit. Follow the instructions in the README file located at **`$deploy/sas-bases/examples/sas-decisions-runtime-builder/buildkit/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/`**

configure_buildkit_for_sas_decisions_runtime_builder_service.htm (for HTML format) to successfully deploy BuildKit.

Kaniko can still be deployed, but using it now requires that the SAS Container Runtime Kaniko feature flag be turned on as a post-deployment step. For more information, see "Configure Container Publishing Destinations" in *SAS Viya Platform: Publishing Destinations*.

Note: The SAS Container Runtime Kaniko feature flag will be removed with the 2025.09 release, and Kaniko will no longer be available.

Security Context Constraint for sas-model-publish

Note: This What's New topic only applies to deployments running on Red Hat OpenShift. If you are using a cloud provider other than OpenShift, skip this topic.

If you plan to use BuildKit to publish models to containers with SAS Model Manager or SAS Intelligent Decisioning, you must bind the sas-model-publish-buildkit, sas-decisions-runtime-builder-buildkit, and default service accounts to the sas-model-publish SCC. For details, see Apply and Bind the Security Context Constraints.

New Configuration File for Redis

Redis now has a transformer file that enables you to modify the PersistentVolumeClaim size or the StorageClass for nodes. The transformer file can be applied during the initial deployment of your SAS Viya platform software or after the software has been deployed. For details, see the README file located at **$deploy/sas-bases/examples/redis/server/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configuration_settings_for_redis.htm** (for HTML format).

Change to OpenShift Requirements

SAS Viya platform deployments on Red Hat OpenShift are no longer required to use the cert-utils-operator to manage certificate content in Route resources. The cert-utils-operator is still recommended for these deployments. For information about an alternative, see the "Example kustomization.yaml Files for the OpenShift Ingress Controller Without the Use of the cert-utils-operator" section of the README file located at **$deploy/sas-bases/examples/security/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_network_security_and_encryption_using_sas_security_certificate_framework.htm** (for HTML format).

Critical Change: Pod Changes

The sas-model-management and sas-model-repository pods were merged into a new pod named sas-model-manager. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

sas-model-management	→	sas-model-manager
sas-model-repository		

SAS Mirror Manager Enhancements

SAS container image signatures are now available for Google Artifact Registry after Google added support for version 1.1 of the OCI distribution specification.

The SAS Mirror Manager documentation has been enhanced with the addition of a procedure describing the steps to set up a mirror registry in Harbor.

Changes to Data Access Requirements

SAS/ACCESS Interface to SQL Server has added support for Microsoft Fabric Data Warehouse and Microsoft Fabric Lakehouse.

SAS Clinical Acceleration Repository Adds Platform Support

SAS Clinical Acceleration Repository can now be deployed in Amazon Web Services, with Amazon Elastic Kubernetes Service. Previously, it was only deployed in Microsoft Azure.

2025.05 (May 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Kubernetes Requirements

Support for Kubernetes 1.32.*x* has been added for all supported providers with the exception of Red Hat OpenShift. Kubernetes 1.29.*x* is no longer supported. SAS Viya platform 2025.05 supports Kubernetes 1.30.*x* - 1.32.*x*.

For OpenShift clusters, you can use either Red Hat OpenShift Kubernetes Engine (OKE) or Red Hat OpenShift Container Platform (OCP) 4.17.*x* or 4.18.*x*. OpenShift must be running in one of the supported environments. These OKE and OCP versions align with Kubernetes 1.30.*x* and 1.31.*x*.

As Red Hat adds support for newer versions of Kubernetes, SAS validates new OCP versions, designates an appropriate cadence to add support, and updates the documentation as needed.

Critical Change: Ingress Requirements

The SAS Viya platform now requires ingress-nginx 1.10.1 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.30.*x* - 1.32.*x*.

IMPORTANT Version 1.13.0 of ingress-nginx is not supported. However, NGINX has fixed a bug in ingress-nginx 1.13.1 and later, enabling the SAS Viya platform to support these versions of the ingress controller.

Using later versions of third-party components is a best practice. In the case of ingress-nginx, SAS strongly recommends using recent versions that include fixes for known CVEs.

If you are using ingress-nginx 1.12.*x* or later for your Kubernetes cluster, you must change the default configuration of the ingress controller in order to mitigate breaking changes from NGINX.

For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Critical Change: Calico CNI Support

Deployments in upstream open-source Kubernetes clusters now require Calico 3.28.*x* and later. This change to the minimum supported version of Calico ensures compatibility with Kubernetes 1.30.*x* - 1.32.*x*.

SAS with SingleStore Is Now SAS SpeedyStore

The SAS product formerly named SAS with SingleStore has a new name: SAS SpeedyStore.

Customer-Provided Root CA Certificate Is Supported

Prior to deployment, the SAS Viya platform deployment can be configured to use a customer-provided root CA certificate by using the **`$deploy/sas-bases/examples/security/customer-provided-sas-viya-ca-certificate-secret.yaml`** file. Follow the instructions in "Configure the SAS Viya Platform Root CA Certificate" in the README file **`$deploy/sasbases/examples/security/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_network_security_and_encryption_using_sas_security_certificate_framework.htm`** (for HTML format).

2025.04 (April 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical

changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Ingress Requirements

For your cluster ingress, ingress-nginx 1.13.0 is not supported. NGINX has fixed a bug in ingress-nginx 1.13.1 and later, enabling the SAS Viya platform to support these versions of the ingress controller.

New Transformers for SAS Servers on OpenShift Using Kerberos

Note: This topic is repeated from 2025.03 because of the timing of its arrival. The repetition is to ensure that users are aware of the new transformers and does not reflect a second set of new transformers.

Note: If your deployment will not be running on Red Hat OpenShift, the contents of this topic do not apply to your deployment.

SAS has introduced new transformers for SAS Servers running on Red Hat OpenShift that use Kerberos. For more information about using the new transformers, see the README file located at **`$deploy/sas-bases/examples/kerberos/sas-servers/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configuring_sas_servers_for_kerberos_in_sas_viya_platform.htm`** (for HTML format).

Configure OpenSearch for a Memory-Backed Temporary Directory

By default, OpenSearch creates its temporary directory within **`/tmp`** using an emptyDir volume mount. However, some hardened installations mount /tmp on emptyDir volumes with the `noexec` option, preventing JNA and libffi from functioning correctly. This can cause start-up failures with exceptions like `java.lang.UnsatisfiedLinkerError` or messages indicating issues with mapping segments or allocating closures. In order to allow JNA loading without relaxing file system restrictions, OpenSearch can be configured to use a memory-backed temporary directory.

For the instructions to use the new transformer, see the README file located at **$deploy/sas-bases/examples/configure-elasticsearch/internal/jna/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_a_temporary_directory_for_jna_in_opensearch.htm** (for HTML format).

Changes to Data Access Requirements

SAS/ACCESS Interface to Hadoop has added support for Cloudera Data Platform (CDP) Public/Private Cloud, 7.3 or later. In addition, the Cloudera platforms that were supported previously are still supported.

2025.03 (March 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Ingress Requirements

Version 1.13.0 of ingress-nginx is not supported. The Ingress Nginx community has fixed a bug in ingress-nginx 1.13.1 and later, enabling the SAS Viya platform to support these versions of the ingress controller.

Enhancements and Documentation to Minimize Downtime during Updates

SAS continues to enhance rolling updates for the SAS Viya platform to minimize downtime and improve system resilience. In 2025.03, several improvements have been introduced to ensure a smoother update experience:

- Improved Stability for Compute Workloads:

  - Various enhancements have been made to reduce disruptions during software updates for workloads running on programming run-time servers.
  - If job failures occur during an update because of programming run-time server initialization, SAS Workload Orchestrator and SAS Launcher now relaunch the affected jobs automatically, ensuring uninterrupted processing.
- Recommendations for Minimizing CAS Workload Disruptions:
  - To further reduce downtime during CAS server updates, SAS strongly recommends that you enable the CAS state transfer feature. CAS state transfer helps to minimize disruptions during CAS server maintenance operations, enabling the transfer of the session state, data, and other relevant artifacts to newer CAS server instances while the previous instances continue to run temporarily.

    Note: The CAS server state transfer feature is available if you are using the SAS Viya Platform Deployment Operator or sas-orchestration to manage your deployment.
  - Starting with 2024.10, Read-Only access to global tables and other state components is now enabled by default during CAS state transfer. This change enables actions that read data to continue to run during a software update, providing a better user experience by minimizing disruptions.

For more information about minimizing downtime during software updates, see the new section of the SAS Viya platform deployment documentation titled "Reduce Downtime during Future Software Updates" in *Getting Started with SAS Viya Platform Operations*.

Critical Change to OpenShift Support

For SAS Viya platform deployments in OpenShift clusters, support for Red Hat OpenShift Container Platform (OCP) and OpenShift Kubernetes Engine (OKE) 4.18.*x* has been added for 2025.03 and later. OCP 4.18 corresponds to Kubernetes 1.31.

With 2025.03 and later, you can use Red Hat OCP or OKE 4.16.*x* - 4.18.*x*. OpenShift must be running in one of the supported environments. These OKE and OCP versions align with Kubernetes 1.29.*x* - 1.31.*x*.

As Red Hat adds support for newer versions of Kubernetes, SAS validates new OCP versions, designates an appropriate cadence to add support, and updates the documentation as needed.

Critical Changes to Data Access Requirements

Starting with 2025.03, the SAS Viya platform includes Simba drivers with SAS/ACCESS software for database access.

- SAS/ACCESS Interface to Impala now includes the Simba client by default for ODBC access. Obtaining and installing the client driver is no longer required. However, some changes to configuration files might be required. For more information, see the Deployment Note titled SAS/ACCESS Interface to Impala: Before Deployment Commands.
- Simba JDBC drivers from insightsoftware replace drivers from CData that were included with previous releases of SAS/ACCESS Interfaces to Hadoop and Spark. Some additional configuration is required. For more information, see:
  - "Requirements for SAS/ACCESS Interface to Hadoop" in *System Requirements for the SAS Viya Platform*.
  - "Requirements for SAS/ACCESS Interface to Spark" in *System Requirements for the SAS Viya Platform*.

SAS/ACCESS Interface to Teradata now includes the required Teradata client by default. Teradata Wallet is not included with this client package, but it is supported if you install it in your environment.

Critical Change: SAS with SingleStore

The instance of SingleStoreDB that is included with SAS with SingleStore has been updated from version 8.7 to 8.9.

The database update is not backward-compatible. If you update to 2025.03 or later, the SingleStoreDB instance is automatically updated to version 8.9.*x*. Following the update to 2025.03 or later, you cannot roll your SingleStoreDB databases back to version 8.7 or to an earlier version of SingleStoreDB. If you need to use databases from an earlier release, you must uninstall the SAS Viya platform and redeploy the earlier version.

New ClusterRole for sas-logon-app Service

The sas-logon-app service account requires permission to verify a service account token using the TokenReviews endpoint of the Kubernetes API Server. To grant this permission, the "system:auth-delegator" ClusterRole is now applied to the sas-logon-app service account.

New Transformers for SAS Servers on OpenShift Using Kerberos

Note: If your deployment will not be running on Red Hat OpenShift, the contents of this topic do not apply to your deployment.

SAS has introduced new transformers for SAS servers running on Red Hat OpenShift that use Kerberos. For more information about using the new

transformers, see the README file located at **$deploy/sas-bases/examples/kerberos/sas-servers/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configuring_sas_servers_for_kerberos_in_sas_viya_platform.htm** (for HTML format).

Changes to SMTP Server Requirements

In Google Cloud environments only, an (optional) SMTP server is not supported, starting with 2025.03. The SAS Viya platform mail service supports only Basic Authentication at this time. Third-party email providers are gradually deprecating Basic Authentication and enforcing OAuth 2.0 for enhanced security on mail servers.

This change in support occurred because Google has removed Gmail account support for connections that rely on Basic Authentication starting in March 2025.

SAS intends to restore support for a Google SMTP server in a future release.

Change to SAS Configurator for Open Source Default Python Profile

SAS Configurator for Open Source is dropping three Python packages that were previously managed by default. The default Python profile, which determines the version of Python and the packages that are downloaded and managed, is removing the following packages:

- hnswlib==0.7.0
- sas-ipc-queue
- pydantic

Removing these packages might improve the performance of the SAS Configurator for Open Source utility.

The default Python profile is defined by parameters in the **$deploy/site-config/sas-pyconfig/change-configuration.yaml** transformer. If you want to continue maintaining these packages as part of the SAS Configurator for Open Source default Python support, you can add them back to the newest version of change-configuration.yaml from your deployment assets. Or, if you prefer to continue using a file that you have customized, previous versions of the YAML file will continue to work.

2025.02 (February 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Changes to Kubernetes Requirements

Support for Kubernetes 1.31.*x* has been added for all supported providers with the exception of Red Hat OpenShift. Kubernetes 1.28.*x* is no longer supported. SAS Viya platform 2025.02 supports Kubernetes 1.29.*x* - 1.31.*x*.

For OpenShift clusters, you can use either Red Hat OpenShift Kubernetes Engine (OKE) or Red Hat OpenShift Container Platform (OCP) 4.16.*x* or 4.17.*x*. OpenShift must be running in one of the supported environments. These OKE and OCP versions align with Kubernetes 1.29.*x* and 1.30.*x*.

As Red Hat adds support for newer versions of Kubernetes, SAS validates new OCP versions, designates an appropriate cadence to add support, and updates the documentation as needed.

Note: For OpenShift 4.16 and later, the restriction on using the OpenShift Container Registry to deploy the SAS Viya platform from a mirror has been removed. A patch has been provided for this issue. Be aware that the procedure for deploying from a mirror in OCR has changed. For more information, see "Create and Populate a Mirror in Red Hat OpenShift Container Registry" in *SAS Viya Platform: Deployment Guide*

Critical Change: Ingress Requirements

The SAS Viya platform now requires ingress-nginx 1.9.6 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.29.*x* - 1.31.*x*.

If you are using ingress-nginx 1.12.*x* or later for your Kubernetes cluster, you must change the default configuration of the ingress controller in order to mitigate breaking changes from NGINX.

For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Critical Change: Pod Changes

Refer to the following table for pod changes. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

TIP The pods to the left of the arrow are removed during the software update. The pods to the right of the arrow run the related servers and services after the software update is successful. Also, the pods that are available in a deployment are dependent on the offerings and features that were deployed.

Table 2.2 *2025.02*

sas-business-rules sas-reference-data	→	sas-decisions-framework[1]
sas-config-reconciler	→	sas-configuration

1 A new pod name for 2025.02.

Critical Change: Calico CNI Support

Deployments in upstream open-source Kubernetes clusters now require Calico 3.27.*x* and later. This change to the minimum supported version of Calico ensures compatibility with Kubernetes 1.29.*x* - 1.31.*x*.

Critical Changes to SAS Risk Solutions

The deployment process for SAS Risk solutions has significant enhancements in 2025.02 that affect both requirements and configuration. SAS Risk solutions consume the SAS Risk Cirrus Core component. Previously, the Risk Cirrus Core component used transformers to manage configuration. Now generators are used instead.

Starting with 2025.02, the Risk Cirrus Core component no longer requires a Git repository. As a result, the processes for setting up SAS Risk solutions have been modified. The documentation has been updated with changes to the requirements for all SAS Risk solutions. If you are updating SAS Risk solutions to 2025.02, be sure to consult the requirements that are described in Requirements for SAS Risk Solutions and in the solution-specific sections that follow.

A few configuration steps are required for all SAS Risk deployments that update to 2025.02 from a previous release. For details, see:

- "After Deployment Commands" in *SAS Viya Platform: Deployment Notes*
- "SAS Risk Cirrus Core" in *SAS Viya Platform: Deployment Notes*

SAS/ACCESS Interface to Microsoft SQL Server Configuration Requirement

A valid truststore must be configured for TLS/SSL connections to some instances of Microsoft SQL Server. This requirement stems from recent changes to a third-party driver. Failure to specify a valid truststore might result in an error when connecting through SAS/ACCESS Interface to Microsoft SQL Server.

The Data Access README has been updated with more information about the error and configuration steps to avoid it. Be sure to read the SAS/ACCESS Interface to Microsoft SQL Server section of the README, **`$deploy/sas-bases/examples/data-access/README.md`** (for Markdown) or **`$deploy/sas-bases/docs/configuring_sasaccess_and_data_connectors_for_sas_viya_4.htm`** (for HTML).

SAS with SingleStore Enhancement

SAS with SingleStore now supports SCIM in addition to LDAP as a source of user identities.

The documentation has been updated to reflect this enhancement.

Enhancements to Support for Open-Source Languages

Starting with 2025.02, the SAS Viya platform includes enhancements to the SAS multi-language architecture. With these enhancements, you can harness the power of SAS analytics directly from Python by means of the new sasviya.ml Python package. SAS Configurator for Open Source now offers an option to include the required Python packages that enable users to take advantage of these new capabilities. The *SAS Viya Platform: Integration with External Languages* guide has been updated to describe these options.

SAS Model Manager added support for the CAS Gateway action set in 2025.01. This enhancement provides significant performance improvements for scoring open-source models. In 2025.02, SAS Configurator for Open Source has added two R packages to the list of packages that it deploys by default. These two packages (arrow and logger) are required to support the scoring of R models using the CAS Gateway action set.

To take advantage of the enhancements for both Python and R, deploy SAS Configurator for Open Source to build Python and R from source and manage your Python and R packages. Be sure to use the most recent version of the **`$deploy/sas-bases/examples/sas-pyconfig/change-configuration.yaml`** file from your deployment assets. Existing deployments that have an older version of the YAML file will continue to work.

For more information, see *SAS Viya Platform: Integration with External Languages*.

Changes to PostgreSQL Support (External PostgreSQL Only)

SAS Viya platform support for PostgreSQL 16 for external PostgreSQL servers was added in 2024.12. SAS offerings in the Retail and Consumer Goods category have added support for PostgreSQL 16 in 2025.02.

2025.01 (January 2025)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the

Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Update Procedure for SAS with SingleStore

A SAS Viya platform software update that includes SAS with SingleStore no longer requires manual steps to pause the SingleStore cluster unless the deployment and updates are performed using Kubernetes commands.

For most deployment methods, the procedure to update deployments that include SAS with SingleStore has been streamlined. For software updates using the SAS Viya Platform Deployment Operator or the sas-orchestration command, a manual step is no longer required to pause the SingleStore cluster. This pre-update step has been automated for those deployment methods.

This additional automation also enhances the `sas-stop-all` and `sas-start-all` CronJobs. Starting with 2025.01, if you use CronJobs to stop and start a SAS Viya platform deployment, the SingleStore pods are also managed by the CronJobs. When you execute the `sas-stop-all` CronJob, it pauses SingleStore, and when you execute the `sas-start-all` CronJob, it restarts SingleStore. Previously, you were required to pause SingleStore manually before executing the `sas-start-all` CronJob.

The documentation has been updated to reflect this enhancement.

CAS Server Enhancement

The CAS server has been enhanced with a new management feature for MPP CAS deployments that include an optional graphics processing unit (GPU). To take advantage of additional capabilities that are provided by a GPU, CAS workers require scheduling to GPU-enabled nodes in the CAS node pool.

Previously, any resource requests or limits that you applied to nodes using a transformer always applied equally to the CAS controller and to all CAS worker nodes. These settings were always applied to the CAS node pool rather than to individual machines. You can now configure distinct node pools for CAS controller pods and CAS worker pods. With enhancements to the SAS GPU reservation service, CAS controller pods can be scheduled on nodes without GPUs, while CAS worker pods are scheduled on nodes that provide the more expensive GPU resources.

The SAS GPU reservation service enables GPU resource sharing by SAS processes. For more information about the service, see the README titled "SAS GPU Reservation Service," located at **`$deploy/sas-bases/examples/gpu/README.md`**

(for Markdown format) or at **$deploy/sas-bases/docs/sas_gpu_reservation_service.htm** (for HTML format).

For instructions about setting up distinct node pools for CAS controllers and CAS workers, including configuration steps, see the README file located at **$deploy/sas-bases/overlays/cas-server/auto-resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/auto_resources_for_cas_server_for_sas_viya.htm** (for HTML format).

2024.12 (December 2024)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Time-to-Live Value for Kubernetes Jobs

Starting with 2024.12, all SAS Viya platform Kubernetes jobs have a default time-to-live (TTL) value of 0. This change was made in order to improve the update experience. The requirement to manually delete certain jobs no longer applies to most deployments.

As a result of this change, Kubernetes jobs that are generated on the SAS Viya platform are automatically deleted once they have run to completion. When jobs are deleted, the associated log data is also deleted. SAS strongly recommends installing a log aggregator to retain and manage log messages from Kubernetes resources that are automatically deleted over time.

CronJobs, such as sas-start-all, sas-backup-job, and sas-restore-job, are not affected by this change.

Critical Change: OpenShift Support

For OpenShift clusters, support for Red Hat OpenShift Container Platform (OCP) 4.17.*x* has been added. OCP 4.17 corresponds to Kubernetes 1.30. With 2024.12, you can use Red Hat OpenShift Container Platform (OCP) 4.15.*x* - 4.17.*x* in one of the supported environments.

Note: For OpenShift 4.16 and 4.17, the restriction on using the OpenShift Container Registry to deploy the SAS Viya platform from a mirror has been removed. A patch has been provided for this issue. Be aware that the procedure for deploying from a mirror in OCR has changed. For more information, see "Create and Populate a Mirror in Red Hat OpenShift Container Registry" in *SAS Viya Platform: Deployment Guide*.

As Red Hat adds support for newer versions of Kubernetes, SAS validates new OCP versions, designates an appropriate cadence to add support, and updates the documentation as needed.

Critical Change: Ingress Controller Required Configuration

If you are using ingress-nginx 1.12.*x* and later for your Kubernetes cluster, you must change the default configuration of the ingress controller in order to mitigate breaking changes from NGINX.

For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Critical Change: Pod Changes

Refer to the following table for pod changes. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

Table 2.3 *2024.12*

Previous SAS Redis server stateful sets: sas-redis-server-0 sas-redis-server-1 sas-redis-server-2	→	New SAS Redis server stateful set: sas-redis-server
Previous SAS Redis server pods:	→	New SAS Redis server pods:

sas-redis-server-0-0	sas-redis-server-0
sas-redis-server-0-1	sas-redis-server-1
sas-redis-server-1-0	
sas-redis-server-1-1	
sas-redis-server-2-0	
sas-redis-server-2-1	

Note:

- In the initial 2024.12 release, the migration-manager pod was configured to scale to one replica by default. A patch update has been provided after the initial release that scales this pod to 0 replicas by default.
- Starting with 2024.12, the SAS Drive application and endpoint are deprecated and disabled by default. The related pod is available until the official retirement of SAS Drive in the 2026.04 release.

SAS Redis Server Dependency on SAS Redis Operator Is Removed

SAS Redis Server is no longer managed by SAS Redis Operator. Events that were handled by the operator will now be performed by the SAS Redis server pods. For details, see "SAS Redis Server" in *SAS Viya Platform: Infrastructure Servers*.

Changes to PostgreSQL Support and Requirements (External PostgreSQL Only)

The SAS Viya platform now supports PostgreSQL 16 for external PostgreSQL servers.

External PostgreSQL servers that use PostgreSQL 12 are not supported with 2024.12 and later.

SAS offerings in the Retail and Consumer Goods category do not support PostgreSQL 16 at this time.

A new plug-in for the sas-viya CLI is available to help you with data migration from an earlier version of SAS. This plug-in, named migrationmanagement, requires an additional PostgreSQL extension. The documentation has been updated to include this requirement.

For more information, see "External PostgreSQL Requirements" in *System Requirements for the SAS Viya Platform*.

2024.11 (November 2024)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Ingress Controller Required Configuration

If you are using ingress-nginx 1.12.*x* and later for your Kubernetes cluster, you must change the default configuration of the ingress controller in order to mitigate breaking changes from NGINX.

For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Critical Change: Pod Changes

The sas-links pod was merged into an existing pod named sas-visual-analytics-app. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

sas-links	→	sas-visual-analytics-app

Change to PostgreSQL Server Requirements

SAS now recommends that you use a block storage device for the PostgreSQL server persistent storage. This recommendation applies equally to an internal or an external PostgreSQL server.

For an internal PostgreSQL server, information about how to change the storage class to block storage after the initial deployment has completed is provided in "Change the Storage Class of the Data Pod" in *SAS Viya Platform: Infrastructure Servers*.

Ingress Configuration Feature Now Available

SAS has streamlined the process for modifying the ingressClass that the SAS Viya platform uses in a deployment. This feature is useful for separating traffic to different or non-default ingress-nginx instances. For details about ingress configuration, see the README file located at **`$deploy/sas-bases/examples/ingress-configuration/README.md`** (for Markdown format) and at **`$deploy/sas-bases/docs/configuring_general_ingress_options.htm`** (for HTML).

SAS Event Stream Processing Adds PV and PVC

SAS Event Stream Processing requires a file-based persistent volume (PV) for running projects. For information about setting up the PV and PVC, see the README file located at **`$deploy/sas-bases/examples/sas-event-stream-processing-studio-app/storage/README.md`** (for Markdown format) and at **`$deploy/sas-bases/docs/configuring_file_storage_for_sas_event_stream_processing_studio_projects.htm`** (for HTML format).

Change to CAS Backing Store Enablement

The method by which the CAS backing store is enabled has been changed. Previously, the backing store was enabled by modifying the custom resource for the CAS operator. Now, you enable the backing store in four different scenarios using patch transformer .yaml files. For information about the scenarios and using the transformer files, see "Configure a Backing Store for Memory Allocations" in *SAS Viya Platform: Deployment Guide*.

SAS Configurator for Open Source Enhancement

SAS Configurator for Open Source has added two options for using alternative locations for Python packages. You can now specify repository locations for the Pip package manager to use for Python packages. You can set these locations by modifying the values for *profile-name*.pip_index_url or *profile-name*.pip_extra_url in the configuration file for SAS Configurator for Open Source: **$deploy/site-config/sas-pyconfig/change-configuration.yaml**.

For more information, see *SAS Viya Platform: Integration with External Languages*.

Changes to Data Access Requirements

SAS In-Database Technologies for Databricks requires a deployment of SAS Embedded Process for Spark. An additional RPM file is now available for a SAS Embedded Process for Spark deployment. The new deployment is referred to as the *accelserver* RPM file. The previous deployment, referred to as the *sepcorespark* RPM file, continues to be supported. When you deploy the accelserver RPM, additional functionality is available.

The two SAS Embedded Process deployments support different versions of Spark. For more information, see "Requirements for SAS In-Database Technologies for Databricks" in *System Requirements for the SAS Viya Platform*.

SAS has performed additional validation of SAS/ACCESS Interface to Teradata with Teradata Tools and Utilities (TTU) 20.00. SAS now recommends TTU 17.20 or 20.00 for use with Teradata Database 17.00 or later.

SAS Real-Time Watchlist Screening Enhancements

SAS Real-Time Watchlist Screening for Entities and SAS Real-Time Watchlist Screening for Payments have added support for deployment on AWS, Google Cloud, and Red Hat OpenShift. As a result, these solutions can now be deployed on any of the supported cloud platforms.

2024.10 (October 2024)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to

changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Kustomize Requirement

Kustomize is required in order to generate Kubernetes manifest files for a deployment of the SAS Viya platform. A newer version of Kustomize is required: Kustomize 5.4.3.

The SAS Viya Platform Deployment Operator and the sas-orchestration command use resources that are delivered with the deployment assets. These resources now include Kustomize 5.4.3.

Critical Change: Ingress Controller Required Configuration

If you are using ingress-nginx 1.12.*x* and later for your Kubernetes cluster, you must change the default configuration of the ingress controller in order to mitigate breaking changes from NGINX.

For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Critical Change: SAS Configurator for Open Source Support for Python 3.11

SAS Configurator for Open Source now supports Python 3.11.10. The Python version is determined by parameters in the SAS Configurator for Open Source transformer: **`$deploy/site-config/sas-pyconfig/change-configuration.yaml`**. The `default_py.python_signature` and `default_py.python_tarball` properties have been modified to support a newer version of Python. If you have enabled it and are using the most recent version of the transformer, the utility attempts to download and build this newer version of Python by default.

In order to preserve any modifications that you have made to change-configuration.yaml, follow the steps that are described in "Revised SAS Configurator for Open Source Transformer" in *SAS Viya Platform: Deployment Notes*. First-time deployments of the SAS Viya platform that use SAS Configurator for Open Source for Python integration are unaffected by this change. You can

continue to use Python 3.10 with the SAS Viya platform, but support for this version will end in the near term.

Critical Change: Pod Changes

The sas-visual-analytics-administration pod was merged into an existing pod named sas-visual-analytics-app. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

sas-visual-analytics-administration	→	sas-visual-analytics-app

Change to PostgreSQL Server Requirements

SAS now recommends that you use a block storage device for the PostgreSQL server persistent storage. This recommendation applies equally to an internal or an external PostgreSQL server.

For an internal PostgreSQL server, information about how to change the storage class to block storage after the initial deployment has completed is provided in "Change the Storage Class of the Data Pod" in *SAS Viya Platform: Infrastructure Servers*.

Changes to SAS with SingleStore

The instance of SingleStoreDB that is included with SAS with SingleStore has been updated from version 8.5 to 8.7. The update is not backward-compatible. If you update to 2024.10 or later, the SingleStoreDB instance is automatically updated to version 8.7. Following the update, you cannot use any SingleStoreDB databases (existing or new) in a release earlier than 2024.10.

Enhancements to SAS Mirror Manager

SAS Mirror Manager has recent enhancements:

Starting with 2024.07, SAS Mirror Manager includes the following enhancement:

- Log messages now include dates in addition to times.

Starting with 2024.10, SAS Mirror Manager includes the following enhancements:

- Support for verifying SAS container image signatures.

SAS container image signatures are available for Microsoft Azure and AWS. At this time, Google Cloud does not support the OCI distribution that SAS uses.

- Log messages now include dates in addition to times.

Enhancement to RabbitMQ Transformer

To maintain optimal I/O levels, RabbitMQ and SAS recommend that you configure a block storage device for RabbitMQ persistent storage. The transformer that was previously used to change the RabbitMQ PVC storage size has therefore been enhanced. The transformer file now provides parameters to help you change the storage type to use block storage. This file is included in your deployment assets: **`$deploy/sas-bases/examples/rabbitmq/configuration/rabbitmq-modify-pvc-size.yaml`**.

The accompanying README file has been updated to describe this change.

SAS Data Quality for Payment Integrity Health Care Now Available

The first module of a new SAS health care offering, SAS Data Quality for Payment Integrity Health Care, is now available. This offering supports medical practices, insurers, and researchers seeking to mine valuable data from medical claims. Module 1 (Medical Claims Ingestion) of SAS Data Quality for Payment Integrity Health Care is designed to ingest, process, and transform medical claims data into a standardized, high-quality format that is ready for analysis and reporting. Taking in raw medical claims data from various sources, such as CSV files and insurance databases, SAS Data Quality for Payment Integrity Health Care enables organizations to make better decisions based on a deeper understanding of their medical claims data. It provides a robust and scalable platform for managing, reporting, and analyzing medical claims data for improved compliance and patient outcomes.

SAS Data Quality for Payment Integrity Health Care can be deployed with either Microsoft Azure Kubernetes Service or open-source Kubernetes. It supports only an external PostgreSQL database. Deploying SAS Common Data Store (CDS PostgreSQL) for this offering is recommended. If you decide to deploy CDS PostgreSQL, it can be used for data storage and management. For additional system requirements to support SAS Data Quality for Payment Integrity Health Care, see "Requirements for SAS Fraud Solutions" in *System Requirements for the SAS Viya Platform*.

Changes to Data Access Requirements

SAS In-Database Technologies for Azure Synapse Analytics now supports Microsoft Azure Synapse Analytics with Spark 3.3. Previously, Spark 2.4 and Spark 3.1 were supported.

In addition, SAS In-Database Technologies for Databricks now supports Databricks 10.4 LTS - 12.2 LTS for Microsoft Azure or Amazon Web Services. Previously, Databricks 13.3 LTS was also supported, but that version contains a software limitation.

Documentation Updates

The *Provisioning Resources* documentation includes checklists for the SAS Viya Infrastructure as Code (IaC) GitHub projects. The IaC projects for Microsoft Azure, Amazon Web Services, and Google Cloud can be used to provision cloud infrastructure prior to the SAS Viya platform deployment. For more information, see *SAS Viya Platform Operations: Provisioning Resources*.

2024.09 (September 2024)

Deployment Notes and What's New

When updating to a new version of the software, be sure to review both the Deployment Notes and the What's New topics. The Deployment Notes alert you to changes to the deployment process. The What's New topics can include critical changes, such as changes to system requirements and pod names. For both the Deployment Notes and the What's New topics, be sure to review each note after the version that is currently deployed, up to and including the version to which you are updating.

What's New topics with critical changes are identified by "Critical Change" in the title. Deployment Notes are located in *SAS Viya Platform: Deployment Notes*.

Critical Change: Changes to Kubernetes Requirements

Support for Kubernetes 1.30.*x* has been added for all supported providers with the exception of Red Hat OpenShift. Kubernetes 1.27.*x* is no longer supported. SAS Viya platform 2024.09 supports Kubernetes 1.28.*x* - 1.30.*x*.

For OpenShift clusters, support for Red Hat OpenShift Container Platform (OCP) 4.16.*x* has been added. You can use either Red Hat OpenShift Container Platform (OCP) 4.15.*x* or 4.16.*x* in one of the supported environments. Support for OCP 4.14.*x* has been dropped.

Note: For OpenShift 4.16, the OpenShift Container Registry cannot be used to deploy the SAS Viya platform from a mirror. A fix is planned for this issue. Until the fix is available, use a different container registry to deploy the SAS Viya platform into OpenShift 4.16.

As Red Hat adds support for newer versions of Kubernetes, SAS validates new OCP versions, designates an appropriate cadence to add support, and updates the documentation as needed.

Critical Change: Kustomize Requirement

In order to avoid a vulnerability, a newer version of Kustomize is required: Kustomize 5.4.3.

The documentation has been revised to reflect this change. A patch that became available in October 2024 includes Kustomize 5.4.3 along with the sas-orchestration image. That image is used by the SAS Deployment Operator and the sas-orchestration command.

Critical Change: Pod Changes

The pods to the left of the arrow were merged into an existing pod named sas-forecasting. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

sas-forecasting-data-definitions	→	sas-forecasting
sas-forecasting-filters		
sas-forecasting-events		
sas-forecasting-models		
sas-forecasting-overrides		

Critical Changes to Ingress Requirements

The SAS Viya platform now requires ingress-nginx 1.9.0 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.28.*x* - 1.30.*x*.

If you are using ingress-nginx 1.12.*x* or later for your Kubernetes cluster, you must change the default configuration of the ingress controller in order to mitigate breaking changes from NGINX.

Version 1.13.0 of ingress-nginx is not supported. The Ingress Nginx community has fixed a bug in ingress-nginx 1.13.1 and later, enabling the SAS Viya platform to support these versions of the ingress controller.

For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Critical Changes to the PostgreSQL Server

The SAS Viya platform now uses PostgreSQL 16 for internal PostgreSQL servers. The internal PostgreSQL server has been upgraded to Crunchy 5.6.1 for PostgreSQL 16.

IMPORTANT If you deploy the SAS Viya platform manually, an additional step is required when you update to 2024.09 or later. For more information, see "Upgrade to PostgreSQL 16" in *SAS Viya Platform: Deployment Notes*.

With this upgrade, a manual change to add the secure computing mode (seccomp) to the securityContext is no longer required. Prior to 2024.09, the manual change had to be re-applied each time the PostgreSQL cluster underwent selected changes, including when StatefulSet attributes or pod attributes such as pod memory limits were changed or replicas were dropped or re-created.

Internal PostgreSQL servers that use PostgreSQL 12 are not supported with 2024.09 and later. For certain atypical deployment scenarios where PostgreSQL 12 and PostgreSQL 16 co-exist on different namespaces, some restrictions might apply. For more information, see "PostgreSQL 16 Post-Upgrade Processing" in *SAS Viya Platform: Deployment Notes*.

SAS now recommends that you use a block storage device for the PostgreSQL server persistent storage. This recommendation applies equally to an internal or an external PostgreSQL server.

For an internal PostgreSQL server, information about how to change the storage class to block storage after the initial deployment has completed is provided in "Change the Storage Class of the Data Pod" in *SAS Viya Platform: Infrastructure Servers*.

Backing Store for CAS Now Available

You can now set a backing store for CAS to support memory allocation. For a fuller explanation of the backing store and the benefits that it provides, see Backing Store for CAS Memory Allocations. For the steps to create the backing store, see Configure a Backing Store for Memory Allocations.

Changes to SAS/CONNECT Server and SAS/CONNECT Spawner

The ability to locally spawn a SAS/CONNECT server inside the SAS/CONNECT spawner pod has been removed. It was previously deprecated in the 2024.03 Stable and Long-Term Support release.

The following deployment changes apply as a result of the removal:

- SAS/CONNECT Spawner no longer requires a security context constraint when it is deployed on Red Hat OpenShift.

  The related README file, **`$deploy/sas-bases/examples/sas-connect-spawner/openshift/README.md`**, has been removed.
- SAS no longer recommends configuring a workload class or node pool for SAS/CONNECT.
- SAS/CONNECT workloads will be associated with the compute workload class in all cases.

Starting with 2024.09, you can configure high availability (HA) for the SAS/CONNECT Spawner by applying the HA transformer: **`$deploy/sas-bases/overlays/scaling/ha/enable-ha-transformer.yaml`**.

Withdrawal of Support for Process Orchestration in Selected Solutions

Support for the Process Orchestration functionality in the SAS Viya platform is currently suspended for the following SAS solutions only:

- SAS Allowance for Credit Loss
- SAS Expected Credit Loss
- SAS Climate Risk Stress Testing
- SAS Credit Risk Stress Testing
- SAS Stress Testing

As a result, the Apache Airflow database that enables Process Orchestration, which is described in "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*, is not required for these solutions at this time.

SAS Integrated Regulatory Reporting Now Available

A new SAS Risk offering, SAS Integrated Regulatory Reporting, is now available for deployment with the SAS Viya platform. SAS Integrated Regulatory Reporting

enables financial institutions to manage the complexities of regulatory reporting processes and meet regulatory deadlines using a modern, scalable, and cloud-native architecture offered by SAS Viya. By means of the Quick Start feature, the solution supports reporting templates from the following European Banking Authority (EBA) frameworks:

- COREP framework under EBA Taxonomy 3.2
- IRRBB and MREL frameworks under EBA Taxonomy 3.4

SAS Integrated Regulatory Reporting can be deployed on all the supported cloud platforms. It requires SAS Common Data Store. For additional system requirements to support SAS Integrated Regulatory Reporting, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

SAS Retail and Consumer Goods Enhancement

With the addition of support for deployment in Google Cloud and Google Distributed Cloud (software only) for VMware, SAS solutions from the Retail and Consumer Goods division can now be deployed on all the supported cloud platforms. This enhancement applies to all the following solutions:

- SAS Intelligent Performance Management for Cost and Profitability
- SAS Intelligent Performance Management for Finance
- SAS Intelligent Planning for Consumer Goods
- SAS Intelligent Planning for Retail
- SAS Intelligent Planning for Supply Chain
- SAS Intelligent Planning Cloud for Consumer Goods
- SAS Intelligent Planning Cloud for Retail

SAS Health and Life Sciences Changes

The SAS solution formerly named SAS Health Clinical Acceleration has been renamed. This solution is now named SAS Clinical Acceleration Repository. If you are updating to SAS Viya 2024.09 or later, you should see this change.

In addition, the solution named SAS Health can now be deployed in an Amazon EKS cluster in AWS.

Support for Web Proxy Servers

The SAS Configurator for Open Source utility now enables you to configure a web proxy server. If you need to use SAS Configurator for Open Source in an environment where a web proxy server is active, new global options have been provided in the change-configuration.yaml file so that you can configure the server

host name and port. For more information about the `global.http_proxy` or `global.https_proxy` options, see *SAS Viya Platform: Integration with External Languages*.

Changes to Data Access Requirements

Starting with 2024.09, the SAS Viya platform supports MinIO Enterprise Object Store as a data source in AWS environments. You can use the CASLIB statement to connect the CAS server with an S3 or MinIO instance. The FILENAME statement lets you connect the Compute Server with your S3 or MinIO data source. At this time, the Parquet LIBNAME statement cannot be used with a MinIO data source. For more information, see "Support for Data Storage in Amazon S3 and MinIO" in *System Requirements for the SAS Viya Platform*.

Documentation Updates

In selected Kubernetes cluster environments, the SAS Viya platform can be deployed on generic physical (or "bare-metal") machines running Red Hat Enterprise Linux. The documentation that is provided for SAS Viya platform deployments was written primarily with virtual machines in mind. The vast majority of this guidance is equally applicable to bare-metal machines. However, deployment and sizing guidance specific to bare-metal clusters has now been added to the *Tuning Guide*. Pre-installation guidelines related to the CAS workload class now incorporate information about deploying on physical machines. For more information, see Tuning Suggestions for Physical Machines.

2024.08 (August 2024)

Critical Change: Ingress Controller Required Configuration

If you are using ingress-nginx 1.12.*x* and later for your Kubernetes cluster, you must change the default configuration of the ingress controller in order to mitigate breaking changes from NGINX.

For more information, see "Required ingress-nginx Controller Configuration" in *SAS Viya Platform: Deployment Guide*.

Critical Change: Pod Changes

Review the pod changes for this release in the following table. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

> **TIP** The pods to the left of the arrow are removed during the software update. The pods to the right of the arrow run the related servers and services after the software update is successful.

sas-category-taxonomy sas-concept-taxonomy	→	sas-text-analytics-taxonomies[1]
sas-folders sas-types	→	sas-file-store[1]
sas-geo-enrichment	→	sas-geography

1 A new pod name for 2024.08.

Changes for SAS Workload Orchestrator Services

Here is a summary of the changes:

- In previous releases, the sas-workload-orchestrator Kubernetes service routed all REST API requests to whichever SAS Workload Orchestrator pod is acting as the workload manager. Starting with 2024.08, the service performs load balancing over newly available sas-workload-orchestrator-x statefulset pods.
- The sas-workload-orchestrator-**x** (where **x** is 0 through 9) Kubernetes services have been replaced by the sas-workload-orchestrator-manager Kubernetes service. The new service routes REST API requests from the daemons to the current SAS Workload Orchestrator manager statefulset pod.

CAS Server Enhancements

Two new server options are available that help to minimize disruptions during state transfer for CAS servers. For more information, see cas.MAXSESSIONTRANSFERSIZE and cas.STATETRANSFERMODEL in *SAS Viya Platform: SAS Cloud Analytic Services*.

Changes to Platform Names and Documentation

Google has changed two names in their cloud architecture that are relevant for a SAS Viya platform deployment:

- Google Cloud Platform (or "GCP") is now called "Google Cloud."
- GKE on VMware and, prior to that name change, Anthos clusters on VMware, has been renamed as "Google Distributed Cloud (software only) for VMware."

The documentation is being updated to reflect these name changes from Google.

Changes to Platform Support

The following SAS solutions have added support for deployment in Red Hat OpenShift:

- SAS Anti-Money Laundering
- SAS Regulatory Capital Management

SAS/ACCESS Interface to Oracle Enhancement

SAS/ACCESS Interface to Oracle now provides support for Oracle Autonomous Database.

2024.07 (July 2024)

Critical Change: Pod Changes

Review the pod changes for this release in the following table. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

TIP The pods to the left of the arrow are removed during the software update. The pods to the right of the arrow run the related servers and services after the software update is successful.

sas-templates	→	sas-collaboration
sas-report-renderer	→	sas-report-renderers
sas-workflow	→	sas-workflow-engine[1]
sas-workflow-definition-history	→	sas-workflow-history[1]
sas-documents sas-terms-management sas-topic-management	→	sas-text-analytics-data[1]
The following pod was removed: sas-event-stream-processing-streamviewer-app		

1 A new pod name for 2024.07.

"Common Customizations" Divided into Two New Topics

In earlier versions of the *SAS Viya Platform: Deployment Guide*, the "Common Customizations" section listed all the customizations (outside of product-specific customizations) that should be considered for a deployment. The "Common Customizations" content has been divided into two new topics. The first, "Required Customizations" in *SAS Viya Platform: Deployment Guide*, describes the customization decisions that must be made for every deployment of the SAS Viya platform. It is in a checklist format. The second, "Optional Customizations" in *SAS Viya Platform: Deployment Guide*, contains the remainder of the customizations previously described in "Common Customizations" and describes the customizations that should be considered.

OpenSearch Adds Configurable Parameters for Retaining Audit Log Indices

Note: This topic applies to internal instances of OpenSearch only.

OpenSearch has added a new transformer file, audit-log-retention-transformer.yaml, to configure the retention of audit log indices. For details about using this new file, see the README file at **`$deploy/sas-bases/examples/configure-elasticsearch/internal/security-audit-logs/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/opensearch_security_audit_logs.htm`** (for HTML format).

File Used to Disable SAS Workload Orchestrator Moved

SAS Workload Orchestrator is deployed by default with every SAS Viya platform deployment. However, users could disable the deployment by referring to the **$deploy/sas-bases/examples/sas-workload-orchestrator/enable-disable/sas-workload-orchestrator-disable-patch-transformer.yaml** file in the base kustomization.yaml file (**$deploy/kustomization.yaml**). That file has been moved to **$deploy/sas-bases/overlays/sas-workload-orchestrator/enable-disable/sas-workload-orchestrator-disable-patch-transformer.yaml**. For details, see the README file at **$deploy/sas-bases/overlays/sas-workload-orchestrator/enable-disable/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/disabling_and_enabling_sas_workload_orchestrator_service.htm** (for HTML format).

SAS Real-Time Watchlist Screening for Payments Now Available

A new offering, SAS Real-Time Watchlist Screening for Payments, is now available for deployment with SAS Viya. SAS Real-Time Watchlist Screening for Payments provides real-time and batch processing capabilities to perform watchlist screening. The payment screening capabilities are complimented with the ability to tune screening parameters and integrate customer-specific allow lists and deny lists. Screening is processed using REST API or Kafka integration and is fully audited to meet your regulatory needs.

Users of SAS Real-Time Watchlist Screening for Entities will find that SAS Real-Time Watchlist Screening for Payments has similar requirements. Both offerings can be deployed on Microsoft Azure or with upstream open-source Kubernetes.

Updated Sizing Recommendations

The minimum resource recommendations that are provided in "Sizing Recommendations" in *System Requirements for the SAS Viya Platform* have been updated to reflect results from recent performance testing with SAS Viya platform 2024.03 (LTS).

The updated recommendations are based on a single node for the CAS server, a topology that has been thoroughly tested for environments with approximately 8 concurrent end users. The recommendations now provide node minimum and maximum estimates when using cluster autoscaling for the Compute, Stateful, and Stateless workload classes. Other changes include lower minimum requirements for CAS disk cache storage and SASWORK and additional, lower-resourced machines for Stateless workloads on most platforms.

SAS Event Stream Processing Streamviewer No Longer Supported

SAS Event Stream Processing Streamviewer is no longer supported. Users are encouraged to explore the SAS Event Stream Processing Data Source Plug-in for Grafana. Read more

2024.06 (June 2024)

Critical Change: Pod Changes

Review the pod changes for this release in the following table. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

> **TIP** The pods to the left of the arrow are removed during the software update. The pods to the right of the arrow run the related servers and services after the software update is successful.

sas-business-rules-services	→	sas-business-rules[1] sas-reference-data[1]
sas-decisions-definitions	→	sas-decisions[1] sas-treatment-definitions[1]
sas-forecasting-comparison sas-forecasting-exploration sas-forecasting-gateway sas-forecasting-pipelines	→	sas-forecasting[1]

1 A new pod name for 2024.06.

Changes to Requirements for an External PostgreSQL Server

Starting with 2024.06, the SharedServices database for an external PostgreSQL server is no longer created automatically during the initial deployment of the SAS Viya platform. Instead, you must manually create it before you start the SAS Viya platform deployment. This database supports the required SAS Infrastructure Data Server component. The procedures to update your SAS Viya platform software to 2024.06 are not affected by these changes.

The list of requirements for an external PostgreSQL database has been updated to include the requirements that are no longer fulfilled automatically by the deployment process. For more information, see "External PostgreSQL Requirements" in *System Requirements for the SAS Viya Platform*.

Changes to SAS with SingleStore

SAS with SingleStore (the product formerly named SAS Viya with SingleStore) has added support for deployment on Red Hat OpenShift.

Deploying SAS with SingleStore on Red Hat OpenShift requires a security context constraint. For more information, see "Apply and Bind the Security Context Constraints" in *SAS Viya Platform: Deployment Guide*.

Change to Storage Requirements

Enhancements to the software update process were added. These enhancements resulted in a change to the requirement for Commonfiles PVC, which was added to the deployment with 2024.05. The PVC was previously set to request 40 GB of space in the corresponding storage volume. With 2024.06, that request has changed to 60 GB. The storage volume that you allocate must be POSIX-compliant.

For more information about the PVC requirement, see "Persistent Storage Volumes, PersistentVolumeClaims, and Storage Classes" in *System Requirements for the SAS Viya Platform*.

SAS Regulatory Capital Management Change

The rcm_transform.yaml file for SAS Regulatory Capital Management has been modified with new variables for increased functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE`. For more information, see the README file located at **`$deploy/sas-bases/examples/sas-risk-cirrus-rcm/`**

resources/README.md (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_regulatory_capital_management.htm** (for HTML format).

New Documentation for External Languages

A new guide to assist you in setting up integration between the SAS Viya platform and external open-source programming languages is now available: *SAS Viya Platform: Integration with External Languages*. Open-source language integration enables SAS Viya platform users to use different programming languages for different projects. The programs that they write in Python or R can be run along with code written in the SAS programming language.

This new guide takes the place of the README files in the following locations:

- **$deploy/sas-bases/examples/sas-pyconfig**
- **$deploy/sas-bases/examples/sas-open-source-config**
- **$deploy/sas-bases/examples/sas-open-source-config/python**
- **$deploy/sas-bases/examples/sas-open-source-config/r**
- **$deploy/sas-bases/examples/sas-microanalytic-score/astores**

These files are still provided. However, *SAS Viya Platform: Integration with Open-Source Languages* provides ordered sets of instructions, contextual explanations, and additional information for configuring the integration and enabling users to authenticate.

2024.05 (May 2024)

Critical Change: Kubernetes Requirements

Support for Kubernetes 1.29.*x* has been added for all supported providers with the exception of Red Hat OpenShift. Kubernetes 1.26.*x* is no longer supported. SAS Viya platform 2024.05 supports Kubernetes 1.27.*x* - 1.29.*x*.

For OpenShift clusters, continue to use Red Hat OpenShift Container Platform (OCP) 4.14.*x* - 4.15.*x* in one of the supported environments. Support for OCP 4.13.*x* has been dropped.

As Red Hat adds support for newer versions of Kubernetes, SAS validates new OCP versions, designates an appropriate cadence to add support, and updates the documentation as needed.

Critical Change: Kustomize Requirement

Kustomize is required in order to generate Kubernetes manifest files for a deployment of the SAS Viya platform. Starting with SAS Viya platform 2024.05, a newer version of Kustomize is required: Kustomize 5.3.0.

The SAS Viya Platform Deployment Operator and the sas-orchestration command use resources that are delivered with the deployment assets. These resources now include Kustomize 5.3.0.

Critical Change: Pod Changes

Review the pod changes for this release in the following table. Pod changes might affect the software update process and the tuning and configuration of pods. For more information, see "Pod Changes by Release" in *SAS Viya Platform Operations: Updating Software Tasks*.

> **TIP** The pods to the left of the arrow are removed during the software update. The pods to the right of the arrow run the related servers and services after the software update is successful.

sas-activities	→	sas-content
sas-report-operations	→	sas-visual-analytics
sas-category-execution-provider sas-concept-execution-provider sas-parse-execution-provider sas-sentiment-execution-provider sas-topic-execution-provider	→	sas-text-analytics-execution

Change to Ingress Requirements

The SAS Viya platform now requires ingress-nginx 1.7.1 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.27.*x* - 1.29.*x*.

Changes to Red Hat OpenShift Requirements

The requirements to deploy the SAS Viya Platform into a Red Hat OpenShift environment are now less restrictive. Red Hat OpenShift Kubernetes Engine (OKE) is supported in addition to Red Hat OpenShift Container Platform (OCP). SAS has assessed these Kubernetes distributions and determined that they function in a similar manner.

In this guide, you should assume that requirements that apply to Red Hat OpenShift apply equally to OCP and OKE.

Change to Storage Requirements

Starting with 2024.05, enhancements to the software update process were added. These enhancements resulted in an additional requirement for a PVC that points to POSIX-compliant storage in order to store shared content and libraries. For more information about the Commonfiles PVC requirement, see "Persistent Storage Volumes, PersistentVolumeClaims, and Storage Classes" in *System Requirements for the SAS Viya Platform*.

Changes to OpenSearch Requirements

The SAS Viya platform uses an Apache 2.0-licensed distribution of OpenSearch to support search features. By default, it is deployed automatically and is currently at version 2.13.0. If you prefer to set up and maintain your own instance of OpenSearch, OpenSearch 2.13.0 is now supported. Additional requirements are described in "OpenSearch Requirements" in *System Requirements for the SAS Viya Platform*.

SAS/ACCESS Interface to Oracle Enhancement

SAS/ACCESS Interface to Oracle requires the Oracle client 19c or later (64-bit libraries). Starting with 2024.05, the required client is included in the deployment.

SAS Allowance for Credit Loss Configuration Change

The acl_transform.yaml file for SAS Allowance for Credit Loss has been modified with new variables for increased functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and

SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-acl/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_allowance_for_credit_loss.htm** (for HTML format).

SAS Asset and Liability Management Configuration Change

The alm_transform.yaml file for SAS Asset and Liability Management has been modified with new variables for increased functionality with Git repositories. The new fields are SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE and SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-alm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_asset_and_liability_management.htm** (for HTML format).

SAS Dynamic Actuarial Modeling Configuration Change

The pcpricing_transform.yaml file for SAS Dynamic Actuarial Modeling has been modified with new variables for increased functionality with Git repositories. The new fields are SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE and SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-pcpricing/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/preparing_and_configuring_sas_dynamic_actuarial_modeling_for_deployment.htm** (for HTML format).

SAS Expected Credit Loss Configuration Change

The ecl_transform.yaml file for SAS Expected Credit Loss has been modified with new variables for increased functionality with Git repositories. The new fields are SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE and SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-ecl/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_expected_credit_loss.htm** (for HTML format).

SAS Insurance Capital Management Configuration Change

The icm_transform.yaml file for SAS Insurance Capital Management has been modified with new variables for increased functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-icm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_insurance_capital_management.htm** (for HTML format).

SAS Model Risk Management Configuration Change

The mrm_transform.yaml file for SAS Model Risk Management has been modified with a new variable for increased functionality with Git repositories, `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-mrm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_model_risk_management.htm** (for HTML format).

SAS Risk Cirrus Core Configuration Change

The core_transform.yaml file for SAS Risk Cirrus Core has been modified with new variables for increased functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-mrm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_model_risk_management.htm** (for HTML format).

SAS Risk Factor Manager Configuration Change

The rfm_transform.yaml file for SAS Risk Factor Manager has been modified with a new variable for increased functionality with Git repositories, `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE`. For more information, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-rfm/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configure_connection_settings_for_sas_risk_factor_manager.htm** (for HTML format).

SAS Risk Modeling Configuration Change

The rm_transform.yaml file for SAS Risk Modeling has been modified with a new variable for increased functionality with Git repositories, `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE`. For more information, see the README file located at **`$deploy/sas-bases/examples/sas-risk-cirrus-rm/resources/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_connection_settings_for_sas_risk_modeling.htm`** (for HTML format).

SAS Stress Testing Configuration Change

The st_transform.yaml file for SAS Stress Testing has been modified with new variables for increased functionality with Git repositories. The new fields are `SAS_RISK_CIRRUS_SOLUTION_GIT_REPO_TYPE` and `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_TYPE`. For more information, see the README file located at **`$deploy/sas-bases/examples/sas-risk-cirrus-st/resources/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_connection_settings_for_sas_stress_testing.htm`** (for HTML format).

2024.04 (April 2024)

Critical Change: Pods Removed

The following pods were removed:

- sas-text-concepts
- sas-drive

Enhancements to SAS Fraud and Compliance Solutions Available

The following SAS Fraud and Compliance solutions have enhanced functionality that is new with 2024.04:

- SAS Fraud Decisioning for Claims Analyze
- SAS Fraud Decisioning for Claims Decision

- SAS Fraud Decisioning for Claims Premier
- SAS Government Management Advanced
- SAS Government Management Premier
- SAS Government Management Professional
- SAS Government Management Standard
- SAS Payment Integrity for Health Care Analyze
- SAS Payment Integrity for Health Care Decision
- SAS Payment Integrity for Health Care Premier
- SAS Payment Integrity for Procurement Premier
- SAS Payment Integrity for Social Benefits Analyze
- SAS Payment Integrity for Social Benefits Decision
- SAS Payment Integrity for Social Benefits Premier
- SAS Tax Compliance Analyze
- SAS Tax Compliance Decision
- SAS Tax Compliance Premier

These solutions can be deployed in any of the environments that are supported by the SAS Viya platform. Some of the optional new functionality has system requirements, which are described in "Requirements for SAS Fraud Solutions" in *System Requirements for the SAS Viya Platform*.

SAS Real-Time Watchlist Screening for Entities Now Available

A new offering, SAS Real-Time Watchlist Screening for Entities, is now available for deployment with SAS Viya. SAS Real-Time Watchlist Screening for Entities provides real-time and batch processing capabilities to perform watchlist screening. It seamlessly integrates with an industry-leading, third-party screening engine to provide efficient, robust watchlist screening.

The name-screening capabilities in SAS Real-Time Watchlist Screening for Entities are complemented by the ability to tune screening parameters and integrate custom allow lists and deny lists. Screening is processed using a REST API or Kafka integration and is fully audited to meet regulatory requirements.

SAS Real-Time Watchlist Screening for Entities can be deployed on Microsoft Azure or with upstream open-source Kubernetes.

SAS Configurator for Open Source Requires SCC on OpenShift

SAS Configurator for Open Source is a utility used for installing and configuring R and Python. If you are performing a deployment on Red Hat OpenShift, SAS Configurator for Open Source now requires that you apply and bind a Security Context Constraint (SCC). For details, see "sas-pyconfig" in *SAS Viya Platform: Deployment Guide*.

Enhanced Product: SAS Business Orchestration Services

SAS Business Orchestration Services now includes a new, cloud-native engine that enables users to declare their orchestrations through a set of workloads and flows in YAML format. The classic engine, based on Apache Camel, is still available, but it will eventually be superseded by the cloud-native engine.

Both SAS Business Orchestration Services engines offer a customizable orchestration framework that enables you to implement enterprise integration patterns based on a set of high-level abstractions that require minimal coding. SAS Business Orchestration Services helps you rapidly integrate newer tools, technologies, and data flows into your organization so that supporting technologies evolve along with your business.

Existing customers can deploy either the classic engine or the cloud-native engine, which is provided in a standalone container. As a result, customers who have not yet migrated to SAS Viya 4 can still benefit from the latest software and security updates. Each engine has a README that describes configuration steps.

- For the classic engine, you should consult **`$deploy/sas-bases/examples/sas-boss/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/deploying_sas_business_orchestration_services.htm`** (for HTML).
- For the newer, cloud-native engine, consult **`$deploy/examples/sas-business-orchestration-worker/README.md`** (Markdown) or **`$deploy/sas-bases/docs/sas_business_orchestration_worker_configuration.htm`** (HTML).

SAS Business Orchestration Services can be deployed in any of the environments that are supported by the SAS Viya platform.

2024.03 (March 2024)

Changes to Red Hat OpenShift Support

Support for Red Hat OpenShift Container Platform (OCP) 4.15.*x* has been added. Support for Red Hat OCP 4.12.*x* was dropped in 2024.02. SAS Viya platform 2024.03 supports Red Hat OCP 4.13.*x* - 4.15.*x*. These versions align with the supported versions of Kubernetes (1.26.*x* - 1.28.*x*).

For more information about Red Hat OpenShift support, see "Cluster Requirements for Red Hat OpenShift" in *System Requirements for the SAS Viya Platform*.

Change to PersistentVolumeClaim for ReadWriteMany Storage Class

The steps to include a storageclass.yaml file and modify the base kustomization.yaml file (**`$deploy/kustomization.yaml`**) to use it have been modified. If you are performing a new deployment, use the revised information at Specify PersistentVolumeClaims to Use ReadWriteMany StorageClass and the revised example kustomization.yaml file at "Initial kustomization.yaml File" in *SAS Viya Platform: Deployment Guide* to deploy your software. Existing deployments do not need to make any changes to the kustomization.yaml file.

OpenSearch Adds Configurable Parameters for Retaining Audit Log Indices

Note: This topic applies to internal instances of OpenSearch only.

OpenSearch has added a new transformer file, audit-log-retention-transformer.yaml, to configure the retention of audit log indices. For details about using this new file, see the README file at **`$deploy/sas-bases/examples/configure-elasticsearch/internal/security-audit-logs/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/opensearch_security_audit_logs.htm`** (for HTML format).

New Transformers for SAS Event Stream Processing

SAS Event Stream Manager and SAS Event Stream Processing Studio each have a transformer that must be included in their deployment. The transformer enables direct file access to the persistent volume file system. For details, see the following README files:

- For SAS Event Stream Manager, see the README file located at **`$deploy/sas-bases/overlays/sas-event-stream-manager-app/data/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configuring_file_storage_for_sas_event_stream_manager_projects.htm`** (for HTML format).
- For SAS Event Stream Processing Studio, see the README file located at **`$deploy/sas-bases/overlays/sas-event-stream-processing-studio-app/data/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configuring_file_storage_for_sas_event_stream_processing_studio_projects.htm`** (for HTML format).

Changes to SAS/CONNECT Server and SAS/CONNECT Spawner

> **IMPORTANT** Deprecation Warning
>
> The ability to locally spawn SAS/CONNECT server inside the SAS/CONNECT spawner is deprecated as of the 2024.03 Stable and Long-Term Support releases. It will be removed at 2024.09 Stable and Long-Term Support releases.

Changes to SAS Risk Solutions

The following SAS Risk offerings are gaining capabilities that use an Apache Airflow database and the Process Orchestration feature:

- SAS Allowance for Credit Loss
- SAS Expected Credit Loss
- SAS Stress Testing
- SAS Climate Risk Stress Testing
- SAS Credit Risk Stress Testing

Apache Airflow requires a dedicated PostgreSQL database. Starting with 2024.03, Apache Airflow can be installed on either an external or an internal instance of PostgreSQL.

Several SAS Risk offerings have had support for Apache Airflow in previous releases. For these offerings, the method for enabling Airflow has changed:

- SAS Insurance Capital Management
- SAS Insurance Contract Valuation Foundation
- SAS Regulatory Capital Management

If you are deploying SAS Risk solutions that include any of the offerings in these lists, consult the README titled "Configure Apache Airflow for Process Orchestration" for configuration instructions. These files are located at **`$deploy/sas-bases/examples/sas-airflow/metadata/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_apache_airflow_for_process_orchestration.htm`** (for HTML).

For more information about the requirements for SAS Risk solutions, see "Requirements for SAS Risk Solutions" in *System Requirements for the SAS Viya Platform*.

SAS Anti-Money Laundering Enhancement

SAS Anti-Money Laundering has added support for deployment on Google Cloud Platform and GKE on VMware.

2024.02 (February 2024)

Changes to Kubernetes Requirements

Support for Kubernetes 1.28.*x* has been added for all supported providers with the exception of Red Hat OpenShift. Kubernetes 1.25.*x* is no longer supported. SAS Viya platform 2024.02 supports Kubernetes 1.26.*x* - 1.28.*x*.

Kubernetes 1.28 has implemented a change in behavior that could affect the CAS server if your cluster is configured with Linux cgroup v2. New behavior by the out-of-memory (OOM) killer might cause CAS pods to restart. Some configuration changes are recommended for certain environments. For more information, see "CAS Pods Restart in a Kubernetes 1.28 Cluster That Is Configured with Linux cgroup v2" in *SAS Viya Platform: SAS Cloud Analytic Services*.

For OpenShift clusters, continue to use Red Hat OpenShift Container Platform (OCP) 4.13.*x* - 4.14.*x* in one of the supported environments. As Red Hat adds support for newer versions of Kubernetes, SAS validates new OCP versions, designates an appropriate cadence to add support, and updates the documentation as needed.

Change to Ingress Requirements

The SAS Viya platform now requires ingress-nginx 1.6.4 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.26.*x* - 1.28.*x*.

Change to Calico CNI Support

Deployments in upstream open-source Kubernetes clusters now require Calico 3.25.*x* and later. This change to the minimum supported version of Calico ensures compatibility with Kubernetes 1.26.*x* - 1.28.*x*.

Updated Source Base Image

Starting with 2024.02, SAS is using a newer version of the source base image for all SAS Viya 4 containers. The Iron Bank Red Hat universal base image (UBI) 8, based on Red Hat Enterprise Linux, contains security-hardening modifications from Platform One. These modifications to the base image conform to the technical guidelines of the U.S. Defense Information Systems Agency (DISA). The image has been approved for use within the US Department of Defense.

As a result of this change to the base image, you might need to update the TLS certificate on your LDAP server. The older SHA1 signature algorithms on remote certificates for an LDAP server are no longer supported.

You can read more about Platform One Iron Bank here: https://p1.dso.mil/services/iron-bank. You can read more about the collaboration between DISA and Red Hat here: https://www.redhat.com/en/blog/disa-has-released-red-hat-enterprise-linux-8-stig. And you can view the ubi8 container repository and find out more about its security modifications at https://repo1.dso.mil/dsop/redhat/ubi/8.x/ubi8.

Changes to a Deployment Command

One kubectl command has been revised. If you deploy or update the SAS Viya platform using Kubernetes commands, you should be aware of this change.

The following command has changed:

```
kubectl apply --selector="sas.com/admin=namespace" -f site.yaml --prune --prune-whitelist=autos
```

The revised command is as follows:

```
kubectl apply --selector="sas.com/admin=namespace" -f site.yaml --
prune --prune-allowlist=autoscaling/v2/HorizontalPodAutoscaler
```

Documentation Changes

Google Cloud has changed the product name of Anthos Clusters on VMware. The new name is GKE on VMware. This guide acknowledges this name change and uses "GKE on VMware (formerly Anthos Clusters on VMware)" in order to provide continuity with previous releases.

Changes to SAS with SingleStore and SAS/ACCESS Interface to SingleStore

The instance of SingleStoreDB that is included with SAS with SingleStore (formerly named SAS Viya with SingleStore) has been updated from version 8.1 to 8.5. The update is not backward-compatible. If you update to 2024.02 or later, the SingleStoreDB instance is automatically updated to version 8.5. Following the update, you cannot use any SingleStoreDB databases (existing or new) in a release earlier than 2024.02.

The SAS with SingleStore README file includes updated instructions to configure the SAS SingleStore Cluster Operator for compatibility with the newer SingleStoreDB instance. For more information, see the README for the operator, which is available at **`$deploy/sas-bases/ examples/sas-singlestore/README.md`** for Markdown format or **`$deploy/sasbases/docs/sas_singlestore_cluster_operator.htm`** for HTML.

The data connector that is included with SAS with SingleStore now supports SingleStore views. To support this feature, the data connector makes a copy of the view result set.

The SingleStore LIBNAME engine now supports single sign-on to Microsoft Entra ID (formerly Azure Active Directory). For more information, "Requirements for SAS/ACCESS Interface to SingleStore" in *System Requirements for the SAS Viya Platform*.

SAS/ACCESS Interface to SingleStore now supports SingleStoreDB 8.1 or later. Previously, SingleStoreDB 7.*x* was supported.

Security Context Constraint for SAS Detection Architecture

Deploying SAS Detection Architecture on Red Hat OpenShift requires a security context constraint.

Changes to Data Access Requirements

SAS/ACCESS Interface to Oracle now supports Oracle client and database 19c and later. Previously, Oracle 12c client and database were supported.

SAS In-Database Technologies for Hadoop Cloud Services now supports Amazon Elastic MapReduce (EMR) 5.*x* and 6.*x*. Previously, only Amazon EMR versions 5.3 and 6.0 were supported. This change does not affect the requirements for SAS/ACCESS Interface to Hadoop.

SAS/ACCESS Interface to MongoDB now supports versions of OpenSSL later than 1.0.2. Previously, OpenSSL 1.0.2 was supported, but the required libraries have now been removed from SAS images. Verify that your version of MongoDB supports a version of OpenSSL that is later than 1.0.2.

SAS/ACCESS Interface to MySQL now supports versions of OpenSSL later than 1.0.2. Previously, OpenSSL 1.0.2 was supported, but the required libraries have now been removed from SAS images. Verify that your version of MySQL supports a version of OpenSSL that is later than 1.0.2.

2024.01 (January 2024)

New Transformer for CAS

CAS has introduced a new transformer file for deployments that use two node pools for CAS, one each for the `cascontroller` and `casworker` taints and labels. For more information, see the README file located at **`$deploy/sas-bases/overlays/cas-server/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/cas_server_for_the_sas_viya_platform.htm`** (for HTML format).

2023.12 (December 2023)

Change to Kustomize Requirement

Kustomize is required in order to generate Kubernetes manifest files for a deployment of the SAS Viya platform. Starting with SAS Viya platform 2023.12, a newer version of Kustomize is required: Kustomize 5.1.1.

The SAS Viya Platform Deployment Operator and the sas-orchestration command use resources that are delivered with the deployment assets. These resources now include Kustomize 5.1.1.

SAS Viya with SingleStore Deployment Change

One of the READMEs for SAS Viya with SingleStore has been revised. The step affects how the base kustomization.yaml file (**`$deploy/kustomization.yaml`**) should be revised before deployment. The revised deployment content is located in Step 6 of the README file located at **`$deploy/sas-bases/examples/sas-singlestore/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/sas_singlestore_cluster_operator.htm`** (for HTML format).

SAS Insurance Capital Management Now Available

SAS Insurance Capital Management is now available for deployment with the SAS Viya platform. SAS Insurance Capital Management is a collection of computational and reporting logic that is designed to enable insurance and reinsurance companies to implement the European Union Solvency II standard model and ICS 2.0 – the International Insurance Capital Standard model for calculating risk-based capital. The solution facilitates the production of regulatory reports according to the various specifications in complex regulatory environments, such as QRTs for Solvency 2.

SAS Insurance Capital Management includes an integrated insurance data model; data-management capabilities; advanced analytics; and reporting technologies for a comprehensive approach to a risk culture. The solution also supports customization capabilities that enable you to adapt the solution to meet the requirements of national regulators.

SAS Insurance Capital Management can be deployed on all the supported cloud platforms. It requires SAS Common Data Store.

SAS Insurance Contract Valuation Now Available

SAS Insurance Contract Valuation is now available for deployment with the SAS Viya platform. SAS Insurance Contract Valuation provides an integrated environment for managing, auditing, and tracing all steps of the IFRS 17 and LDTI compliance processes. This solution integrates risk and finance calculations into structured workflow processes that ensure data quality, transparency, and auditability. In addition, it provides robust reporting capabilities.

SAS Insurance Contract Valuation can be deployed on all the supported cloud platforms. It requires SAS Common Data Store.

SAS Regulatory Capital Management Now Available

SAS Regulatory Capital Management is now available for deployment with the SAS Viya platform. SAS Regulatory Capital Management enables financial institutions to manage the complexities of regulatory capital calculation and reporting processes in the banking sector in an integrated and reliable enterprise framework. The solution supports the calculation of credit risk and counterparty credit risk capital requirements under all applicable approaches defined by the Basel regulatory framework.

SAS Regulatory Capital Management can be deployed on all the supported cloud platforms. It requires SAS Common Data Store.

SAS Data Studio

Access to SAS Data Studio in SAS Viya platform is no longer enabled by default. SAS administrators can enable SAS Data Studio using SAS Environment Manager.

1. In SAS Environment Manager, open the **Rules** page and search for "SASDataStudio."
2. Edit the SAS Data Studio rule in one of these ways:
   - Change the rule type from *Prohibit* to *Grant*. Then add the users who need access to SAS Data Studio.
   - Change the rule status to *Off*, which disables the rule.

For more information, see "Edit a Rule" in *SAS Environment Manager: User's Guide*.

SAS recommends that you move to SAS Studio for data preparation and data management. SAS Studio offers more extensive features for managing your data.

2023.11 (November 2023)

Server and Service Management Change

Using Kustomize transformers to start or stop SAS Viya platform deployment is no longer supported. Use `sas-stop-all` and `sas-start-all` CronJobs to stop and start your SAS Viya platform deployments.

For more information, see "Starting and Stopping a SAS Viya Platform Deployment" in *SAS Viya Platform Operations: Servers and Services*.

PostgreSQL Changes

Starting with 2023.11, PostgreSQL 11 is no longer supported for an external PostgreSQL server instance of SAS Infrastructure Data Server. PostgreSQL versions 12 - 15 are the only supported versions of PostgreSQL for an external instance.

As a result of this change, Microsoft Azure Database for PostgreSQL - Single Server, which was previously supported for PostgreSQL 11 only, is also no longer supported for an external PostgreSQL instance.

Changes to Data Access Support

SAS Data Connector for SingleStore now supports Microsoft Entra ID for single sign-on. For more information, see "Enabling Single Sign-On for Microsoft Azure" in *SAS SpeedyStore: Administration and Configuration Guide*.

SAS Anti-Money Laundering Now Available

SAS Anti-Money Laundering is now available for deployment with the SAS Viya platform. This release is the latest iteration of SAS Anti-Money Laundering, which saw its first release in 2012. The current version on SAS Viya merges two previous offerings, SAS Anti-Money Laundering and SAS Customer Due Diligence, into a single offering.

SAS Anti-Money Laundering helps customers in the financial industry comply with regulations that aim to prevent and combat money laundering, terrorism financing, and corruption. Like its predecessor, SAS Anti-Money Laundering on SAS Viya 3.5, this version uses the SAS Visual Investigator framework.

SAS Anti-Money Laundering can be deployed with Microsoft Azure Kubernetes Service or with upstream open source Kubernetes.

New Risk Products Now Available

Two new SAS Risk products, SAS Climate Risk Stress Testing and SAS Credit Risk Stress Testing, are now available for deployment with the SAS Viya platform.

SAS Climate Risk Stress Testing enables organizations to address the requirements of the various climate risk stress-testing regulatory exercises, dedicated climate risk regulations, and different reporting standards (Pillar 3, CSRD, IFRS, SFDR, TCFD, and more). These factors require banks to establish effective and efficient processes to calculate forward-looking portfolio climate-related KRIs and KPIs and report on them. SAS Climate Risk Stress Testing also addresses business

challenges related to climate scenario analysis; portfolio decarbonization simulations; assessment of various portfolio decarbonization pathways and strategies toward Net Zero Financed Emissions; and transition planning reporting.

SAS Credit Risk Stress Testing helps financial institutions to modernize both regulatory calculation (such as Provisioning) and internal planning in the scalable and cloud-native architecture offered by SAS Viya. Credit stress-testing enablement assists banks in configuring their models, workflows, and reports to adequately address the specific requirements of credit risk analysis.

SAS Climate Risk Stress Testing and SAS Credit Risk Stress Testing can be deployed on all the supported cloud platforms. They both require an instance of SAS Common Data Store.

2023.10 (October 2023)

Withdrawal of Support for Application Multi-Tenancy

Support for application multi-tenancy for the SAS Viya platform is currently suspended. Customers who support use cases that require separate tenants are encouraged to deploy the SAS Viya platform into more than one namespace on the same Kubernetes cluster. For more information, see "Multiple Deployments" in *Getting Started with SAS Viya Platform Operations*.

Deprecated Features

The SAS Viya Release Notes interface now includes the option to show only deprecated and obsolete features under the type What's New.

SAS Workload Orchestrator Included in Deployment by Default

SAS Workload Orchestrator is now deployed and enabled, by default, as part of the SAS Viya platform deployment. A license is no longer required.

Note: For certain offerings SAS Workload Orchestrator has been included since release 2023.08. These offerings are:

- SAS Visual Statistics
- SAS Visual Machine Learning
- SAS Data Science

- SAS Data Science Decisioning
- SAS Text Analytics
- SAS Visual Forecasting
- SAS Intelligent Decisioning
- SAS Data Science Programming

For these offerings there is no change in release 2023.10.

For more information about SAS Workload Orchestrator, see "Configure SAS Workload Orchestrator" in *SAS Viya Platform: Deployment Guide*.

SAS Conversation Designer End of Life

SAS Conversation Designer has reached end of life. If you formerly had SAS Conversation Designer included in your SAS Viya platform deployment, it is no longer available after this update.

In order to avoid errors, you must remove a reference to a SAS Conversation Designer transformer from your base kustomization.yaml file (**`$deploy/kustomization.yaml`**). For more information, see "Remove Transformer from kustomization yaml File" in *SAS Viya Platform: Deployment Notes*

PostgreSQL Changes and Kubernetes Compatibility

The SAS Viya platform now supports PostgreSQL 15 for external PostgreSQL servers in 2023.10. PostgreSQL 11 - 15 are now supported.

If you are currently running an external PostgreSQL server on PostgreSQL 11, be aware that the PostgreSQL Global Development Group is ending support for that version in November 2023.

Note: SAS Viya platform 2023.10 or later is required if you want to use PostgreSQL 15.

IMPORTANT The combination of Kubernetes 1.27.*x* and an internal instance of PostgreSQL is fully supported for SAS Viya platform 2023.10. Previously, this support was experimental. An update to 2023.10 is required for Standard Support of this combination. You can update any version of the SAS Viya platform that is in Standard Support.

SAS Viya platform 2023.10 supports Kubernetes 1.25.*x* - 1.27.*x*.

Changes to Deployment Options for Red Hat OpenShift

The SAS testing and support partnership with Red Hat has enabled expanded support for SAS Viya platform deployments on Red Hat OpenShift Container Platform (OCP). For more information, see "Cluster Requirements for Red Hat OpenShift" in *System Requirements for the SAS Viya Platform*.

Support for Red Hat OCP 4.14.*x* has been added. Support for Red Hat OCP 4.11.*x* was dropped in 2023.09. SAS Viya platform 2023.10 supports Red Hat OCP 4.12.*x* - 4.14.*x*. These versions align with the supported versions of Kubernetes.

New File Required for Deployments Using OpenShift Container Registry

If you are deploying on Red Hat OpenShift and using OpenShift Container Registry, you should add a reference to a new file in the base kustomization.yaml file (**`$deploy/kustomization.yaml`**) . For more information, see "New File Required for OpenShift Container Registry" in *SAS Viya Platform: Deployment Notes*.

2023.09 (September 2023)

Changes to Kubernetes Requirements

Support for Kubernetes 1.27.*x* has been added. Kubernetes 1.24.*x* is no longer supported. SAS Viya platform 2023.09 supports Kubernetes 1.25.*x* - 1.27.*x*.

IMPORTANT The combination of Kubernetes 1.27 and an internal instance of PostgreSQL is experimental for SAS Viya platform 2023.09. *Experimental* software has been tested by SAS, but it should be used with care because it has not necessarily been tested to production-quality standards.

Internal PostgreSQL uses PGO 5.3.3, the Postgres Operator from Crunchy Data, which has not been tested by Crunchy Data on Kubernetes 1.27. SAS recommends using an external instance of PostgreSQL if you want to deploy with Kubernetes 1.27. PostgreSQL versions 11 - 14 are supported.

Changes to Deployment Options for Red Hat OpenShift

The SAS testing and support partnership with Red Hat has enabled expanded support for SAS Viya platform deployments on Red Hat OpenShift Container Platform (OCP). For more information, see "Cluster Requirements for Red Hat OpenShift" in *System Requirements for the SAS Viya Platform*.

The SAS Viya platform now requires Red Hat OCP 4.12.*x* - 4.13.*x*. OCP 4.11 is no longer supported. These versions align with supported versions of Kubernetes (1.25 - 1.26).

Change to Ingress Requirements

The SAS Viya platform now requires ingress-nginx 1.4.0 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.25 - 1.27.

IMPORTANT For ingress-nginx versions prior to 1.9.0, `allow-snippet-annotations=true` was the default setting. The default behavior changed with ingress-nginx 1.9.0 and later. If necessary, you can make this modification at the same time as you make the pre-installation changes that are described in ingress-nginx Vulnerability Mitigation.

Changes to Deployment for SAS In-Database Technologies

In SAS Embedded Process for Hadoop, security updates have been introduced by a newer version of the Java Runtime Environment. With this update, SAS In-Database Technologies no longer uses the Java API that is provided in the set of Hadoop JAR files. SAS Embedded Process jobs run on Spark only. Jobs are now dispatched using the REST API that is provided by Apache Livy. The execution of SAS Embedded Process jobs on MapReduce is no longer supported.

- The deployment of SAS Embedded Process for Cloudera and Amazon EMR is now delivered from a SAS Viya platform repository. In previous releases, the deployment was delivered from a SAS Viya 3.5 repository. Only manual installation is supported. If you previously used a parcel (Cloudera Manager) or a stack (Ambari) to deploy SAS Embedded Process, you must uninstall the software by using that method and then install the software by using the manual method.

The installation now uses one RPM file. In addition, a new configuration task requires you to copy two configuration files, spark-defaults.conf and sparkep-defaults.conf, to a client-side location. For more information, see *SAS Viya In-Database Technologies: Deployment and Administration Guide*

- Changes to the code for parallel data transfer and in-database model scoring are required. For more information, see "Publishing and Running Models in Hadoop" in *SAS In-Database Products: User's Guide*.

Changes to Data Access Support

The requirements to use SAS In-Database Technologies for Hadoop Cloud Services have been reduced. Previously, users could publish only scoring models to a location on AWS EMR HDFS, and only if the SAS Viya platform had been deployed in AWS. Starting with 2023.09, users can publish scoring models to a table in Hive. AWS EMR allows optional external connections to Hive through a JDBC connection.

However, parallel data transfer activities with the Hadoop data connector for Amazon EMR still require the SAS Viya platform to be deployed in AWS.

Table Rebalancing for CAS Nodes Now Available

Administrators can more easily control the number of workers for a distributed (MPP) CAS server without disrupting running jobs. Changing the number of worker nodes helps you manage cloud costs by keeping the CAS server right-sized for your workloads. Starting with 2023.09, when you enable the automatic table-balancing feature, the CAS server can load-balance tables among nodes when CAS worker nodes are added to or removed from an MPP CAS configuration.

Enabling table rebalancing requires an administrator to set some environment variables. For more information, see "Change the Number of Workers for MPP CAS" in *SAS Viya Platform: Deployment Guide*.

SAS Refresh Token Sidecar Now Available

The SAS Compute server provides the ability to execute SAS Refresh Token, which works as a silent partner to the main container, refreshing the client token as needed. Using the sidecar is valuable for long-running tasks that exceed the default life of the client token, which in turn inhibits the successful completion of such tasks. The sidecar seamlessly refreshes the token so that these tasks can continue running unimpeded.

Note: Currently, only the SAS/CONNECT server uses this facility.

The SAS Refresh Token facility is disabled by default. For the instructions to enable the SAS Refresh Token, see the README file located at **`$deploy/sas-bases/overlays/sas-programming-environment/refreshtoken/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_sas_compute_server_to_use_sas_refresh_token_sidecar.htm`** (for HTML format).

SAS Intelligent Planning Now Available

SAS Intelligent Planning is now available for deployment with the SAS Viya platform. The new planning platform replaces all previous planning solutions on SAS Viya and SAS 9.x, including SAS Demand Planning, SAS Assortment Planning, SAS Financial Planning, SAS Merchandise Financial Planning, SAS Merchandise In-Season Management, and SAS for Demand-Driven Planning and Optimization (SAS Forecast Analyst Workbench, SAS Collaborative Planning Workbench, SAS Demand Signal Repository).

SAS Intelligent Planning can be deployed on Microsoft Azure and Amazon Web Services as a managed service or a Software as a Service option available on SAS Cloud. SAS Intelligent Planning requires SAS Common Data Store.

SAS Intelligent Pricing Now Available

SAS Intelligent Pricing is now available for deployment with the SAS Viya platform. The new pricing platform replaces all previous pricing solutions on SAS Viya and SAS 9.x, including SAS Markdown Optimization and SAS Promotion Optimization.

SAS Intelligent Pricing can be deployed on Microsoft Azure and Amazon Web Services. SAS Intelligent Pricing requires SAS Common Data Store.

SAS Intelligent Inventory Management Now Available

SAS Intelligent Inventory Management is now available for deployment with the SAS Viya platform. The new inventory management platform replaces all previous inventory management solutions on SAS Viya and SAS 9.x, including SAS Size Optimization, SAS Size Profiling, SAS Pack Optimization, and SAS Inventory Optimization.

SAS Intelligent Inventory Management can be deployed on Microsoft Azure and Amazon Web Services. SAS Intelligent Inventory Management requires SAS Common Data Store.

SAS Intelligent Performance Management Now Available

SAS Intelligent Performance Management is now available for deployment with the SAS Viya platform. The new performance management platform replaces all previous performance management solutions on SAS Viya and SAS 9.x, including SAS Financial Management, SAS Cost and Profitability Advanced, and SAS Cost and Profitability Standard.

SAS Intelligent Performance Management can be deployed on Microsoft Azure and Amazon Web Services. SAS Intelligent Performance Management requires SAS Common Data Store.

SAS Asset and Liability Management Enhancement

SAS Asset and Liability Management has added support for deployment on Red Hat OpenShift. The product can now be deployed on any of the supported cloud platforms.

SAS Risk Modeling Configuration for Workflow Service Tasks

SAS Risk Modeling now requires that certain values in the SAS Risk Cirrus Core configuration file be set so that the offering can take advantage of the workflow service tasks. In the **`$deploy/sas-bases/examples/sas-risk-cirrus-rcc/resources/core_transform.yaml`** file, the following parameters must be set to the appropriate values:

- `SAS_RISK_CIRRUS_SET_WORKFLOW_SERVICE_ACCOUNT_FLG`
- `SAS_RISK_CIRRUS_WORKFLOW_DEFAULT_SERVICE_ACCOUNT`

For the details about these parameters, see the README file located at **`$deploy/sas-bases/examples/sas-risk-cirrus-rcc/resources/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/preparing_and_configuring_risk_cirrus_core_for_deployment.htm`** (for HTML format).

SAS Dynamic Actuarial Modeling Enhancements and Bundles

SAS Dynamic Actuarial Modeling now has three bundling options: SAS Dynamic Actuarial Modeling Analyze, SAS Dynamic Actuarial Modeling Decision, and SAS

Dynamic Actuarial Modeling Premier. SAS Dynamic Actuarial Modeling Premier is the end-to-end bundle, proceeding from data, to premium model, to deployment. This bundle corresponds to the previous product. SAS Dynamic Actuarial Modeling Analyze is for customers who need the analytical side of the premium calculation and optimization. SAS Dynamic Actuarial Modeling Decision is focused on the deployment of premium models using SAS model format, PMML, Python, or ratebook. SAS Dynamic Actuarial Modeling Decision includes impact analysis and underwriting rules.

With the addition of support for deployment on GCP and Anthos Clusters on VMware and on Red Hat OpenShift, these products can be deployed on any of the supported cloud platforms.

All the SAS Dynamic Actuarial Modeling products require SAS Common Data Store (CDS PostgreSQL).

Changes to the Updating Software Documentation

A new topic lists the SAS Viya platform versions that are in Standard Support and the recommended update paths to the latest version.

2023.08 (August 2023)

SAS Workload Orchestrator Now Included with Some Offerings

SAS Workload Orchestrator is now deployed and enabled, by default, as part of many SAS Viya platform deployments. For those offerings for which it is not included by default, it is available upon request. A license is no longer required.

The following offerings include SAS Workload Orchestrator by default:

- SAS Visual Statistics
- SAS Visual Machine Learning
- SAS Data Science
- SAS Data Science Decisioning
- SAS Text Analytics
- SAS Visual Forecasting
- SAS Intelligent Decisioning
- SAS Data Science Programming

For more information about SAS Workload Orchestrator, see "Configure SAS Workload Orchestrator" in *SAS Viya Platform: Deployment Guide*.

nss_wrapper Now Available

nss_wrapper is now available as an alternative to System Security Services Daemon (SSSD). Unlike SSSD, nss_wrapper does not require being run in a more restrictive Pod Security Standard (PSS). For details, see "Use Kerberos Connections to Connect to the CAS Server" in *SAS Viya Platform: Deployment Guide*.

SAS Market Risk Management Now Available

SAS Market Risk Management is now available on SAS Viya. SAS Market Risk Management deploys in a unified framework with Kamakura Risk Manager, an enterprise risk management system. It provides advanced analytics for interest-rate risk, earnings risk, economic value of equity, and liquidity risk management. SAS Market Risk Management covers a wide range of trading-book and banking-book products. Users can perform scenario, sensitivity, and simulation analyses of portfolio P/L and accounting. SAS Visual Analytics provides reporting capabilities.

SAS Market Risk Management can be deployed on Microsoft Azure and Google Cloud Platform. It requires SAS Common Data Store.

SAS Asset and Liability Management Enhancements

SAS Asset and Liability Management has added support for deployment on AWS. In addition, you can now deploy SAS Asset and Liability Management with an external PostgreSQL instance for SAS Infrastructure Data Server and SAS Common Data Store (CDS PostgreSQL).

SAS Cost and Profitability Management Enhancement

SAS Cost and Profitability Management now supports an external PostgreSQL instance for both SAS Infrastructure Data Server and SAS Common Data Store.

Changes to the Updating Software Documentation

A Pre-update Checklist is included to help you get started with updating to a new version or to apply a patch update. Through a Q&A format, the Pre-update Checklist highlights prerequisites, best practices, specific scenarios, and the required documentation to update the software.

2023.07 (July 2023)

Changes to Data Source Support

Starting with 2023.07, SAS/ACCESS Interface to Vertica now includes the required Vertica ODBC client software. Obtaining and installing the driver are no longer required.

Also, in 2023.07, SAS/ACCESS Interface to Informix has added support for Informix engine bulk loading. A required Informix utility requires some additional configuration. For more information, see "Requirements for SAS/ACCESS Interface to Informix" in *System Requirements for the SAS Viya Platform*.

The SAS Viya platform can access data that is stored in Amazon Simple Storage Service (S3). SAS Technical Support has clarified that for the S3 procedure, FILENAME S3, a CAS S3 data source, and the CAS S3 action set, only AWS is supported. SAS cannot provide direct technical support for other S3-compatible providers. For more information about Amazon S3 support, see "Support for Data Storage in Amazon S3 and MinIO" in *System Requirements for the SAS Viya Platform*.

New Retail and Planning Offerings and Offering Names

With the July Stable release, the names and licensing of some *SAS Retail* and *SAS Planning* offerings have been changed. SAS Assortment Planning, SAS Demand Planning, and SAS Financial Planning are now part of a new offering, *SAS Intelligent Planning*. Licensing changes enable you to combine the capabilities of each intelligent planning offering for the requirements of a specific enterprise (such as consumer items, logistics, and retail).

The following changes are reflected in the documentation:

- SAS Assortment Planning, SAS Demand Planning and SAS Financial Planning were renamed as *SAS Intelligent Planning*.
- Additional Planning offerings are now available: SAS® Intelligent Planning for Consumer Goods, SAS® Intelligent Planning for Retail, and SAS® Intelligent Planning for Supply Chain. These offerings have been added to the system requirements for the SAS Viya platform.
- These new offerings require SAS Common Data Store.
- These new offerings can be deployed with Microsoft AKS or with open source Kubernetes.

Previous releases of SAS retail products for SAS Viya 3.*x* and SAS 9® are not affected by these changes.

SAS Asset and Liability Management Now Available

SAS Asset and Liability Management on SAS Viya is now available with a new architecture. This release creates a unified framework with Kamakura Risk Manager, a mature enterprise risk management system that focuses on credit risk, asset and liability management, liquidity risk, market risk, stress testing, and capital allocation. Starting with 2023.07, SAS Asset and Liability Management deploys in a unified framework with Kamakura Risk Manager. SAS Asset and Liability Management manages risk data, workflow, and analysis configuration and uses Kamakura Risk Manager as an analytics engine. SAS Visual Analytics provides reporting capabilities.

SAS Asset and Liability Management on SAS Viya can be deployed on Microsoft Azure and Google Cloud Platform. It requires SAS Common Data Store.

SAS Risk Modeling Requires a Git Repository

SAS Risk Modeling now requires a Git repository. The requirements for the repository are described at "Requirements for SAS® Risk Modeling" in *System Requirements for the SAS Viya Platform*.

Additionally, parameters in the **$deploy/sas-bases/examples/sas-risk-cirrus-rcc/resources/core_transform.yaml** file should be revised to account for the addition of the Git repository. `SAS_RISK_CIRRUS_CODE_LIB_GIT_SETUP_NEEDED` should be set to `Y`. The following parameters should be set to the appropriate values for your Git repository:

- `SAS_RISK_CIRRUS_CODE_LIB_REPO_NAME`
- `SAS_RISK_CIRRUS_CODE_LIB_REPO_USER`
- `SAS_RISK_CIRRUS_CODE_LIB_REPO_EMAIL`
- `SAS_RISK_CIRRUS_CODE_LIB_GIT_REPO_FULL_URL`

For the details about these parameters, see the README file located at **$deploy/sas-bases/examples/sas-risk-cirrus-rcc/resources/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/preparing_and_configuring_risk_cirrus_core_for_deployment.htm** (for HTML format).

SAS Viya with SingleStore Updates

In previous releases, the default value for the SingleStore `--overpack-factor` option was 0.10. Starting with 2023.07, the default value is 0.15.

2023.06 (June 2023)

Alert: Kubernetes and PostgreSQL Support

IMPORTANT As of 12 July 2023, the combination of Kubernetes 1.26 and an internal instance of PostgreSQL is fully supported. Previously, support was experimental. A patch update is required for this support. Patch updates are available for all versions of the SAS Viya platform that are in Standard Support.

IMPORTANT As of 12 July 2023, the combination of Red Hat OCP 4.12 and later and an internal instance of the PostgreSQL database is fully supported. Previously, support was experimental. A patch update is required for this support. Patch updates are available for all versions of the SAS Viya platform that are in Standard Support.

SAS Viya with SingleStore Updates

The instance of SingleStoreDB that is included with SAS Viya with SingleStore has been updated from version 7.8 to 8.1. If you update to 2023.06 or later, the SingleStore DB is automatically updated.

Following the update, you cannot use the databases in a release earlier than 2023.06.

Support for GPUs on Red Hat OpenShift

Some SAS offerings support processing-intensive features that can leverage a GPU for improved performance. For example, deep learning or deep neural network capabilities that are included with SAS Viya or SAS Viya Advanced can leverage a GPU if it is present in the cluster. You can now take advantage of these features with GPU-capable VMs in a Red Hat OCP cluster for OpenShift on VMware.

For more information, see "Offerings and Action Sets that Support GPU Capabilities" in *System Requirements for the SAS Viya Platform*.

Change to Kustomize and ingress-nginx Requirements

Kustomize is required in order to generate Kubernetes manifest files for a deployment of the SAS Viya platform. Starting with SAS Viya platform 2023.06, a newer version of Kustomize is required: Kustomize 5.0.3.

The SAS Viya Platform Deployment Operator uses resources that are delivered with the deployment assets. These resources now include Kustomize 5.0.3.

For ingress-nginx versions prior to 1.9.0, `allow-snippet-annotations=true` was the default setting. The default behavior changed with ingress-nginx 1.9.0 and later. You can make this modification at the same time as you make the pre-installation changes that are described in ingress-nginx Vulnerability Mitigation.

SAS Fraud Decisioning Now Available

SAS Fraud Decisioning detects, prevents, and manages evidence of fraud in real time. SAS Fraud Decisioning provides real-time decision processing and advanced analytic modeling. Functionality extends to decisions related to credit and debit cards, payments, authentication, identity verification, and merchant transactions.

SAS Fraud Decisioning can be deployed only with AKS or with upstream open source Kubernetes at this time.

SAS Allowance for Credit Loss Now Available

Starting with 2023.06, SAS Allowance for Credit Loss is available for deployment with the SAS Viya platform. SAS Allowance for Credit Loss enables organizations to address the requirements of the Current Expected Credit Loss (CECL) and International Financial Reporting Standards 9 (IFRS 9) accounting standards. It also addresses business challenges that are related to the calculation of expected credit loss. Using a role-based, workflow-driven process, participants contribute to the results and generate auditable artifacts.

You can deploy SAS Allowance for Credit Loss on any of the supported platforms.

Changes to Data Source Support

SAS/ACCESS Interface to MongoDB now supports MongoDB client 1.23 or later and server 6.0 or later.

Changes to Supported Browsers for SAS for Microsoft 365

The minimum browser versions that are required for SAS for Microsoft 365 have changed. These changes are necessary in order to accommodate an enhanced content security policy setting.

SAS recommends always using the latest versions of web browsers.

FIPS Compliance

Starting with 2023.06, the SAS Viya platform supports the use of FIPS 140-2 validated cryptographic modules when executed on Kubernetes nodes that are running in FIPS mode.

A few SAS components and products do not support running in a FIPS-enabled environment at this time. For more information, see "Support for Federal Information Processing Standards (FIPS)" in *System Requirements for the SAS Viya Platform*.

Changes to the Updating Software Documentation

Additional best practices are included. Before each software update, a best practice is to perform an inventory scan of the current Kubernetes environment. After updating the software, a comparison report can be generated to validate the content of the updated deployment. Also, for an update to a new version using the deployment operator, a best practice is to reduce the size of the $deploy directory before creating the custom resource.

2023.05 (May 2023)

Changes to Kubernetes Requirements

Support for Kubernetes 1.26.*x* has been added. Kubernetes 1.23.*x* is no longer supported. SAS Viya platform 2023.05 supports Kubernetes 1.24.x - 1.26.x.

IMPORTANT As of 12 July 2023, the combination of Kubernetes 1.26 and an internal instance of PostgreSQL is fully supported. Previously, support was experimental. A patch update is required for this support. Patch updates

are available for all versions of the SAS Viya platform that are in Standard Support.

IMPORTANT As of 12 July 2023, the combination of Red Hat OCP 4.12 and later and an internal instance of the PostgreSQL database is fully supported. Previously, support was experimental. A patch update is required for this support. Patch updates are available for all versions of the SAS Viya platform that are in Standard Support.

Changes to Ingress Controller Support

The SAS Viya platform now requires ingress-nginx 1.3.0 or later. This change to the minimum supported version of ingress-nginx was made in order to ensure compatibility with Kubernetes 1.24 - 1.26.

(Open Source Kubernetes Only) Changes to Kubernetes CNI Requirement

Deployments in open source Kubernetes clusters now require Calico 3.24*x* and later.

Changes to Data Source Support

SAS/ACCESS Interface to Teradata now supports Teradata TTU 17.20 or later.

SAS/ACCESS Interface to Spark has added support for single sign-on to Databricks in Microsoft Azure. A few additional requirements apply to this feature.

Support for Confidential Computing

Starting with SAS Viya platform 2023.03, confidential computing is supported in Microsoft AKS deployments. Confidential computing encrypts data in memory and provides verification, providing an additional layer of protection for data in use. At this time, AKS is the only SAS Viya platform deployment environment that supports confidential computing.

For more information, see "Requirements for Confidential Computing" in *System Requirements for the SAS Viya Platform*.

New Workload Classes

To increase the granularity for scheduling CAS workloads, SAS has introduced cascontroller and casworker workload classes. For more information, see "Workload Classes" in *SAS Viya Platform: Deployment Guide*.

Forward Proxy Content

Content describing how to configure for forward proxies during the deployment of your software has been added to the deployment guide. For details, see "Add Forward Proxy Settings" in *SAS Viya Platform: Deployment Guide*.

Revised Deployment Command

In order to accommodate a change in Kubernetes 1.26 and later, the required command to prune additional resources while performing an update using Kubernetes commands has been revised. For details, see "Deployment Using Kubernetes Commands" in *SAS Viya Platform: Deployment Guide*.

Changes to the Updating Software Documentation

Additional information about using the `cadence-release` flag is provided in the "Update to a New Version Using the Deployment Operator" and "Apply a Patch Update Using the Deployment Operator" topics.

2023.04 (April 2023)

Support for Anthos Clusters on VMware

Starting with 2023.04, the SAS Viya platform can be deployed in Anthos Clusters on VMware (GKE on-prem). These clusters are managed by the version of Google Kubernetes Engine for on-premises data centers. Anthos Clusters run in customer-managed data centers rather than in Google Cloud Platform (GCP).

SAS Mirror Manager Support for Additional Registry Options

SAS Mirror Manager now offers support for deploying from an image registry in Red Hat OpenShift or JFrog Artifactory.

Minor enhancements to SAS Mirror Manager, testing, and documentation updates were required in order to enable this support. These efforts were completed shortly after the general availability of the March release of the SAS Viya platform (2023.03).

Note: At the present time, only new deployments of the SAS Viya platform can be performed on OpenShift using SAS Mirror Manager. Existing deployments of the SAS Viya platform on OpenShift do not support adding a mirror registry (as a method of updating the software, for example). SAS might add that functionality in a future release.

For more information, see "Create and Populate a Mirror in Red Hat OpenShift Container Registry" in *SAS Viya Platform: Deployment Guide*.

Support for External PostgreSQL Instances

You can now deploy the following additional products with an external instance of the required PostgreSQL database:

- SAS Asset and Liability Management
- SAS Assortment Planning
- SAS Demand Planning
- SAS Dynamic Actuarial Modeling
- SAS Expected Credit Loss
- SAS Model Risk Management
- SAS Financial Management
- SAS Financial Planning
- SAS Risk Modeling
- SAS Stress Testing

Support for Confidential Computing

Starting with SAS Viya platform 2023.03, confidential computing is supported in Microsoft AKS deployments. Confidential computing encrypts data in memory and

performs verification, providing an additional layer of protection for data in use. At this time, AKS is the only SAS Viya platform deployment environment that supports confidential computing.

For more information, see "Requirements for Confidential Computing" in *System Requirements for the SAS Viya Platform*.

Changes to the Updating Software Documentation

- For multi-tenant environments, re-onboarding tenants is no longer required after a software update. Each topic in the "Update to a New Version" and "Apply a Patch Update" categories was updated to reflect this change, and the related section in the "Guidance for Updating a Multi-tenant Environment" topic was removed.
- Additional guidance is provided for changing deployment methods at the same time that a software update is performed. Also, a related change is that the "Option 2 — Create and Apply the SASDeployment Custom Resource" sections were removed from the "Update to a New Version Using the Deployment Operator" and "Apply a Patch Update Using the Deployment Operator" topics.

Changes to Data Source Support

SAS In-Database Technologies for Databricks now supports Databricks 10.4 LTS or later (with Spark 3.2.*x* or later) for Microsoft Azure or Amazon Web Services.

The newer versions of Databricks include fixes for issues with Spark SQL. Previously, SAS In-Database Technologies for Databricks supported Databricks 6.*x* - 9.*x*.

In addition, SAS In-Database Technologies for Hadoop Cloud Services now supports Microsoft Azure HDInsight 5.0.

2023.03 (March 2023)

Changes to Kubernetes Requirements

Support for Kubernetes 1.25.*x* has been added. As of this release, Kubernetes 1.22.*x* is no longer supported.

IMPORTANT The combination of Red Hat OCP 4.12 and an internal instance of the PostgreSQL database is experimental in the 2023.03 release of the SAS Viya platform. *Experimental* software has been tested prior to

release, but because it has not necessarily been tested to production-quality standards, it should be used with care.

OCP 4.12 corresponds to Kubernetes 1.25. However, internal PostgreSQL is based on Crunchy Data PostgreSQL 5.3, which does not support OCP 4.12. SAS recommends that you deploy on Red Hat OpenShift with OCP 4.10 or 4.11 in order to use the internal PostgreSQL instance.

Kubernetes 1.25 and later have deprecated pod security policies and have implemented pod security standards and a pod security admission controller to enforce the standards. Three pod security levels are defined by the pod security standards in order to control the level of the restrictions that are applied to pods: privileged, baseline, and restricted. These admission standards control the level of restrictions that are applied to pods. Pod security standards are supported by most SAS Viya pods.

Change to Kustomize Support

Kustomize is a client tool that is required in order to generate Kubernetes manifest files for a deployment of the SAS Viya platform. Starting with SAS Viya platform 2023.03, a newer version of Kustomize is required: Kustomize 5.0.0.

Each SAS Viya platform release and cadence is optimized for and tested with a single version of Kustomize. Previous releases of SAS Viya platform can continue to use Kustomize 3.7.0 or 4.5.7.

Changes to PostgreSQL

Starting with the October Stable release (2022.10), SAS made changes that affected both an external and an internal PostgreSQL database instance. SAS recommends that you gain a full understanding of these changes. For more information, see “Changes Related to PostgreSQL” on page 227.

For an external instance of SAS Infrastructure Data Server, PostgreSQL 14 is now supported with SAS Viya platform 2023.03 or later.

In this release, the following changes were made to the internal PostgreSQL instance, which is based on Crunchy Data PostgreSQL 5:

- The comprehensive tuning transformer, **`$deploy/sas-bases/examples/crunchydata/tuning/crunchy-tuning-transformer.yaml`**, was divided into separate, more granular transformers. The additional transformers have been provided in order to target specific configuration changes.

  The **`$deploy/sas-bases/examples/crunchydata/tuning`** directory now contains the following transformers:

  - crunchy-tuning-connection-params-transformer.yaml - modifies PostgreSQL connection parameters

- crunchy-tuning-log-params-transformer.yaml - modifies PostgreSQL log parameters so that they resemble the logging behavior of Crunchy Data PostgreSQL 4
- crunchy-tuning-patroni-params-transformer.yaml - modifies Patroni parameters
- crunchy-tuning-pg-hba-no-tls-transformer.yaml - lets you disable TLS by changing the entry for the pg_hba.conf file

For more information, see **`$deploy/sas-bases/examples/crunchydata/tuning/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/postgres_configuration_settings_for_tuning.htm`** (for HTML format).

- The existing transformer for tuning backup settings, **`$deploy/sas-bases/examples/crunchydata/backups/crunchy-backup-transformer.yaml`**, has been enhanced and renamed as crunchy-pgbackrest-backup-config-transformer.yaml.

  This transformer can be used to change the backup schedule and the retention policy for backups and for WAL data archives.

  For more information, see **`$deploy/sas-bases/examples/crunchydata/backups/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/postgres_configuration_settings_for_backup.htm`** (for HTML format).

SAS Mirror Manager Support for OpenShift

SAS Mirror Manager now offers support for deploying from an image registry in Red Hat OpenShift.

Minor enhancements to SAS Mirror Manager, testing, and documentation updates were required in order to enable this support. These efforts were completed shortly after the general availability of the March release of the SAS Viya platform (2023.03).

Note: At the present time, only new deployments of the SAS Viya platform can be performed on OpenShift using SAS Mirror Manager. Existing deployments of the SAS Viya platform on OpenShift do not support adding a mirror registry (as a method of updating the software, for example). SAS might add that functionality in a future release.

For more information, see "Create and Populate a Mirror in Red Hat OpenShift Container Registry" in *SAS Viya Platform: Deployment Guide*.

Cloud Data Exchange Now Available

Cloud Data Exchange provides data connection capability for a variety of SAS Viya offerings. To take advantage of Cloud Data Exchange, co-located SAS Data Agent is configured during the SAS Viya platform deployment. Also, remote SAS Data

Agent is run as a Docker container to access, copy, and load data between on-premises data sources and data sources that are available to the SAS Viya platform. Cloud Data Exchange also includes:

- A microservice that provides a set of REST interfaces for SAS Data Agent administration and data access.
- A CAS data connector for interfacing with a SAS Viya CAS server, and a CAS Action Set to move data sets both to and from the cloud.
- A LIBNAME that is used to interface with a SAS Viya Compute Server.

For more information, see "What is the deployment process for SAS Data Agent?" in *Getting Started with SAS Viya Platform Operations*.

SAS Data Engineering

SAS Data Engineering is a new offering for the SAS Viya platform that provides enhanced programming, workload and job management, data-management, and analytics. It includes the following SAS components: SAS Studio Engineer, SAS Information Governance, SAS Workload Management and SAS In-Database Technologies.

Tenants Require Pod Templates

All tenants in a multi-tenant deployment now require SAS Programming Environment pod templates. For more information, see the "Create Kubernetes Resources" section of the README file located at **`$deploy/sas-bases/examples/sas-tenant-job/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/onboard_or_offboard_tenants.htm`** (for HTML format).

Option to Deploy External OpenSearch Instance

OpenSearch, an Apache 2.0-licensed distribution of OpenSearch with enhanced security, provides search features for software that runs on the SAS Viya platform. Starting with 2023.03, the platform supports the use of an external OpenSearch instance that you administer and maintain yourself. Previously, an internal instance of OpenSearch was automatically included in the deployment and could not be modified.

The decision whether to use the default (internal) OpenSearch instance or to supply your own instance is made at deployment time. After the deployment has completed, you cannot modify your deployment to use a different OpenSearch instance.

You must modify the kustomization.yaml file in order to set up the connection to the external OpenSearch cluster.

Default Memory Increased for RabbitMQ

RabbitMQ supports the required SAS Message Broker component. It is deployed with HA by default and three replicas. Each replica is now deployed with a memory limit set to 8 Gi.

Previously, each replica was limited to 2 Gi by default.

Additional Data Source Support

Three new SAS/ACCESS engines are now included with the SAS Viya platform:

- SAS/ACCESS Interface to Informix
- SAS/ACCESS Interface to SAP IQ
- SAS/ACCESS Interface to SingleStore

Starting with 2023.03, the ability to access a SingleStore instance using SAS/ACCESS Interface to MySQL has been deprecated. You can instead use SAS/ACCESS Interface to SingleStore.

Support for Confidential Computing

Starting with SAS Viya platform 2023.03, confidential computing is supported in Microsoft AKS deployments. Confidential computing encrypts data in memory and performs verification, providing an additional layer of protection for data in use. At this time, AKS is the only SAS Viya platform deployment environment that supports confidential computing.

For more information, see "Requirements for Confidential Computing" in *System Requirements for the SAS Viya Platform*.

Additional SAS Viya with SingleStore Deployment Option

You can now deploy SAS Viya with SingleStore using the SAS Viya Infrastructure as Code (IaC) tools for AWS. Previously, only the IaC projects for Microsoft Azure and open source Kubernetes were able to deploy SAS Viya with SingleStore. For more information, see https://github.com/sassoftware/viya4-iac-aws.

SAS Viya with SingleStore system requirements are described in Requirements for SAS Viya with SingleStore.

Change to the Updating Software Documentation

A new command to delete the sas-pyconfig job is documented in the "Update to a New Version Using Kubernetes Commands" and "Apply a Patch Update Using Kubernetes Commands" topics.

Revision to "Change Deployment Methods" Appendix

The steps to change your deployment method from the SAS Viya Platform Deployment Operator to any other method have been expanded. For details, see "SAS Viya Platform Deployment Operator to Any Other Method" in *SAS Viya Platform: Deployment Guide*.

Deprecation Warning for Start/Stop Transformers

The option of starting and stopping your SAS Viya platform deployment using Kustomize transformers is deprecated as of the 2023.03 Stable and Long-Term Support releases. It will be removed at Stable 2023.10 and Long-Term Support 2024.03. SAS recommends that you use `sas-stop-all` and `sas-start-all` CronJobs to stop and start your SAS Viya platform deployments.

Launcher Service Authentication

Starting 2023.03, the OAuth tokens with the client credential 'grant' type and which do not have 'sasapp' authority are not allowed by the Launcher service to create Launcher processes directly. These client credentials are only allowed to create processes with the use of a stored credential.

2023.02 (February 2023)

Change to Kustomize Support

Kustomize is a client tool that is required in order to generate Kubernetes manifest files for a deployment of the SAS Viya platform. Starting with SAS Viya platform 2023.02, a newer version of Kustomize is required. For more information, see

"Kubernetes Client Machine Requirements" in *System Requirements for the SAS Viya Platform*.

Each SAS Viya platform release and cadence is optimized for and tested with a single version of Kustomize. Previous releases of SAS Viya platform can continue to use Kustomize 3.7.0.

Changes to PostgreSQL

Starting with the October Stable release (2022.10), SAS made changes that affected both an external and an internal PostgreSQL database instance. SAS recommends that you gain a full understanding of these changes, which are described in "Changes Related to PostgreSQL" on page 227.

New User Interface for My SAS (my.sas.com)

As of 31 January 2023, My SAS (my.sas.com) has a new user interface. My SAS is the location where users access and manage software orders, and download assets for deploying and updating the software. Starting with the Stable 2022.09 documentation, the instructions related to using My SAS were updated to reflect the new user interface.

Auto-Resourcing Enhancements

Previously, the CAS Operator applied the Kubernetes Guaranteed Quality of Service (QoS) setting when auto-resourcing was enabled. A change was made in order to enable supplementary container resources to increase when auto-resourcing is configured, and when a burst of activity is required.

For example, the SAS Viya platform is backed up by default every Sunday morning, when the CAS server typically is not running. With this change, the backup agent and other component containers can autoscale to temporarily use a larger share of CPU resources that are available on the node. Backups complete more rapidly as a result.

The CAS operator applies auto-resourcing by default in order to manage the RAM and CPU resources of the nodes where CAS is running. When you instead want to allocate node resources manually, you can disable auto-resourcing and manually modify resourcing requests. If you disable auto-resourcing, you might instead apply guaranteed QoS by configuring the manage CPU and RAM transformer: **`$deploy/sas-bases/examples/cas/configure/cas-manage-cpu-and-memory.yaml`**. Guaranteed QoS places the CAS pods in the category of pods that are the last to be evicted by Kubernetes when available resources become insufficient on the node.

In order to determine whether auto-resourcing is enabled in your deployment, check the main kustomization.yaml file for the following overlay in the resources section:

```
sas-bases/overlays/cas-server/auto-resources
```

If the overlay is present, auto-resourcing is enabled. See “Adjust RAM and CPU Resources for CAS Servers” in *SAS Viya Platform: Deployment Guide* for more information about enabling or disabling auto-resourcing.

Change to the Updating Software Documentation

A command to delete the sas-risk samples job is documented in the "Update to a New Version Using Kubernetes Commands" and "Apply a Patch Update Using Kubernetes Commands" topics.

2023.01 (January 2023)

Important Notice: Changes to Offering Names

Documentation for previous releases of SAS Viya 4 used the term *SAS Viya* to refer to the totality of SAS components that supported compatible SAS product offerings. These offerings ran in and interacted with a deployment of the *SAS Viya platform*, which was referred to as "SAS Viya." With the January Stable release, the name *SAS Viya* has been applied to multiple SAS product offerings:

- SAS Visual Machine Learning was renamed as *SAS Viya*
- SAS Visual Data Science was renamed as *SAS Viya Advanced*
- SAS Visual Data Science Decisioning was renamed as *SAS Viya Enterprise*
- SAS Visual Data Science Programming was renamed as *SAS Viya Programming*

To avoid confusion, the term *platform* has been applied to SAS Viya 4. The documentation has been updated to reflect these changes.

Releases of SAS Viya 3.*x* are not affected by these changes.

Changes to PostgreSQL

Starting with the October Stable release (2022.10), SAS made changes that affected both an external and an internal PostgreSQL database instance. SAS recommends that you gain a full understanding of these changes, which are described in “Changes Related to PostgreSQL” on page 227.

Additional Requirement for SAS Event Stream Processing

Starting with the October Stable release (2022.10), enhancements to SAS Event Stream Processing were available. These enhancements resulted in an additional requirement for a PVC to support SAS Event Stream Processing Studio. For more information, see "Persistent Volumes for Applications" in *System Requirements for the SAS Viya Platform*.

Changes to SAS Startup Sequencer

Prior to 2023.01, users of SAS Startup Sequencer had to make changes to .yaml files in order to deploy the application. Starting with 2023.01, users must make changes to prevent SAS Startup Sequencer from being deployed. For more information, see the README file at **`$deploy/sas-bases/overlays/startup/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/disabling_the_sas_viya_start-up_sequencer.htm`** (for HTML format).

SAS Viya with SingleStore Update

The SAS Viya with SingleStore offering provides integration with a highly scalable distributed relational database. The integration provides reduced data movement and seamless access to SingleStore features. You can now deploy SAS Viya with SingleStore into a Kubernetes cluster that is running in AWS and managed by Amazon EKS. Previously, only Microsoft AKS and upstream open source Kubernetes were supported for these deployments.

SAS Viya with SingleStore system requirements are described in Requirements for SAS Viya with SingleStore.

New User Interface for My SAS (my.sas.com)

As of 31 January 2023, My SAS (my.sas.com) has a new user interface. My SAS is the location where users access and manage software orders, and download assets for deploying and updating the software. Starting with the Stable 2022.09 documentation, the instructions related to using My SAS were updated to reflect the new user interface.

Change to the Updating Software Documentation

The "Update to a New Version Using the sas-orchestration Command" topic is available.

2022.12 (December 2022)

Important Notice: Updating to SAS Viya 2022.10

As of 17 January 2023, customers with internal instances of PostgreSQL on Red Hat OpenShift can update to 2022.10, which includes Crunchy Data 5. If you intend to update, ensure that you have downloaded the latest deployment assets before starting the update process.

New Deployment Method Now Available

With SAS Viya 2022.12 and later, an enhancement to the SAS orchestration tool enables you to run a new command to launch the "deploy" operation. Like the SAS Viya Deployment Operator, the `sas-orchestration deploy` command automates the steps that deploy SAS Viya in the Kubernetes cluster.

Unlike the SAS Viya Deployment Operator or a manual deployment, the `sas-orchestration deploy` command launches SAS Viya deployment automation from outside the cluster. The user session that invokes the deployment from the external CLI automatically exits when the deployment has completed. Another distinction is that this type of deployment does not perform updates automatically. However, you can run the deploy command again, specifying the target release, in order to update SAS Viya.

The `sas-orchestration-deploy` command runs under the user account that is specified in your kubeconfig file. Docker is a prerequisite. As with the SAS Viya Deployment Operator, elevated permissions are required so that CRDs and other cluster-wide resources are applied. For more information about this new command, see "Deployment Methods" in *Getting Started with SAS Viya Platform Operations*.

Note: Although the `sas-orchestration deploy` command is available in the SAS orchestration tool with earlier versions of SAS Viya, it is not supported for use with any release earlier than SAS Viya 2022.12.

Changes to PostgreSQL

Starting with the October Stable release (2022.10), SAS made changes that affected both an external and an internal PostgreSQL database instance. SAS recommends that you gain a full understanding of these changes, which are described in "Changes Related to PostgreSQL" on page 227.

Support for Multi-Tenancy Available with Red Hat OpenShift

You can now deploy SAS Viya with multi-tenancy in a Kubernetes cluster running in Red Hat OpenShift on VMware. Previously, multi-tenant deployments could be performed only in the other supported cloud environments.

SAS Business Orchestration Services Now Available

SAS Business Orchestration Services is now available for deployment with SAS Viya. SAS Business Orchestration Services provides a customizable orchestration framework that enables you to implement enterprise integration patterns based on a set of high-level abstractions that require minimal coding. SAS Business Orchestration Services helps you rapidly integrate newer tools, technologies, and data flows into your organization so that supporting technologies evolve along with your business.

In an upcoming release, SAS plans to provide an option to deploy SAS Business Orchestration Services in a standalone container. As a result, existing customers who have not yet migrated to SAS Viya 4 will still benefit from the latest software and security updates.

SAS Business Orchestration Services can be deployed with Microsoft Azure Kubernetes Service or with upstream open source Kubernetes.

SAS Cost and Profitability Management Now Available

SAS Cost and Profitability Management is now available for deployment with SAS Viya. SAS Cost and Profitability Management is derived from the discipline of activity-based management. It enables managers to analyze the costs and profits that are associated with a product, customer, service, or business process, and it supports profitability analysis, cost-management initiatives, shared-services management, planning and budgeting efforts, and capacity optimization.

SAS Cost and Profitability Management can be deployed with Microsoft Azure Kubernetes Service or with upstream open source Kubernetes.

SAS Expected Credit Loss Now Available

A new offering, SAS Expected Credit Loss, is now available for deployment with SAS Viya.

SAS Expected Credit Loss addresses accounting requirements and business challenges related to the calculation of Expected Credit Loss (ECL) by integrating a set of powerful analytics for process management and model execution. The accounting requirements that SAS Expected Credit Loss applies include both the International Financial Reporting Standard of accounting for financial instruments, published by the International Accounting Standards Board (IFRS 9), and Current Expected Credit Losses (CECL), issued by the Financial Accounting Standards Board (FASB).

SAS Expected Credit Loss can be deployed with Microsoft Azure Kubernetes Service or with upstream open source Kubernetes.

SAS Stress Testing Now Available

A new offering, SAS Stress Testing, is now available for deployment with SAS Viya.

SAS Stress Testing lets you expand the utility of regulatory stress testing programs to enhance your understanding of portfolio dynamics; improve your planning processes; and better prepare for and avoid future crises. It creates an enterprise-wide view of scenario analysis and uses sophisticated analytics to perform advanced modeling and projections. Integration with other SAS Risk offerings enables you to draw all key ratios and metrics from a single source.

SAS Stress Testing can be deployed with Microsoft Azure Kubernetes Service or with upstream open source Kubernetes.

SAS Revenue Optimization Suite Now Available

Multiple product offerings from the SAS Revenue Optimization Suite are now available for deployment with SAS Viya. Starting with 2022.12, you can deploy SAS® Markdown Optimization, SAS® Promotion Optimization, and SAS® Regular Price Optimization in a Kubernetes cluster with SAS Viya. These products assist you by boosting your productivity through automated plan creation and execution using default pricing rules, promotion settings and product life cycle dates; predicting consumer demand at individual stores and crafting the most effective customer offers; and implementing optimal pricing at a store, within a zone, or for an entire market.

These offerings can be deployed with Microsoft Azure Kubernetes Service or with upstream open source Kubernetes.

SAS Viya Monitoring for Kubernetes

The documentation for this solution has been redesigned and is now located in the SAS Viya Monitoring for Kubernetes Help Center.

New User Interface for My SAS (my.sas.com)

As of 31 January 2023, My SAS (my.sas.com) has a new user interface. My SAS is the location where users access and manage software orders, and download assets for deploying and updating the software. Starting with the Stable 2022.09 documentation, the instructions related to using My SAS were updated to reflect the new user interface.

Changes to the Updating Software Documentation

- The "Apply a Patch Update Using the sas-orchestration Command" topic is available.
- The "Guidance for Updating a Multi-tenant Environment" topic was revised to include more information about the update process for a multi-tenant environment.

2022.11 (November 2022)

Important Notice: Updating to SAS Viya 2022.10

As of 17 January 2023, customers with internal instances of PostgreSQL on Red Hat OpenShift can update to 2022.10, which includes Crunchy Data 5. If you intend to update, ensure that you have downloaded the latest deployment assets before starting the update process.

Changes to PostgreSQL

Starting with the October Stable release (2022.10), SAS made changes that affected both an external and an internal PostgreSQL database instance. SAS recommends that you gain a full understanding of these changes, which are described in "Changes Related to PostgreSQL" on page 227.

SAS/ACCESS Enhancements and Changes

SAS/ACCESS Interface to Hadoop has added support for Google Dataproc 2.0.45 and Microsoft Azure HDInsight 5.0.

SAS/ACCESS Interface to Spark has added support for Microsoft Azure HDInsight 5.0.

SAS/ACCESS Interface to MySQL has dropped support for MySQL 5.6.

SAS® Asset Performance Analytics Now Available

With 2022.11 (November Stable) and later, SAS Asset Performance Analytics can now be deployed along with SAS Viya.

Designed for capital-intensive industries or anywhere that equipment performance is critical, SAS Asset Performance Analytics captures and analyzes data from sensors on equipment and in facilities to help predict failures and avoid downtime. With advanced analytics and data-mining and visualization tools, SAS Asset Performance Analytics enables engineers to identify root causes and rapidly develop corrective action plans. In addition to monitoring and alerting, the product assists you in developing predictive and prescriptive maintenance strategies to address known sources of failure and performance degradation.

New User Interface for My SAS (my.sas.com)

As of 31 January 2023, My SAS (my.sas.com) has a new user interface. My SAS is the location where users access and manage software orders, and download assets for deploying and updating the software. Starting with the Stable 2022.09 documentation, the instructions related to using My SAS were updated to reflect the new user interface.

2022.10 (October 2022)

Important Notice: Updating to SAS Viya 2022.10

As of 17 January 2023, customers with internal instances of PostgreSQL on Red Hat OpenShift can update to 2022.10, which includes Crunchy Data 5. If you intend to update, ensure that you have downloaded the latest deployment assets before starting the update process.

Read all deployment notes for 2022.10, which include the following information:

- **Important considerations to help you decide whether to update to 2022.10.** See *General Update Considerations* in the Deployment Notes for more information.
- **About updates from Crunchy Data 4 to 5:** Steps are provided that must be performed to update successfully from Crunchy Data 4 to 5.

Changes to Kubernetes Requirements

Support for Kubernetes 1.24.*x* has been added. Starting with 2022.10, Kubernetes 1.21.*x* is no longer supported.

Changes to Red Hat OpenShift Requirements

SAS Viya now supports Red Hat OpenShift Container Platform (OCP) 4.9 - 4.11. Previous releases of SAS Viya supported OCP 4.8 - 4.10.

Changes Related to PostgreSQL

With 2022.10 (October Stable) and later, SAS made changes that affected both an external and an internal PostgreSQL database instance.

For an external instance of SAS Infrastructure Data Server, SAS Viya 2022.10 and later supports PostgreSQL 11 - 13. Previous releases supported PostgreSQL 11 and 12 only.

The internal instance of SAS Infrastructure Data Server has been upgraded from Crunchy Data PostgreSQL 4 to Crunchy Data PostgreSQL 5 in SAS Viya 2022.10. Crunchy Data PostgreSQL supports an internal instance of SAS Infrastructure Data Server and also supports SAS Common Data Store. Manual steps are required in order to update SAS Viya from an earlier release, even if you use the SAS Viya Deployment Operator. Follow the steps that are described in the Deployment Notes for 2022.10 to perform the update.

When SAS upgraded the version of PostgreSQL to Crunchy Data PostgreSQL 5, some aspects of cluster configuration and some default settings changed. Be aware of the following changes to the PostgreSQL cluster:

- Crunchy Data PostgreSQL version 5 offers significant improvements over the previous version. Crunchy Data 5 is more declarative than version 4 and also requires fewer containers. It includes a new Custom Resource Definition (CRD) named PostgresCluster.
- Cluster deletion behavior has changed.

  The command to delete the CustomResource, `kubectl delete postgrescluster`, affects the cluster differently. With Crunchy Data

PostgreSQL 4, this command ignored PVCs and deleted only the cluster objects. However, this behavior has changed with the upgrade to Crunchy Data PostgreSQL 5. Now the PVCs are deleted along with the CR and other cluster objects, permanently deleting the data that was stored in the corresponding storage volumes.

> **IMPORTANT** Crunchy PostgreSQL uses persistent volumes that are dynamically created by the storageClass that is defined in each PostgreSQL persistentVolumeClaim (PVC). Crunchy 5 responds to the command to delete the PostgreSQL cluster CustomResource by deleting the PostgreSQL PVCs, potentially causing data loss. You might run this command during an uninstallation. Avoid this risk by setting the reclaimPolicy to `retain`. In previous versions of SAS Viya with Crunchy 4, deleting the CustomResource did not affect the associated PVCs.
>
> For more information, see "Retaining the PVCs When the PostgreSQL Cluster Is Deleted" in *SAS Viya Platform: Infrastructure Servers*.

- Many pgo client commands have been deprecated.

  Crunchy Data implemented a different method of supporting the pgo client, pgo kubectl plug-in. The change streamlined the installation, but it supports only a limited number of pgo client commands. Many back-level pgo client commands are now handled by native Kubernetes reconciliation processes. As a result, they have been removed from the pgo client. For more information about the installation and how to use the pgo client commands, see "Configure the PostgreSQL Operator (pgo) Client Using kubectl Plug-in" in *SAS Viya Platform: Infrastructure Servers*.

- Several example YAML files and their accompanying README files now have new file names or new locations in your deployment assets directory tree.

- The file name and directory location for the server log have changed.

  The PostgreSQL server log is generated by the PostgreSQL server and is separate and independent from the PostgreSQL pod log. Previously, the PostgreSQL server log file name for Crunchy Data PostgreSQL 4 included a timestamp and was created under **`/pgdata/name-of-cluster/pg_log`** along with the pod. With Crunchy Data PostgreSQL 5, the log file name indicates the day on which it was created, and it is created under the **`/pgdata/pg12/log/`** directory. Because its file name includes the day of the week, the log files are rotated or replaced every seven days.

- Component names have been changed.

  Because some component names have been changed in Crunchy Data PostgreSQL 5, any custom tools that have dependencies on the names of PostgreSQL deployment objects, such as pods, secrets, and configMaps, require configuration changes.

- With the update to Crunchy 5, the PostgreSQL server no longer requires an SCC for deployments on Red Hat OpenShift.

- Crunchy Data pgAdmin has been disabled in 2022.10 and later. Changes to pgAdmin by Crunchy Data have caused it to stop functioning correctly.

- pgBackRest backup with retention policy is now automatic.

  With Crunchy Data PostgreSQL 5, one aspect of cluster management has been streamlined. An automatic pgBackRest backup is scheduled by default, and it includes a predefined retention policy. Every Sunday morning at 06:00 UTC, a full backup is taken. This backup truncates existing full and incremental backups as well as all WAL archive data. On the other days of the week, an incremental backup that truncates the WAL data is taken. You can adjust the backup schedule or the retention policy by following the steps in the README file. After you have downloaded and uncompressed the deployment assets, it is located in **`$deploy/sas-bases/examples/crunchydata/backups/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/configuration_settings_for_postgresql_backups.htm`** (for HTML format).

The "PostgreSQL and Crunchy Data Appendix" that included documentation for previous versions of PostgreSQL and Crunchy Data has been removed from *SAS Viya Operations*.

SAS Viya Includes Redis

SAS Viya now uses Redis to provide a distributed cache technology. Redis and the Redis Operator replace Apache Geode and SAS Cache Server. The full replacement for all SAS Viya offerings is planned for completion in 2022.11.

Not all SAS Viya offerings require the cache server functionality. With the addition of Redis, you might notice that the sas-cacheserver and sas-cachelocator stateful sets are still in your cluster but are not running. This behavior is expected. The sas-cacheserver and sas-cachelocator services are still included in deployments but are not enabled unless another service (such as services that are used by the SAS Intelligent Planning Suite) requires them.

Enhancements to Auditing in a Multi-Tenant Deployment

Auditing is now tenant-specific in deployments with multi-tenancy enabled. Individual tenant administrators can now view audit records that were generated within the scope of their tenant in User Activity reports.

IMPORTANT In previous releases of SAS Viya, the provider tenant managed the process of archiving and purging audit configuration data for all tenants. Now, tenant administrators can set their own values for archiving and purging. However, as a result, during an update to SAS Viya 2022.10, all tenant-specific configurations are automatically restored to their default settings.

Deprecated Functionality in SAS® Visual Investigator

The native entity-resolution feature in SAS Visual Investigator offers limited functionality, including support for a reduced set of external data sources and limited data volumes. Therefore, this feature is being deprecated in SAS Visual Investigator 2022.10 and later. SAS recommends that you use an external resource, such as RTENG or SAS® Data Management, to perform entity resolution, and make the resolved entities available to SAS Visual Investigator. The resolved entities can then be indexed and accessed using SAS Visual Investigator.

If you are migrating data from a previous version of SAS Visual Investigator, be aware of the deprecation schedule for native entity resolution. The end-of-life for this feature is SAS Viya 2023.03 (Long-Term Support), where the functionality will be removed. And if you experience difficulties with entity resolution using an external resource, contact SAS Technical Support.

New User Interface for My SAS (my.sas.com)

As of 31 January 2023, My SAS (my.sas.com) has a new user interface. My SAS is the location where users access and manage software orders, and download assets for deploying and updating the software. Starting with the Stable 2022.09 documentation, the instructions related to using My SAS were updated to reflect the new user interface.

2022.09 (September 2022)

New Versioning Format for SAS Viya Releases

To make it easier to identify when the software is released, the version numbers now use the `yyyy.mm` format. Also, to help identify the cadence for a version, the cadence name can precede the version number in the product documentation and application user interfaces. SAS Viya and SAS product offerings that deploy with SAS Viya have adopted this new convention. For more information, see "Release Schedule and Versions" in *Getting Started with SAS Viya Platform Operations*.

This change does not apply to software that was released prior to September 2022.

Changes to Kubernetes Requirements

Support for Kubernetes 1.24.*x* has been added. With this additional support, SAS Viya 2022.09 (September 2022) can be deployed with Kubernetes 1.21.*x* – Kubernetes 1.24.*x*.

Changes to Red Hat OpenShift Requirements

SAS Viya now supports Red Hat OpenShift Container Platform (OCP) 4.8 – 4.11. The previous release of SAS Viya supported OCP 4.8 – 4.10. These versions align with the supported versions of Kubernetes. VMware vSphere 7.0.1 or later is required.

SAS® Visual Investigator Adds Platform Support

SAS Visual Investigator can now run in all the environments that SAS Viya supports for deployment.

SAS Visual Investigator support for open source Kubernetes is available with SAS Viya 2022.1.4 and later. SAS Viya 2022.09 is required to support Red Hat OpenShift.

SAS® Law Enforcement Intelligence Now Available

A new offering, SAS Law Enforcement Intelligence, is now available for deployment with SAS Viya.

SAS Law Enforcement Intelligence is a public security solution that supports law enforcement, criminal justice, and corrections institutions with industry-leading analytics and evidence-based practices. SAS Law Enforcement Intelligence (LEI) integrates multiple SAS products, including SAS Visual Investigator and SAS Mobile Investigator, SAS Visual Analytics, and SAS Visual Text Analytics.

Automation for Multi-Tenancy

Starting with SAS Viya 2022.09 (September 2022), the viya4-deployment tools provide automated support for a SAS Viya deployment with multi-tenancy enabled. The scripts and other resources in this deployment-as-code project can now onboard tenants and CAS servers as part of the SAS Viya deployment process. This same automation can also be reused in subsequent onboarding and offboarding of tenants and CAS servers.

New User Interface for My SAS (my.sas.com)

As of 31 January 2023, My SAS (my.sas.com) has a new user interface. My SAS is the location where users access and manage software orders, and download assets for deploying and updating the software. Starting with the Stable 2022.09 documentation, the instructions related to using My SAS were updated to reflect the new user interface.

2022.1.4 (August 2022)

SAS® Viya® with SingleStore Now Available

SAS Viya integration with SingleStoreDB, formerly MemSQL, is now available. The SAS Viya with SingleStore offering includes SingleStoreDB 7.0 and later.

SAS Viya with SingleStore provides a highly scalable distributed relational database that powers a platform for AI, analytics, and data management. The integration results in reduced data movement and seamless access to SingleStore features.

SAS Viya with SingleStore system requirements are described in "Requirements for SAS SpeedyStore" in *System Requirements for the SAS Viya Platform*.

SAS® Dynamic Actuarial Modeling Now Available

A new offering, SAS Dynamic Actuarial Modeling, is now available for deployment with SAS Viya.

SAS Dynamic Actuarial Modeling was designed and architected for the insurance industry. It addresses the problem of siloed and inefficient systems and modeling that does not align with business needs. It provides a guided process to enable actuaries to more accurately calculate and model insurance premiums. SAS Dynamic Actuarial Modeling is integrated with SAS® Risk Cirrus. It can be deployed on Microsoft Azure or AWS.

Changes to SAS/ACCESS Interface to MySQL

SAS/ACCESS Interface to MySQL no longer supports SingleStoreDB 6.**x** (formerly MemSQL 6.**x**). The new baseline is now SingleStoreDB 7.0.

SAS® Event Stream Processing Uninstall Steps No Longer Required

The special steps for SAS Event Stream Processing used during the removal of your software from a Kubernetes cluster are no longer required. The content has been removed from the documentation.

Multi-tenancy: Change in Job Name

In SAS Viya Platform Multi-tenancy, the name of the job that onboards and offboards tenants has changed from tenant-job to sas-tenant-job.

2022.1.3 (July 2022)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

Kubernetes Server-Side Apply

SAS Viya now uses Kubernetes server-side apply (SSA) for select resources deployed to the Kubernetes cluster. SSA is a Kubernetes feature that provides improved field management for applied resources and addresses issues with increasingly large resource specifications.

The SAS Deployment Operator now uses SSA where appropriate. Also, the manual deployment steps for SAS Viya have been modified to enable SSA. For the revised manual deployment steps, see "Deployment Using Kubernetes Commands" in *SAS Viya Platform: Deployment Guide*, especially step 2.

For more information about SSA, see the official Kubernetes SSA documentation.

SAS Visual Investigator Now Available

SAS Visual Investigator, a flexible solution that can be tailored for a variety of industries, enables you to uncover suspicious activity or hidden behaviors as you search your data, triage alerts, investigate fraud, and monitor for security, risk, and compliance. SAS Visual Investigator is available for deployment with SAS Viya 2022.1.3 and later.

A few additional requirements apply to SAS Visual Investigator in a SAS Viya deployment. For more information, see "Requirements for SAS® Visual Investigator" in *System Requirements for the SAS Viya Platform*.

Changes for Internal Instances of PostgreSQL Deployment

The required customizations in the base kustomization.yaml file for internal instances of PostgreSQL have changed.

Updates to SAS/ACCESS Interface to Spark

Requirements for SAS/ACCESS Interface to Spark have changed. Hortonworks HDP 3.1 is no longer supported. Databricks 10.4 and later are now supported. Spark SQL 3.1 or later is required.

In addition, SAS/ACCESS Interface to Spark now redistributes JDBC drivers from CData Software. Downloading and configuring JAR files to make a basic connection to Spark with SAS/ACCESS software is no longer required. For more information, see "Requirements for SAS/ACCESS Interface to Spark" in *System Requirements for the SAS Viya Platform*.

Updates to Multi-Tenancy Support

SAS Event Stream Processing and its client applications (SAS Event Stream Manager, SAS Event Stream Processing Streamviewer, and SAS Event Stream Processing Studio) now support SAS Viya multi-tenancy.

Updates to SAS Configurator for Open Source

The SAS Configurator for Open Source utility now supports R in addition to Python. The utility simplifies the download, configuration, building, and installation of Python and R from source. The utility also now uses a CronJob instead of a Kubernetes Job.

Both change led to modifications in the utility's configuration (YAML) files. For details about the configuration and usage of this utility, see the README file located at **`$deploy/sas-bases/examples/sas-pyconfig/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/sas_configurator_for_open_source_options.htm`** (for HTML format).

New Documentation for Open Source Integration

SAS Viya provides integration points with a variety of open source languages, including Python, R, Lua, and Java. Required components and configuration to enable integration with external programs were previously documented in separate README files that were stored in different locations. A new README file describes the steps that are required in order to configure and deploy Python, R, external access to the CAS server, Git integration, and more. An additional section of the System Requirements now summarizes requirements for external open source integration and directs you to the location of the README.

For more information, see "Integrating Open Source Tools" in *System Requirements for the SAS Viya Platform*.

2022.1.2 (June 2022)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

Support for Upstream Open Source Kubernetes

SAS Viya offerings are delivered as a set of container images that can be deployed into an upstream open source Kubernetes cluster. The cluster for this type of deployment can run on physical machines or on VMs in VMware vSphere or vCenter.

SAS provides tools to help administrators create and configure a cluster that meets SAS Viya system requirements. The scripts that are included in the SAS Viya 4 Infrastructure as Code (IaC) for Open Source Kubernetes project can help you provision cloud infrastructure resources for VMware or prepare physical machines with a Kubernetes cluster that is ready for a SAS Viya deployment.

Changes to Kubernetes Support

Support for Kubernetes 1.23 has been added. As of this release, Kubernetes 1.20 is no longer supported.

If you are upgrading from Kubernetes 1.21 or earlier, consult A Note on Upgrading Kubernetes in order to avoid issues with an existing cluster.

Be aware that some components, such as NGINX Ingress Controller, might require upgrades to newer releases. Check the appropriate third-party documentation for

these compatibility requirements. Verify that your version of kubectl falls within the Kubernetes version skew policy.

If you want to use cert-manager for TLS certificate management, check the cert-manager documentation to select a release of cert-manager that is compatible with your version of Kubernetes: https://cert-manager.io/docs/installation/supported-releases/.

Changes to Red Hat OpenShift Requirements

SAS Viya now supports Red Hat OpenShift Container Platform (OCP) 4.8 - 4.10. Previous releases of SAS Viya supported OCP 4.7 - 4.9.

SAS Viya Monitoring for Kubernetes

The SAS Viya Monitoring for Kubernetes solution no longer deploys Elasticsearch and Kibana. Instead, OpenSearch and OpenSearch Dashboards are deployed. For more information, see SAS Viya Platform Operations: Logging.

2022.1.1 (May 2022)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

Addition of SAS Startup Sequencer

Although SAS Viya comprises components that are designed to start in any order, in some scenarios it is more efficient for the components to start in an ordered sequence. SAS Startup Sequencer ensures that certain components start before others and allows Kubernetes to pull container images in a priority-based sequence. It also provides a degree of resource optimization, in that resources are more efficiently spent during SAS Viya start-up with a priority given to starting essential components first.

Additional Product Offerings That Support Multi-Tenancy

The following SAS Viya offerings have added support for deployments with multi-tenancy enabled:

- SAS Analytics for IoT
- SAS Field Quality Analytics
- SAS Production Quality Analytics

2021.2.6 (April 2022)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

My SAS Order Management Updates

The order management features of My SAS have been restructured. Relevant content in the *SAS Viya Operations Guide* has been revised to accommodate the new structure. If you are working with older versions of SAS Viya, then any instructions that are specific to My SAS might be out of date.

Note: This change originally took place as an update between versions 2021.2.5 and 2021.2.6. It has been listed in both cadences to ensure that users will not miss the change.

Default Certificate Generator Is Now openssl

SAS has replaced the default certificate generator used in the SAS Viya deployment with openssl. SAS Viya recommends the use of the openssl certificate generator instead of cert-manager because it is provided by SAS specifically to meet the needs of the SAS Viya software and is tested for compatibility with each release of SAS Viya. On the other hand, cert-manager is an open source project. It releases on its own schedule and is not specifically tested for compatibility with SAS prior to being released.

For more information, see the "Certificate Generators" section of the security README file located at **`$deploy/sas-bases/examples/security/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/configure_network_security_and_encryption_using_sas_security_certificate_framework.htm`** (for HTML format).

Updated Manual Deployment Commands

The commands to perform a manual deployment of SAS Viya have been revised in order to simplify them. The new commands are available at "Deployment Using Kubernetes Commands" in *SAS Viya Platform: Deployment Guide*.

Connect Workload Class Changes

Starting with 2021.2.6, SAS/CONNECT Spawner is deployed in the stateless work class by default. The connect workload class is required only if you are not using dynamically launched pods. If you choose not to use dynamically launched pods, you must add a transformer to your base kustomization.yaml file. For more information, see "Assign Nodes by Class" in *SAS Viya Platform: Deployment Guide*.

Additional Product Offerings That Support Multi-Tenancy

The following SAS Viya offerings have added support for deployments with multi-tenancy enabled:

- SAS Assortment Planning
- SAS Demand Planning
- SAS Financial Management
- SAS Financial Planning
- SAS Health: Cohort Builder
- SAS Inventory Optimization
- SAS Markdown Optimization
- SAS Revenue Optimization
- SAS Size Optimization

Offerings with Enhanced Processing Capabilities Using GPUs

The SAS Programming Environment container image can now make the SAS GPU reservation service available, providing additional processing power for selected action sets. Previously, the GPU reservation service was used only by the CAS server. This service assists SAS processes in resource sharing and utilization of GPUs that are available in your cluster. To see a list of procedures and action sets

that can now take advantage of GPUs, see "Offerings and Action Sets that Support GPU Capabilities" in *System Requirements for the SAS Viya Platform*.

Some configuration is required in order to enable the reservation service. Not all GPU environments are supported. For more information, see "Requirements for GPU Support" in *System Requirements for the SAS Viya Platform*.

Changes to SAS® In-Database Technologies Offerings

In previous releases of SAS Viya, advanced features such as parallel loading of data and model publishing and scoring were available only in SAS Data Science Programming or SAS Visual Data Science Decisioning offerings. Now customers can perform those tasks with any relevant data source. The advanced features are made available through granular packaging whose names indicate supported data sources.

The following table summarizes the changes to SAS In-Database Technologies software offerings:

Table 2.4 *Changes to SAS In-Database Technologies Package Names*

Former Package Name	New Package Name
SAS® In-Database Technologies for Hadoop Cloud Services	SAS® In-Database Technologies for Hadoop Cloud Services SAS® In-Database Technologies for Cloudera Data Platform
SAS® In-Database Technologies for Spark	SAS® In-Database Technologies for Databricks SAS® In-Database Technologies for Azure Synapse Analytics
SAS® In-Database Technologies for Teradata	SAS® In-Database Technologies for Teradata (no change)

These packaging changes also enable SAS to deliver future capabilities. For information about the specific data sources that these products support, see "Requirements for SAS In-Database Technologies" in *System Requirements for the SAS Viya Platform*.

2021.2.5 (March 2022)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

My SAS Order Management Updates

The order management features of My SAS have been restructured. Relevant content in the *SAS Viya Operations Guide* has been revised to accommodate the new structure. If you are working with older versions of SAS Viya, then any instructions that are specific to My SAS might be out of date. Check the 2021.2.5 version of the guide for details.

Replacing Elasticsearch with OpenSearch

Previous versions of SAS Viya included Open Distro for Elasticsearch as a distributed search engine. Starting with 2021.2.5, it is being replaced with OpenSearch, an Apache 2.0 licensed search and analytics suite. Most references to Elasticsearch and Open Distro for Elasticsearch in the documentation (including the READMEs) have been replaced with references to OpenSearch. There are some caveats:

- The Elasticsearch and Kibana distributions that are used in the Monitoring and Logging GitHub projects are unaffected.
- The directory structure in the deployment assets includes "elasticsearch" in directories and file names. Those names are not being changed in order to avoid requiring manual changes during updates to the latest versions of SAS Viya.
- In previous releases, SAS Viya included ODFE. Many Kubernetes resources continue to use these names for backward compatibility.

Ability to Change the OpenSearch UID

The OpenSearch pods that support the SAS Viya search capabilities must be owned by a fixed user ID (UID) so that the search indices that are written to storage can be read after a restart. By default, the OpenSearch processes run under the fixed UID of 1000. If you do not want OpenSearch to run with UID 1000, you can change the run user for the OpenSearch pods by applying a transformer that changes the UID to another value.

NGINX Ingress Vulnerability Mitigation

SAS Viya 2021.2.5 steps to mitigate CVE-2021.25742, a vulnerability in the NGINX ingress. For the details and the steps to mitigate the CVE, see "ingress-nginx Controller Vulnerability Mitigation" in *SAS Viya Platform: Deployment Guide*.

NGINX Support

Your cluster now requires NGINX Ingress Controller 0.50.0 and later or 1.1.0 and later. Version 0.41.0 is no longer supported.

SAS® for Microsoft® 365 Enhancement

SAS for Microsoft 365 now supports Microsoft Outlook 365, in addition to Microsoft Excel 365. If you want to use the web application with Microsoft Outlook, an Apple Safari browser is not supported at this time.

Updates to Data Source Support

SAS/ACCESS Interface to JDBC now supports JDBC drivers from CData that let you make secure connections to third-party sites and manipulate data as if it were in a relational database. Supported sites include Twitter, Facebook, and more.

SAS/ACCESS Interface to PostgreSQL now supports CockroachDB 21.1.5 or later. Bulk load and bulk unload are not supported at this time.

SAS/ACCESS Interface to Teradata now supports Teradata Vantage SQL Engine version 17.10, and it requires Teradata CLIv2 client libraries, TTU 17.10 or later.

For more information about data source access and support, see "Data Source Requirements" in *System Requirements for the SAS Viya Platform*.

Updated Manual Deployment Commands

The commands to perform a manual deployment of SAS Viya have been revised in order to simplify them. The new commands are available at "Deployment Using Kubernetes Commands" in *SAS Viya Platform: Deployment Guide*.

In-Database Name Change

The SAS In-Database Technologies for Hadoop product name has changed. It is now referred to as SAS In-Database Technologies for Hadoop Cloud Services. If you are updating SAS Viya 2021.2.4, you should see this change.

2021.2.4 (February 2022)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

Kubernetes Support

Support for Kubernetes 1.22 has been added. As of this release, Kubernetes 1.19 is no longer supported.

When you have selected a new version of Kubernetes, consult A Note on Upgrading Kubernetes in order to avoid issues with an existing cluster.

Be aware that some components, such as NGINX Ingress Controller, require upgrades to newer releases for use with Kubernetes 1.22.x. Check the appropriate third-party documentation for these compatibility requirements. Verify that your version of kubectl falls within the Kubernetes version skew policy.

If you want to use cert-manager for TLS certificate management, check the cert-manager documentation to select a release of cert-manager that is compatible with your version of Kubernetes: https://cert-manager.io/docs/installation/supported-releases/.

NGINX Support

Support for NGINX Ingress Controller 1.x.x has been added.

Updates to Data Source Support

SAS/ACCESS Interface to Impala is now supported on Cloudera Data Platform (CDP) Public and Private cloud.

SAS/ACCESS Interface to Netezza now supports only versions 11.2.0.0 and 11.2.1.*x* of IBM Netezza Performance Server.

SAS/ACCESS Interface to Microsoft SQL Server no longer supports Microsoft SQL Server 2012. Microsoft SQL Server 2017 and later and its cloud variants are supported.

SAS In-Database Technologies for Spark now supports Databricks 7 and 9.

For more information about data source access and support, see "Data Source Requirements" in *System Requirements for the SAS Viya Platform*.

In-Database Name Change

The SAS In-Database Technologies for Hadoop product name has changed. It is now referred to as SAS In-Database Technologies for Hadoop Cloud Services.

2021.2.3 (January 2022)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

Common Planning Server Replaced by Common Data Store

The Common Planning Server is being replaced by Common Data Store. The Common Data Store is hierarchically different from a second PostgreSQL database used by several SAS Viya offerings because the character of the data used by those offerings is the data generally stored in the primary PostgreSQL database. The separation into two different databases allows them to be tuned individually, in turn enhancing the performance of both.

External Instances of PostgreSQL and Red Hat OpenShift

SAS Viya deployments on Red Hat OpenShift now support external instances of PostgreSQL.

2021.2.2 (December 2021)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

External Instances of PostgreSQL and Red Hat OpenShift

SAS Viya deployments on Red Hat OpenShift now support external instances of PostgreSQL.

New Product to Manage Open-Source Components

SAS Configurator for Open Source is a utility that simplifies the download, configuration, building, and installation of Python from source. It produces one or more user-specified Python releases in a user-specified PVC. Pods that require Python for their operations can be configured to reference it from the PVC. SAS Configurator for Open Source can build, install, and manage multiple Python versions and reduces the downtime associated with Python updates.

Enhancements to SAS/CONNECT

SAS®9.4 clients can now make direct connections to the SAS/CONNECT spawner in a SCIM environment. SAS/CONNECT for SAS 9.4M7 has been updated so that these client connections can include an ID token that is generated by the SAS Viya REST services in place of the user name and password. This support enables you to use SCIM for identity management and connect directly to SAS Viya in a Kubernetes cluster.

Support for Additional Spark Distributions

SAS In-Database Technologies for Spark supports an additional Spark distribution: Microsoft Azure Synapse Analytics with Spark 3.*x*.

2021.2.1 (November 2021)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

External Instances of PostgreSQL and Red Hat OpenShift

SAS Viya deployments on Red Hat OpenShift now support external instances of PostgreSQL.

Changes to Commands for Manual Deployment

A new command has been added to the list of commands to be performed in order to manually deploy SAS Viya. For the complete list of commands, including the new one, see "Deployment Using Kubernetes Commands" in *SAS Viya Platform: Deployment Guide*.

State Transfer for CAS Servers

State transfers preserve the sessions, tables, and state of a running CAS server for a new CAS server instance that is being started as part of a CAS server update. For more information, see "Enable State Transfer for CAS Servers" in *SAS Viya Platform: Deployment Guide*.

Support for Additional Spark Distributions

SAS In-Database Technologies for Spark supports additional Spark distributions: Databricks 6.x and 7.x for Microsoft Azure or Amazon Web Services.

Documentation Update for SAS Workload Management

The documentation has been updated with a new requirement for SAS Workload Management. When SAS Workload Management is deployed with SAS Viya, compute servers and other components that are started by the launcher do not run if hosts with the `workload.sas.com/class=compute` label are not found in the cluster.

2021.1.6 (October 2021)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

Support for Red Hat OpenShift

SAS Viya can now be deployed in a Red Hat OpenShift on VMware environment. The documentation has been updated with system requirements and pre-installation tasks that are specific to OpenShift deployments.

External Instances of PostgreSQL and Red Hat OpenShift

SAS Viya deployments on Red Hat OpenShift now support external instances of PostgreSQL.

Support for Multi-tenancy

Note: Multi-tenant functionality was added to the Stable 2021.1.6 version on 17 November 2021. If you deployed your Stable 2021.1.6 software before this date and did not perform an update after this date, it does not include multi-tenancy functionality.

SAS Viya can be enabled to support multi-tenancy at the time of deployment. The documentation has been updated with system requirements, workload planning information, and customization requirements that are specific to multi-tenancy enablement. The documentation also describes the steps for onboarding and administering tenants after multi-tenancy is enabled.

Deprecated Kubernetes API Versions

SAS Viya has dropped support for the Kubernetes API versions that were deprecated in the Kubernetes 1.18 release in preparation for future support of Kubernetes 1.22. The deployment guide and READMEs include updated content related to these API versions.

2021.1.5 (September 2021)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

Documentation Updates for SAS Model Risk Management

SAS Model Risk Management requires a few pre-deployment steps and has unique requirements. For more information, see "Requirements for SAS® Model Risk Management" in *System Requirements for the SAS Viya Platform*.

Enhancements to SAS/ACCESS Interface to Spark

SAS/ACCESS Interface to Spark now supports Spark Server 3.1 and no longer requires you to collect the Spark client JAR files from the Hadoop cluster.

Where previously it supported only Hortonworks HDP 3.1, SAS/ACCESS Interface to Spark now supports four data sources.

Enhancement to SAS/ACCESS Interface to Snowflake

SAS/ACCESS Interface to Snowflake no longer requires the installation of a driver. The required client software is now included automatically.

Enhancements to SAS In-Database Products

SAS In-Database Technologies for Hadoop now supports additional Hadoop distributions. SAS In-Database Technologies for Spark is now supported and enables you to connect to a Databricks or Microsoft Azure Synapse Analytic data source.

2021.1.4 (August 2021)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

SAS Data Server Operator

The deployment and maintenance of PostgreSQL is now managed by the SAS Data Server Operator. PostgreSQL can still be deployed as either an external instance (your own version and instance of PostgreSQL to which SAS Viya connects) or as an internal instance using Crunchy Data. The internal instance is included with your SAS Viya software.

New Option for TLS Certificate Management

SAS has added a second certificate generator for the SAS Viya deployment: openssl. The openssl certificate generator is proprietary SAS software that uses the OpenSSL open-source project. This option for TLS certificate management is available in addition to the cert-manager utility.

Instructions for configuring openssl as the certificate generator are provided in the README file at **`$deploy/sas-bases/examples/security/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configure_network_security_and_encryption_using_sas_security_certificate_framework.htm`** (for HTML format).

Support for Additional Data Sources

SAS/ACCESS Interface to Microsoft SQL Server now supports Microsoft Azure SQL Server Big Data Clusters.

New SAS Mirror Manager Option

The option to mirror a specific version of the SAS Viya software has been enhanced. If deployment assets have been downloaded, you can use the new `--deployment-assets` flag to automatically extract the information that is required in order to populate the mirror with an exact cadence version and release.

2021.1.3 (July 2021)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

New Software Offering (Early Adopter)

SAS Workload Orchestrator is available as an Early Adopter product.

Host Launch for CAS Available

CAS can be configured to allow for host identity launches by including a patch transformer in the base kustomization.yaml file. For more information, see the "Enable Host Launch in the CAS Server" section of the README file located at **`$deploy/sas-bases/examples/cas/configure/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/configuration_settings_for_cas.htm`** (for HTML format).

2021.1.2 (June 2021)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

Documentation Updates and Improvements

The following information is included:

- In *System Requirements for SAS Viya*, the virtual machine recommendations for Google Cloud Platform have been updated.
- In *SAS Viya Operations: Updating Software*, additional guidance has been provided for first-time use of the deployment operator when applying a patch update and updating to a new version.

2021.1.1 (May 2021)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

SAS Image Staging Configuration Available

By default, SAS Image Staging starts pods on nodes via a daemonset at approximate two-minute intervals to ensure that relevant images have been pulled to hosts. Although this behavior accomplishes the goal of pulling images to nodes and decreasing start-up times, some users might want more intelligent and specific control with less churn in Kubernetes. To accomplish these goals, configure SAS Image Staging to take advantage of a node list to further decrease start-up times and target specific nodes for pulling.

For information about both methods of using SAS Image Staging, including a comparison of their relative advantages and disadvantages, see the README file at **`$deploy/sas-bases/examples/sas-prepull/README.md`** (for Markdown format) or at **`$deploy/sas-bases/docs/sas_image_staging_configuration_option.htm`** (for HTML format).

CAS Auto-Restart Option Available

By default, CAS does not automatically restart during version updates performed by the SAS Viya Deployment Operator. To change the default to enable auto-restart, see the "CAS Auto-Restart During Version Updates" section of the README file located at **`$deploy/sas-bases/overlays/cas-server/README.md`** (for Markdown format) or **`$deploy/sas-bases/docs/mpp_cas_server_for_sas_viya.htm`** (for HTML format).

SAS Micro Analytic Service Data Sources

Microsoft Azure PostgreSQL and Microsoft Azure SQL Database (via ODBC) are now additional data source options if you publish content to destinations on SAS Micro Analytic Service. Several offerings that include SAS Micro Analytic Service now offer this support. Consult the corresponding user documentation for more information.

2020.1.5 (April 2021)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

New Software Offering

SAS Inventory Optimization is available.

2020.1.4 (March 2021)

For each stable release, make sure that you are using the required versions of kubectl, Kustomize, and Kubernetes. See "Cluster Requirements for All Environments" in *System Requirements for the SAS Viya Platform* for details.

New Software Offerings

SAS Analytics for IoT and SAS Production Quality Analytics are available.

Emphasis on the SAS Viya Deployment Operator

The documentation about *SAS Viya Operations* has been revised to emphasize the use of the SAS Viya Deployment Operator. After extensive testing, SAS is ready to promote the operator as the automated method for deploying your SAS Viya software.

As a result, the documentation contains new information that emphasizes the use of the operator. In *SAS Viya: Deployment Guide*, the steps to deploy with the operator have been moved from an appendix and integrated with the guide along with the steps for a manual deployment. Other documents about *SAS Viya Operations* were reorganized and new sections were added as well.

Guidance for Infrastructure Provisioning by Cloud Provider

To help prepare the cloud-provider infrastructure prior to deploying SAS Viya, references to the SAS Viya Infrastructure as Code (IaC) projects are included.

These GitHub projects contain scripts and configuration files that can automatically provision the infrastructure components that are required in order to deploy SAS Viya on Microsoft Azure and on Amazon Web Services.

Reorganized "PostgreSQL and Crunchy Data" Appendix

The provider of the internal PostgreSQL database, Crunchy Data, has modified the organization of its pods. This reorganization is reflected in the organization of the "Available Pods" section in the "PostgreSQL and Crunchy Data Appendix." Here is a summary of the changes:

- The topics about the sas-crunchy-data-backrest-restore, sas-crunchy-data-pgdump, and sas-crunchy-data-pgrestore pods have been removed.
- The content from the removed topics is now included in the content for sas-crunchy-data-postgres.
- References to the sas-crunchy-data-postgres-12 pod have been replaced with "sas-crunchy-data-postgres".

Personal CAS Server Now Available

A single-user CAS server is now available for deployment. For more information, see "Create a Personal CAS Server" in *SAS Viya Platform: Deployment Guide*.

Integration with Microsoft Excel

SAS for Microsoft 365 is now included with most software orders. This integration is available to you unless your order consisted of SAS Event Stream Processing only.

If you plan to use the SAS Viya integration with Microsoft Excel, be aware that SAS for Microsoft 365 has additional system requirements. For more information, see "Create a Personal CAS Server" in *SAS Viya Platform: Deployment Guide*.

New SAS LOCALE and SAS ENCODING Functionality

New functionality is available that allows the specification of a single set of default SAS LOCALE and SAS ENCODING values for all SAS Compute Server, SAS/CONNECT, and SAS Batch server instances using a Kubernetes ConfigMap in the SAS Launcher Service. This default is initially set to en_US for LOCALE and utf8 for ENCODING. To change the default values, see the "Locale and Encoding

Defaults" section of the README file at **$deploy/sas-bases/examples/sas-launcher/configure/README.md** (for Markdown format) or at **$deploy/sas-bases/docs/configuration_settings_for_sas_launcher_service.htm** (for HTML format).

Before this change, the effective SAS LOCALE and SAS ENCODING were derived based on the `export LANG=<RedHat LANG values>` statement inside the startup_commands instance for configurations of sas.compute.server, sas.connect.server, and sas.batch.server. For backward compatibility, as of 2020.1.4, any such LANG values are still honored, and the derived LOCALE and ENCODING values are used and override the defaults from the Kubernetes ConfigMap described earlier.

Changes to storageclass.yaml Content

Prior to 2020.1.4, the creation of a storageclass.yaml file and its addition to the example kustomization.yaml file were treated as optional. Starting with 2020.1.4, they are required.

In addition, the content of the storageclass.yaml reference to be included in the example kustomization.yaml file has been revised. The new reference includes `sas-commonfiles` in the `annotationSelector` line.

See "Create a Personal CAS Server" in *SAS Viya Platform: Deployment Guide* and the example kustomization.yaml file in "Create a Personal CAS Server" in *SAS Viya Platform: Deployment Guide* for more information.

Change in the Default Value for the Write-Ahead Log In PostgreSQL

Prior to 2020.1.4, no setting was specified for the Write-Ahead Log (WAL) in the wal_keep_segments variable for internal instances of PostgreSQL. Therefore, the default setting of 8 was used, which caused the pg_wal subdirectory to consume 512 MB. Starting with 2020.1.4, wal_keep_segments is set to 500, which causes the pg_wal subdirectory to consume 8 GB. However, users can adjust this setting by revising and applying the postgres_custom_config.yaml generator.

For more information about changing the wal_keep_segments value, see the README file located at **$deploy\sas-bases\examples\configure-postgres\internal\custom-config\README.md** (for Markdown format) or at **$deploy\sas-bases\examples\docs\configuration_settings_for_postgresql_database_cluster.htm** (for HTML format). For information about how PostgreSQL uses WAL, see Write-Ahead Logging (WAL).

2020.1.3 (February 2021)

New Software Offering

SAS Risk Modeling is available.

New Pod to Support Search

A pod that contains Open Distro for Elasticsearch is automatically deployed, starting with this release. SAS Viya uses the Elasticsearch distributed search cluster in infrastructure and solution services. If your environment does not allow privileged containers, the Kubernetes administrator must make manual changes to the nodes that host stateful workloads. The pod includes a PVC of 128 Gi.

Support for Amazon Elastic Kubernetes Service (Early Adopter)

SAS Viya is supported on Amazon Web Services (AWS) only for the Early Adopter program. The documentation has been updated with system requirements that are specific to EKS environments.

Support for Google Kubernetes Engine (Early Adopter)

SAS Viya is supported on Google Cloud Platform (GCP) only for the Early Adopter program. The documentation has been updated with system requirements that are specific to GKE environments.

Additional Changes to System Requirements

Previous stable releases did not support versions of Microsoft Azure Kubernetes Service (AKS) later than version 1.18.x. These restrictions have been removed. In addition, the required container runtime is no longer limited to Docker. The System Requirements documentation has been updated to reflect the removal of the previous restrictions.

Microsoft fixed a bug in mid-February that affected SAS Viya MPP CAS deployments with AKS 1.19.x. One symptom is that load table actions on MPP CAS servers consistently fail with the following message: `A send or receive operation failed because the requested peer node is no longer present.` In order to avoid the issue, use a more recent (supported) level of AKS. For more information, see https://github.com/Azure/AKS/issues/2031.

2020.1.2 (January 2021)

Restrictions on Kubernetes Support

SAS internal testing has discovered a problem with versions of Microsoft Azure Kubernetes Service (AKS) that are later than version 1.18.*x*. These versions of Kubernetes include an unsupported container runtime. Therefore, these versions are not supported with this release of SAS Viya. SAS has also determined that only the Docker container runtime is supported with this release. The System Requirements documentation reflects these restrictions.

SAS Micro Analytic Service Data Sources

Microsoft SQL Server is now an additional data source option if you publish content to destinations on SAS Micro Analytic Service. Several offerings that include SAS Micro Analytic Service now offer this support. Consult the corresponding user documentation for more information.

Orchestration Tool deploy Command Available

The orchestration tool now includes the `deploy` command. For more information, see the README file at **`$deploy/sas-bases/examples/kubernetes-tools/README.md`** (for Markdown) or **`$deploy/sas-bases/docs/using_kubernetes_tools_from_the_sas-orchestration_image.htm`** (for HTML).

SAS Operational Qualification Tool

The SAS 9.4 Operational Qualification Tool can now be used with SAS Viya. For more information, see "The SAS Viya Platform and the SAS Operational Quality Tool" in *SAS Viya Platform: Deployment Guide*.

2020.1.1 (December 2020)

Restrictions on Kubernetes Support

SAS internal testing discovered a problem with versions of Microsoft Azure Kubernetes Service (AKS) that are later than version 1.18.*x*. These versions of Kubernetes include an unsupported container runtime. Therefore, these versions are not supported by this release of SAS Viya. SAS also determined that only the Docker container runtime was supported. The System Requirements documentation reflects these restrictions.

New Software Offerings

- SAS Assortment Planning
- SAS Demand Planning
- SAS Financial Planning
- SAS Markdown Optimization
- SAS Risk Cirrus: Asset and Liability Management (pre-production, Limited Availability)
- SAS Risk Engine
- SAS Size Optimization
- SAS Studio Analyst

Every SAS Viya order automatically includes all the SAS/ACCESS offerings. The following new SAS/ACCESS interfaces are available in order to add support for the corresponding data sources:

- SAS/ACCESS Interface to the PI System
- SAS/ACCESS Interface to Yellowbrick

If you plan to integrate data from these data sources, check the System Requirements: Data Source Requirements section to make sure your environment is configured appropriately.

System Requirements for SAS/ACCESS Interface to Impala

System Requirements for SAS/ACCESS Interface to Impala have been simplified. For more information, see " Requirements for SAS/ACCESS Interface to Impala" in *System Requirements for the SAS Viya Platform*.

Microsoft Azure Instance Type Recommendations

For Microsoft Azure, VM instance type recommendations have changed slightly. The section titled Sizing Recommendations for Selected Offerings on Microsoft Azure recommended using the same example VM, Microsoft Azure E16ds_v4, for all combinations of vCPUs and memory. The corrected examples recommend selecting the Standard_E8ds_v4 instance for 64 GB and 8 vCPUs, which more accurately reflects the available Microsoft Azure instance types.

Update Checker

A new set of environment variables is now available to enable you to use the Update Checker in an environment that is protected by a proxy server. For more information, see " Requirements for SAS/ACCESS Interface to Impala" in *System Requirements for the SAS Viya Platform*.

When updating software, new topics are provided for updating to a new version and creating an ad hoc report when using the Update Checker.