Red Hat OpenShift Data Science 1

Release notes

Features, Technology Previews, and known issues associated with this release
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Abstract

These release notes provide an overview of new features, enhancements, major technical changes, and any known bugs in the version of Red Hat OpenShift Data Science currently available in Red Hat OpenShift Dedicated and Red Hat OpenShift Service on Amazon Web Services (ROSA).
Table of Contents

PREFACE ......................................................................................................................... 3

CHAPTER 1. OVERVIEW OF OPENSİFT DATA SCIENCE .................................................. 4

CHAPTER 2. PRODUCT FEATURES .................................................................................. 5
  2.1. FEATURES FOR DATA SCIENTISTS .............................................................. 5
  2.2. FEATURES FOR IT OPERATIONS ADMINISTRATORS .................................... 5
  2.3. ENHANCEMENTS .............................................................................................. 6
  2.4. LIMITED SUPPORT FEATURES ........................................................................ 6

CHAPTER 3. BUG FIXES ................................................................................................. 7

CHAPTER 4. KNOWN ISSUES ......................................................................................... 9
PREFACE

See the following documents for service and life cycle information related to this release:

- OpenShift Data Science Service Definition
- OpenShift Data Science Life Cycle
CHAPTER 1. OVERVIEW OF OPENSSHIFT DATA SCIENCE

Using Red Hat OpenShift Data Science, users can integrate data, artificial intelligence and machine learning software to execute end-to-end machine learning workflows. OpenShift Data Science is available as an Add-on to Red Hat managed environments such as Red Hat OpenShift Dedicated and Red Hat OpenShift Service on Amazon Web Services (ROSA).

For data scientists, OpenShift Data Science includes JupyterHub and a collection of default notebook images optimized with the tools and libraries required for model development, and the TensorFlow and PyTorch frameworks. Deploy and host your models, integrate models into external applications, and export models to host them in any hybrid cloud environment. You can also accelerate your data science experiments through the use of graphics processing units (GPUs).

For administrators, OpenShift Data Science enables data science workloads in an existing Red Hat OpenShift Dedicated or ROSA environment. Manage users with your existing OpenShift identity provider, and manage the resources available to notebook servers to ensure data scientists have what they require to create, train, and host models.
CHAPTER 2. PRODUCT FEATURES

Red Hat OpenShift Data Science provides several features for data scientists and IT operations administrators.

2.1. FEATURES FOR DATA SCIENTISTS

One-page JupyterHub notebook server configuration
Choose from a default set of notebook images pre-configured with the tools and libraries you need for model development.

Collaborate on notebooks using Git
Use JupyterLab’s Git interface to work collaboratively with application developers or add other models to your notebooks.

Integrate with Red Hat OpenShift Streams for Apache Kafka
Integrate fault-tolerant real-time data streams into your notebooks and machine learning models by connecting OpenShift Data Science to Red Hat OpenShift Streams for Apache Kafka.

Deploy using application templates
Red Hat provides application templates designed for data scientists so that you can easily deploy your models and applications for testing purposes on either Red Hat OpenShift Dedicated or Red Hat OpenShift Service on Amazon Web Services (ROSA).

Try it out in the Red Hat Developer sandbox environment
You can try out OpenShift Data Science and access tutorials and activities in the Red Hat Developer sandbox environment.

Configure custom notebooks
In addition to notebook images provided and supported by Red Hat and independent software vendors (ISVs), you can configure custom notebook images that cater for your project’s specific requirements.

2.2. FEATURES FOR IT OPERATIONS ADMINISTRATORS

Install as an Add-on
Install the OpenShift Data Science as an Add-on to your Red Hat OpenShift Dedicated or Red Hat OpenShift Service on Amazon Web Services (ROSA) cluster using Red Hat OpenShift Cluster Manager (http://console.redhat.com/openshift/).

Manage users with your existing identity provider
OpenShift Data Science supports the same identity providers as OpenShift Dedicated and ROSA. You can configure existing groups in your identity provider as administrators or users of OpenShift Data Science.

Manage resources with OpenShift Dedicated
Use your existing OpenShift Dedicated or ROSA knowledge to configure and manage machine pools for your OpenShift Data Science users.

Customize PVC size to suit your workloads
Allocate the right amount of persistent storage for your data scientists by default to optimize resource costs and productivity.

Control Red Hat usage data collection
Choose whether to allow Red Hat to collect data about OpenShift Data Science usage in your cluster. Usage data collection is enabled by default when you install OpenShift Data Science on your OpenShift Dedicated cluster.

**Manage resource usage by stopping idle notebooks**

Reduce resource usage in your OpenShift Data Science deployment by stopping notebook servers that have been idle (without logged in users) for a period of time.

### 2.3. ENHANCEMENTS

This section describes enhancements to existing features in Red Hat OpenShift Data Science.

**Default persistent volume claim (PVC) size increased**

The default size of a PVC provisioned for a data science user in an OpenShift Data Science cluster has been increased from 2 GB to 20 GB.

**Improved resilience to OpenShift Dedicated node failure**

OpenShift Data Science services now try to avoid being scheduled on the same node so that OpenShift Data Science components are more failure resistant.

### 2.4. LIMITED SUPPORT FEATURES

This section outlines features provided with limited support in Red Hat OpenShift Data Science.

**NVIDIA GPU support now available**

To ensure that your data scientists can use compute-heavy workloads in their models, you can now enable graphics processing units (GPUs) in OpenShift Data Science. To make GPUs available in OpenShift Data Science, after you install OpenShift Data Science, you must install the NVIDIA GPU Add-On. GPU support is currently available as a Field Trial feature. For more information, see the [OpenShift Data Science Service Definition](#) and [Enabling GPU support in OpenShift Data Science](#).

**Additional resources**

- [OpenShift Data Science Service Definition](#)
CHAPTER 3. BUG FIXES

This section describes the fixes for notable user-facing issues in Red Hat OpenShift Data Science.

**JupyterHub was unable to display images when the NVIDIA GPU add-on was installed**

The Start a notebook server page did not display notebook images after installing the NVIDIA GPU add-on. Images are now correctly displayed, and can be started from the Start a notebook server page.

**PVC usage limit alerts were not sent when usage exceeded 90% and 100%**

Alerts indicating when a PVC exceeded 90% and 100% of its capacity failed to be triggered and sent. These alerts are now triggered and sent as expected.

**Cluster settings were reset on operator restart**

When the OpenShift Data Science operator pod was restarted, cluster settings were sometimes reset to their default values, removing any custom configuration. The OpenShift Data Science operator was restarted when a new version of OpenShift Data Science was released, and when the node that ran the operator failed. This issue occurred because the operator deployed ConfigMaps incorrectly. Operator deployment instructions have been updated so that this no longer occurs.

**The OpenVINO notebook image failed to build successfully**

The OpenVINO notebook image failed to build successfully and displayed an error message. This issue has now been resolved.

**Incorrect package versions were displayed during notebook selection**

The Start a notebook server page displayed an incorrect version number (4.9.0) for conda in the Anaconda notebook image. This has been corrected to display the installed version (4.13.0).

**Starburst Galaxy quick start did not provide download link in the instruction steps**

The Starburst Galaxy quick start, located on the Resources page on the dashboard, required the user to open the explore-data.ipynb notebook, but failed to provide a link within the instruction steps. Instead, the link was provided in the quick start’s introduction.

**Incorrect number of available GPUs were displayed in JupyterHub**

When a user attempted to create a notebook instance in JupyterHub, the maximum number of GPUs available for scheduling was not updated as GPUs were assigned. As a result, there was a delay if the user requested a GPU that was already assigned.

**Changing alert notification emails required pod restart**

Changes to the list of notification email addresses in the Red Hat OpenShift Data Science Add-On were not applied until after the rhods-operator pod and the prometheus-* pod were restarted.

**Red Hat OpenShift API Management 1.15.2 add-on installation did not successfully complete**

For OpenShift Data Science installations that are integrated with the Red Hat OpenShift API Management 1.15.2 add-on, the Red Hat OpenShift API Management installation process did not successfully obtain the SMTP credentials secret. Subsequently, the installation did not complete.

**GPU tutorial did not appear on dashboard**

The "GPU computing" tutorial, located at Gtc2018-numba, did not appear on the Resources page on the dashboard.

**GPU selection persisted when GPU nodes were unavailable**
When a user provisioned a notebook server with GPU support, and the utilized GPU nodes were subsequently removed from the cluster, the user could not create a notebook server. This occurred because the most recently used setting for the number of attached GPUs was used by default.

**Pachyderm now compatible with OpenShift Dedicated 4.10 clusters**

Pachyderm was not initially compatible with OpenShift Dedicated 4.10, and so was not available in OpenShift Data Science running on an OpenShift Dedicated 4.10 cluster. Pachyderm is now available on and compatible with OpenShift Dedicated 4.10.

**Uninstall process failed to complete when both OpenShift Data Science and OpenShift API Management were installed**

When OpenShift Data Science and OpenShift API Management are installed together on the same cluster, they use the same Virtual Private Cluster (VPC). The uninstall process for these Add-ons attempts to delete the VPC. Previously, when both Add-ons are installed, the uninstall process for one service was blocked because the other service still had resources in the VPC. The cleanup process has been updated so that this conflict does not occur.

**Images were incorrectly updated after upgrading OpenShift Data Science**

After the process to upgrade OpenShift Data Science completed, JupyterHub failed to update its notebook images. This was due to an issue with the image caching mechanism. Images are now correctly updating after an upgrade.

**Incorrect TensorFlow and TensorBoard versions displayed during notebook selection**

The Start a notebook server page displayed incorrect version numbers (2.4.0) for TensorFlow and TensorBoard in the TensorFlow notebook image. These versions have been corrected to TensorFlow 2.7.0 and TensorBoard 2.6.0.

**Quick start links did not display for enabled applications**

For some applications, the Open quick start link failed to display on the application’s card on the Enabled page. As a result, users did not have direct access to the quick start tour for the relevant application.

**Incorrect Python versions displayed during notebook selection**

The Start a notebook server page displayed incorrect versions of Python for the TensorFlow and PyTorch notebook images. Both images incorrectly displayed Python 3.8.6. The actual version used was Python 3.8.8. Additionally, the third integer of package version numbers is now no longer displayed.

**Missing step in Getting Started with OpenShift Streams for Apache Kafka**

The guided tour for OpenShift Streams for Apache Kafka missed a step on assigning read permissions to the service account. This step is now included, allowing users to complete the guided tour without issues.

**Ten minute wait after notebook server start fails**

If the JupyterHub leader pod failed while the notebook server was being started, the user could not access their notebook server until the pod restarted, which took approximately ten minutes. This process has been improved so that the user is redirected to their server when a new leader pod is elected. If this process times out, users see a 504 Gateway Timeout error, and can refresh to access their server.
CHAPTER 4. KNOWN ISSUES

This section describes known issues in Red Hat OpenShift Data Science and any known methods of working around the issues described.

The previously installed version of the Minimal Python notebook image persists after upgrading to OpenShift Data Science 1.15

After upgrading from OpenShift Data Science 1.14 to 1.15, the older version of the Minimal Python notebook persists, including all associated package versions.

Incorrect headings display in the Notebook Images page

The Notebook Images page, accessed from the Settings page on the OpenShift Data Science dashboard, displays incorrect headings in the user interface. The headings BYON image settings and Import BYON images are erroneously displayed, instead of Notebook image settings and Import Notebook images respectively.

The OpenShift Data Science dashboard log contains an excessive number of "missing x-forwarded-access-token header" error messages

The rhods-dashboard pod’s log contains an excessive number of error messages similar to the following:

```
"
```

JupyterHub cannot start TensorFlow, PyTorch and CUDA notebook servers

JupyterHub’s Start a notebook server page fails to start a notebook server using the TensorFlow, PyTorch and CUDA notebook images. Instead, the following error message is displayed:

Back-off restarting failed container

Workaround: If you see this error while attempting to start a notebook server using the TensorFlow, PyTorch and CUDA notebook images, use the following steps to refresh the image cache on each worker node in your cluster. This requires the cluster-admins role in OpenShift Dedicated.

a. Log in to your cluster using the oc client.

b. Rebuild the CUDA images.

   `$ oc start-build s2i-minimal-gpu-cuda-11.4.2-notebook -n redhat-ods-applications`

c. Open a debug environment for the node and use chroot to set the root directory to /host.

   `$ oc debug node/<worker node>
   $ chroot /host`

d. Check when the cached image was created.

   `$ podman inspect <image name>:<tag> | jq '.[0].Created'


e. Remove any old cached images.
$ podman rmi <image name>:<tag>

For example:

$ oc debug node/ip-10-0-0-1-ab1-internal
$ chroot /host
$ podman inspect image-registry.openshift-image-registry.svc:5000/redhat-ods-applications/pytorch:py3.8-cuda-11.4.2-2 | jq ".[0].Created"
$ podman rmi image-registry.openshift-image-registry.svc:5000/redhat-ods-applications/pytorch:py3.8-cuda-11.4.2-2
$ podman inspect image-registry.openshift-image-registry.svc:5000/redhat-ods-applications/minimal-gpu:py3.8-cuda-11.4.2 | jq ".[0].Created"
$ podman rmi -f image-registry.openshift-image-registry.svc:5000/redhat-ods-applications/minimal-gpu:py3.8-cuda-11.4.2;
$ podman inspect image-registry.openshift-image-registry.svc:5000/redhat-ods-applications/tensorflow:py3.8-cuda-11.4.2-2 | jq ".[0].Created"
$ podman rmi -f image-registry.openshift-image-registry.svc:5000/redhat-ods-applications/tensorflow:py3.8-cuda-11.4.2-2;

A non-standard check box displays after disabling usage data collection

After disabling usage data collection on the Cluster settings page, when a user accesses another area of the OpenShift Data Science dashboard, and then returns to the Cluster settings page, the Allow collection of usage data check box has a non-standard style applied, and therefore does not look the same as other check boxes when selected or cleared.

Spurious notebook image build errors

After OpenShift Data Science is upgraded to version 1.15, alert messages such as "JupyterHub image builds are failing" incorrectly indicate that notebook images are failing to build. These messages are firing erroneously, and can be safely ignored.

JupyterHub fails to start a notebook server using the OpenVINO notebook image

JupyterHub’s Start a notebook server page fails to start a notebook server using the OpenVINO notebook image. Intel is investigating this issue and will provide a resolution in the form of an OpenVINO operator update.

Tensorboard requires manual steps to view

When a user has TensorFlow or PyTorch notebook images and wants to use TensorBoard to display data, manual steps are necessary to include environment variables in the notebook environment, and to import those variables for use in your code.

Workaround: To work around this issue, when you start your notebook server, use the following code to set the value for the TENSORBOARD_PROXY_URL environment variable to use your OpenShift Data Science user ID.

```python
import os
os.environ["TENSORBOARD_PROXY_URL"]="/user/<user-id>/proxy/6006/"
```

You can also use the JUPYTERHUB_SERVICE_PREFIX environment variable to set this correctly:

```python
os.environ["TENSORBOARD_PROXY_URL"]=
os.environ["JUPYTERHUB_SERVICE_PREFIX"]="/proxy/6006/"
```
The Intel® oneAPI AI Analytics Toolkits quick start references nonexistent sample notebooks

The Intel® oneAPI AI Analytics Toolkits quick start, located on the Resources page on the dashboard, requires the user to load sample notebooks as part of the instruction steps, but refers to notebooks that do not exist in the associated repository.

The CronJob responsible for validating Anaconda Professional Edition's license is suspended and does not run daily

The CronJob responsible for validating Anaconda Professional Edition’s license is automatically suspended by the OpenShift Data Science operator. As a result, the CronJob does not run daily as scheduled. In addition, when Anaconda Professional Edition’s license expires, Anaconda Professional Edition is not indicated as disabled on the OpenShift Data Science dashboard.

The NVIDIA GPU add-on card on the dashboard displays button unnecessarily

GPUs are automatically available in JupyterHub after the NVIDIA GPU add-on is installed. The Enable button, located on the NVIDIA GPU add-on card on the Explore page, is therefore redundant. In addition, clicking the Enable button moves the NVIDIA GPU add-on card to the Enabled page, even if the add-on is not installed.

The jupyterhub-username cookie does not expire

In JupyterHub, the jupyterhub-username cookie does not expire as it is updated from the server. As a result, notebook sessions in JupyterHub also do not expire.

Dashboard administration settings are not enabled for fully qualified user names

When logging into a cluster using Google authentication, the <organization user name>@<Google apps organization domain> user name is created for OpenShift Container Platform. When this fully qualified user name is added to the dedicated-admins user group, dashboard settings are subsequently unavailable for that user, as the domain is not recognized.

Workaround: Add the shortened version of the user name to the dedicated-admins user group, omitting the Google apps organization domain name.

Incorrect package versions displayed during notebook selection

The Start a notebook server page displays an incorrect version number (11.4) for the CUDA notebook image. The actual installed version is 11.6.

Dashboard does not display Enabled page content after ISV operator uninstall

After an ISV operator is uninstalled, no content is displayed on the Enabled page on the dashboard. Instead, the following error is displayed:

Error loading components
HTTP request failed

Workaround: Wait 30–40 seconds and then refresh the page in your browser.

Incorrect package versions displayed during notebook selection

The Start a notebook server page displays incorrect version numbers (3.0.14 and 6.3.0) for JupyterLab and Notebook in the Intel openVINO notebook image, and (3.0.14 and 6.1.12) for JupyterLab and Notebook in the oneAPI AI Analytics Toolkit notebook image. The actual installed versions are JupyterLab 3.4.2 and Notebook 6.4.11 in the Intel OpenVINO notebook image, and JupyterLab 3.2.1 and Notebook 6.4.6 in the oneAPI AI Analytics Toolkit notebook image.

Unavailable images set as default selection in JupyterHub during a rebuild
During a rebuild of the Pytorch and TensorFlow images, if either of these images is specified in the user’s configmap as the last selected image, the image remains selected by default in JupyterHub.

**Error can occur when creating a notebook instance**

When creating a notebook instance in JupyterHub, a *Directory not found* error appears intermittently. This error message can be ignored by clicking *Dismiss*.

**Ten minute wait after notebook server start fails**

If the JupyterHub leader pod fails while the notebook server is starting, the user cannot access their notebook server until the pod restarts. This takes approximately ten minutes.  
*Workaround:* Click *Try Again* in the notebook server interface.

**Seldon unavailable on OpenShift Dedicated 4.9 or higher**

Seldon is not available in OpenShift Data Science because it is not yet compatible with OpenShift Dedicated 4.9 or higher. OpenShift Dedicated is used by OpenShift Data Science. There is currently no workaround for this issue.

**Terminal access unavailable in Pachyderm pod**

The *pachd* pod created by Pachyderm intentionally does not provide Terminal access to OpenShift Dedicated administrators. The Terminal view in the OpenShift Dedicated web console is provided regardless of whether pods provide access. If you attempt to access the Terminal view for the *pachd* pod, the following expected error appears:

```
ERRO[0000] exec failed: container_linux.go:367: starting container process caused: exec: "sh": executable file not found in $PATH
command terminated with non-zero exit code: exit status 1
The terminal connection has closed.
```

**Actions on dashboard not clearly visible**

The dashboard actions to re-validate a disabled application’s license, and to remove a disabled application’s card are not clearly visible to the user. These actions only appear when the user clicks on the application card’s *Disabled* label. As a result, the intended workflows may not be clear to the user.

**License re-validation action appears unnecessarily**

The dashboard action to re-validate a disabled application’s license appears unnecessarily for applications that do not have a license validation or activation system. In addition, when a user attempts to re-validate a license that cannot be re-validated, feedback is not displayed to state why the action cannot be completed.

**Error can occur during Pachyderm deployment**

When creating an instance of the Pachyderm operator, a webhook error appears intermittently, preventing the creation process from starting successfully. The webhook error is indicative that, either the Pachyderm operator failed a health check, causing it to restart, or that the operator process exceeded its container’s allocated memory limit, triggering an Out of Memory (OOM) kill.  
*Workaround:* Repeat the Pachyderm instance creation process until the error no longer appears.

**Error occurs while fetching the generated images in the sample Pachyderm notebook**

An error occurs when a user attempts to fetch an image using the sample Pachyderm notebook in JupyterHub. The error states that the image could not be found.
Workaround: If the error stating that the image could not be found occurs, run the following commands:

$ oc adm policy add-scc-to-user anyuid -z pachyderm-worker
$ oc scale rc/pipeline-edges-v1 --replicas=0; oc scale rc/pipeline-edges-v1 --replicas=1

This command must be performed by an administrator with cluster-admins role privileges.

---

**PyTorch and TensorFlow images are unavailable in JupyterHub during a rebuild**

Users are unable to start PyTorch and TensorFlow notebooks in JupyterHub during a rebuild.

---

**PyTorch and TensorFlow images are unavailable when upgrading**

When upgrading from OpenShift Data Science 1.3 to a later version, PyTorch and TensorFlow images are unavailable to users for approximately 30 minutes. As a result, users are unable to start PyTorch and TensorFlow notebooks in JupyterHub during the upgrade process. **Workaround:** Users that start their TensorFlow or PyTorch images prior to the upgrade do not experience any disruption. Therefore, it is recommended that users start their PyTorch or TensorFlow notebooks prior to commencing the upgrade.

---

**IBM Watson Studio not available in OpenShift Data Science**

IBM Watson Studio is not available when OpenShift Data Science is installed on OpenShift Dedicated 4.9 or higher, because it is not compatible with these versions of OpenShift Dedicated. Contact Marketplace support for assistance manually configuring Watson Studio on OpenShift Dedicated 4.9 and higher.

---

**Gateway errors during notebook server creation**

If the leader JupyterHub pod fails during notebook server creation and a new leader pod is not selected before a user is redirected to their notebook server, users may see either a 504 Gateway Timeout error page or a 502 Bad Gateway error page. A new leader pod is selected after a few seconds. To recover from this error, wait a few seconds and then refresh the page.

---

**Unnecessary warnings about missing Graphical Processing Units (GPUs)**

The TensorFlow notebook image checks for graphical processing units (GPUs) whenever a notebook is run, and issues warnings about missing GPUs when none are present. These messages can safely be ignored, but you can disable them by running the following in a notebook when you start a notebook server that uses the TensorFlow notebook image.

```python
import os
os.environ['TF_CPP_MIN_LOG_LEVEL'] = '3'
```

---

**Cannot delete Git repositories in JupyterLab file browser**

When a user attempts to delete a directory using the JupyterLab file browser, deletion fails if the directory is not empty. Hidden files such as the .git directory in a Git repository are not shown in the JupyterLab file browser, so Git repositories cannot be deleted from the JupyterLab file browser. **Workaround:** To delete a Git repository from JupyterLab:

- Use the JupyterLab launcher to open a Terminal.
- Run the remove command, `rm -rf <path>`, replacing `<path>` with the path to the Git repository directory, for example, `repos/my-project-repo`.  

---

CHAPTER 4. KNOWN ISSUES
**Cannot set container size during notebook server creation**

The **Container size** dropdown menu is intermittently not displayed on the **Create a notebook server** page. Users cannot select a container size other than the default if this menu does not display. You may be able to trigger the correct behavior by refreshing the page.

**Previously authenticated sessions persist after user configuration change**

When an administrator logs in to JupyterHub and later configures a custom user group to replace a default user group, the JupyterHub session that was initially authenticated using the default group persists for up to five minutes in the same browser window. This mainly affects administrators attempting to test permissions after adding or removing a custom user group for their identity provider.

**Workaround:** After changing user group configuration, manually log out of all sessions before testing updated user permissions.

**OpenShift Data Science hyperlink still visible after uninstall**

When the OpenShift Data Science Add-on is uninstalled from an OpenShift Dedicated cluster, the link to the OpenShift Data Science interface remains visible in the application launcher menu. Clicking this link results in a "Page Not Found" error because OpenShift Data Science is no longer available.

**User sessions persist in some components**

Although users of OpenShift Data Science and its components are authenticated through OpenShift, session management is separate from authentication. This means that logging out of OpenShift Dedicated or OpenShift Data Science does not affect a logged in JupyterHub session running on those platforms. When a user’s permissions change, that user must log out of all current sessions so that changes take effect.

**Deleted users stay logged in to JupyterHub for up to 5 minutes**

When a user’s permissions for JupyterHub are revoked, it takes up to five minutes for JupyterHub to log the user out. After a user has been removed from a valid user group, the user is able to spawn a new notebook server for about 30 seconds, and is able to continue working in JupyterLab for up to five minutes before they are logged out.

**Removed users are shown in the JupyterHub administrative interface**

When a user’s permission to access JupyterHub is revoked, they are prevented from creating or starting notebook servers, but their user name still appears in the list of users in the JupyterHub administrative interface. This happens because the cleanup step to remove that user from JupyterHub’s user list is missing. There is currently no customer workaround for this issue.

**Notebook servers shut down after 24 hours**

A JupyterHub user can be logged in for a maximum of 24 hours. After 24 hours, user credentials expire, the user is logged out of JupyterHub, and their notebook server pod is stopped and deleted regardless of any work running in the notebook server. There is currently no workaround for this issue. However, you can configure OAuth tokens to expire after a set period of inactivity. See **Configuring the internal OAuth server** for more information.