Machine Learning 1.4.1

Cloudera Machine Learning Runtimes

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Contents

Managing ML Runtimes

Provides overview, installation, set up, configuration, and customization information for Machine Learning Runtimes.

ML Runtimes are responsible for running the code written by users and intermediating access to the Data Hub.

You can think of an ML Runtime as a virtual machine, customized to have all the necessary dependencies to access the computing cluster while keeping each project's environment entirely isolated. To ensure that every ML Runtime has access to the parcels and client configuration managed by the Cloudera Manager Agent, a number of folders are mounted from the host into the container environment.

ML Runtimes versus Legacy Engine

While Runtimes and the Legacy Engine are both container images that contain the Linux OS, interpreter(s), and libraries, ML Runtimes keeps the images small and improves performance, maintenance, and security.

Note: Starting with the current CML release, Engines are deprecated. Cloudera recommends using ML Runtimes for all new projects from now on. You can also migrate existing Engine-based projects to ML Runtimes. Engines are still supported, but new features are only be available for ML Runtimes.

Runtimes and the Legacy Engine serve the same basic goal: they are container images that contain a complete Linux OS, interpreter(s), and libraries. They are the environment in which your code runs. However, ML Runtimes design keeps the images small, which improves performance, maintenance, and security.

There is one Legacy Engine. The Engine is monolithic. It contains the machinery necessary to run sessions using all four Engine interpreter options that Cloudera currently supports (Python 2, Python 3, R, and Scala) and a much larger set of UNIX tools including LaTeX.

Runtimes are the future of CML. There are many Runtimes. Currently each Runtime contains a single interpreter (for example, Python 3.8, R 4.0) and a set of UNIX tools including `gcc`. Each Runtime supports a single UI for running code (for example, the Workbench or JupyterLab).

To migrate from Legacy Engine to Runtimes, you'll need to modify your project settings. See *Modifying Project Settings* for more information.

Jupyter

Our Python Runtimes support JupyterLab, a general purpose IDE from the Jupyter project. The engine supports Jupyter Notebook, a simpler UI focused on Notebooks. If you prefer the simpler Notebook UI, choose Classic Notebook from the JupyterLab Help menu. To further customize the JupyterLab experience on CML see *Using Editors for ML Runtimes*.

Build dependencies

Runtimes generally include fewer UNIX tools than the Legacy Engine. This means you are more likely to find that you cannot install a Python or R package because the Runtime is missing a build dependency such as a library. This should not happen often with Python. Most Python packages are distributed as precompiled "wheels", so there are no build dependencies. It is more likely to happen with R packages because precompiled packages are not available for our architecture. We have tried to cover most common use cases, but if you find you cannot build something, then please contact customer support.

Using pip to install libraries in Python

To install a Python library from within Workbench or JupyterLab we recommend you use %pip (for example, %pip install sklearn. %pip is a "magic" command that is guaranteed to point to the right version of pip. This is a good habit to get into, as it will work outside CML. Note you do not need to add "3" to install a Python 3 library.

If you prefer to use the pip executable directly, both pip and pip3 work. This is because Runtimes do not include Python 2. Like any shell command, precede it with "!" to run it from within Workbench or JupyterLab (for example,

!pip install sklearn. In the Legacy Engine you must use pip3 to install Python 3 packages and the %pip magic command is not supported.

Python paths

Python Runtimes include preinstalled Python packages at /usr/local/lib/python/<version>/site-packages. The pre-installed packages and versions are documented in *Pre-Installed Packages in ML Runtimes*.

When you use pip, you install packages into the current project (not a runtime image) at /home/cdsw/.local/lib/python/<version>/site-packages. This means you need to reinstall packages if you change Python versions.

In most cases, you can install a newer version of a package preinstalled in /usr/local into your project. For example, we preinstall numpy and you can install a newer version. But there are some exceptions to this: if you install matplotlib, ipykernel, or its dependencies (ipython, traitlets, jupyter_client, and tornado) then you may break your ability to launch sessions.

If you accidentally install these packages (or you see unexpected behavior when you switch a project from Legacy Engine to Runtimes), the simplest solution is to delete /home/cdsw/.local/lib/python and reinstall your project's dependencies from the project overview page.

R paths

R Runtimes include preinstalled R packages at /usr/local/lib/R/library/. The pre-installed packages and versions are documented in *Pre-Installed Packages in ML Runtimes*.

When you use install.packages(), you install packages into the current project (not a runtime image) at /home/cdsw/.local/lib/R/<version>/library (for example, $R_LIBS_USER). This means you need to reinstall packages if you change R versions.

Note the R project package path in Legacy Engines. If you use engines, you install packages to /home/cdsw/R. The change to /home/cdsw/.local/lib/R/<version>/library was made to support multiple versions of R.

In most cases, you can install a newer version of a package preinstalled /usr/local into your project. For example, we preinstall ggplot2 and you can install a newer version. But there are two exceptions to this. If you install Cairo or RServe they may break your ability to launch sessions.

If you accidentally install these packages (or you see unexpected behavior when you switch a project from Legacy Engine to Runtimes), the simplest solution is to delete /home/cdsw/.local/lib/python and reinstall your project's dependencies from the project overview page.

Related Information

Creating a Project with Legacy Engine Variants

Modifying Project Settings

Using Runtime Catalog

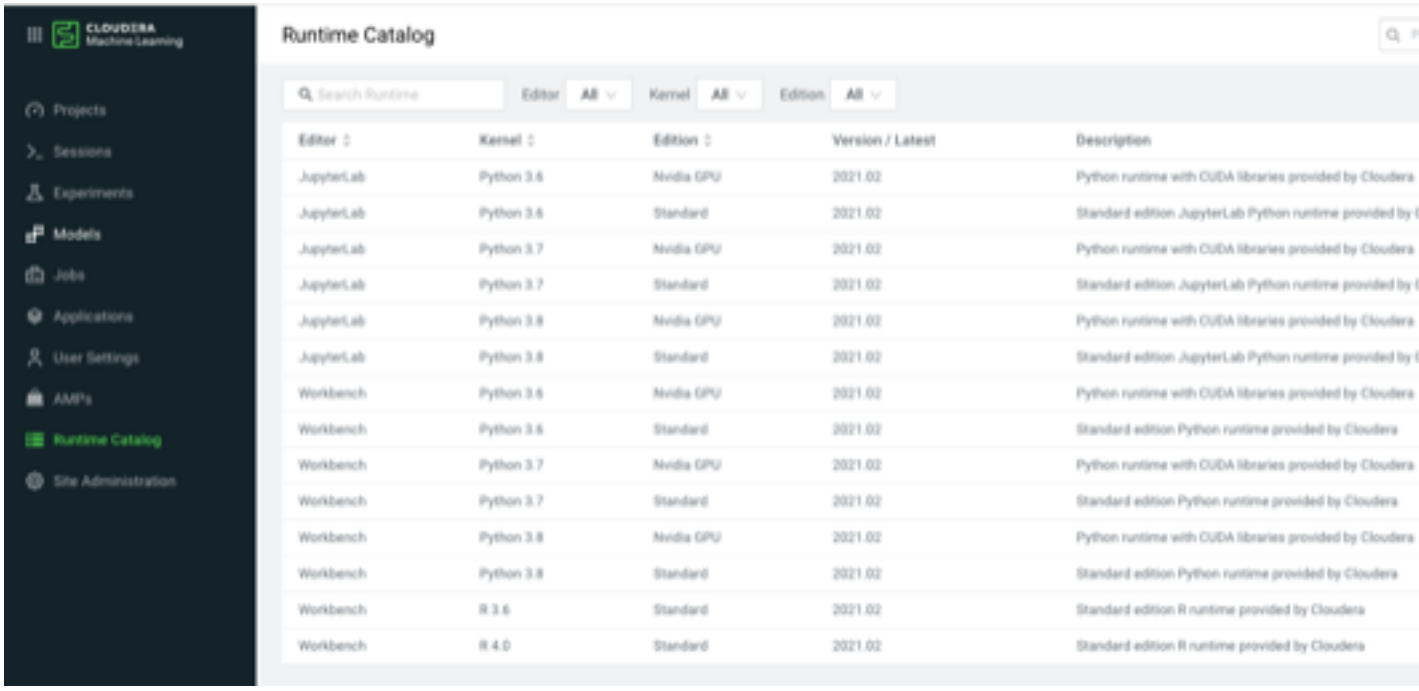
You can use the Runtime catalog to list all runtimes that are available for your deployment.

About this task

The Runtime Catalog lists information about each of the available runtimes. Information includes the editor and kernel supported by the runtime along with the edition, version, and a brief description.

Procedure

Click Runtime Catalog in the left Navigation bar to display a list of all available runtimes.



Using ML Runtimes Addons

ML Runtime Addons allow you to add Spark and Hadoop CLI to sessions run on projects using ML Runtime images.

While Legacy Engines include support for both Spark and Hadoop CLI, ML Runtimes do not contain Spark and Hadoop CLI binaries to keep them small and lean. Instead Spark and Hadoop binaries are stored in persistent storage on an NFS server and can be added to your ML Runtime sessions.

Adding Hadoop CLI to ML Runtime Sessions

Hadoop CLI can be enabled only on sessions that are selected to use Spark.

About this task

To add Hadoop CLI to sessions run on projects using ML Runtimes images:

Procedure

1. You can view all available ML Runtime addons by selecting the Site Administration>Runtime/Engine tab and viewing Runtime Addons.
2. To include Hadoop in all sessions created in the workspace, under Site Administration>Runtime/Engine, choose the desired Hadoop version in the pull down menu next to Hadoop CLI Version.

   Note: Hadoop CLI can be enabled only on sessions that are selected to use Spark.

   This will add Hadoop CLI to all sessions created in the workspace.
3. To use Hadoop commands for your session, click the Terminal Access button at the top of the Session window.

   CML launches a terminal window in which you can use Hadoop commands.

Adding Spark to ML Runtime Sessions

You can add Spark to ML Runtime Sessions using the ML Runtimes Addons. Both Spark and Hadoop CLI are enabled when you enable Spark.

About this task

To add Spark to sessions run on projects using ML Runtimes images:

Procedure

1. You can view all available ML Runtime addons by selecting the Site Administration>Runtime/Engine tab and viewing Runtime Addons.
2. Start a New Session for an ML Runtimes project.
3. Click the Enable Spark option, then select the Spark version.
4. Click Start Session.
5. You can now run a Spark job for your session.

   The Logs tab displays the executors in your Spark job.
6. After you start a Spark job, you can access the Spark UI by clicking the Spark UI button at the top of the Session window.

Turning off ML Runtimes Addons

ML Runtimes Addons is turned on by default. However, you can disable ML Runtimes Addons.

Procedure

1. Select Site Administration > Settings.
2. Under Feature Flags, uncheck the checkbox next to Allow users to Run ML Runtimes Addons.

ML Runtimes NVIDIA GPU Edition

The NVIDIA GPU Edition Runtimes are built on top of NVIDIA CUDA docker images. CUDA is a parallel computing platform and programming model developed by NVIDIA for general computing on graphical processing units (GPUs). With CUDA, developers can dramatically speed up computing applications by harnessing the power of GPUs.

Cloudera Machine Learning supports GPUs using particular ML Runtime Editions. NVIDIA GPUs together with related specialized software can be utilized using the NVIDIA GPU Edition.

Version information:

Version	Additional software	Tested OS	Tested Driver Version
2021.09	CUDA 11.4	RHEL 7.6	NVIDIA driver 460.56

Compatibility information:

Runtime Version	CUDA Version	Kernels	Editors	Base Image
2021.02	CUDA 11.1	Python 3.7 and Python 3.8	Workbench and JupyterLab	

ML Runtimes inherit the compatibility requirements for NVIDIA CUDA. For compatibility information, visit the following pages:

- NVIDIA/CUDA compatibility matrix
- Tensorflow requirements
- Pytorch requirements

Testing ML Runtime GPU Setup

You can use the following simple examples to test whether the new ML Runtime is able to leverage GPUs as expected.

1. Go to a project that is using the ML Runtimes NVIDIA GPU edition and click Open Workbench.
2. Launch a new session with GPUs.
3. Run the following command in the workbench command prompt to verify that the driver was installed correctly:

```
! /usr/bin/nvidia-smi
```

4. Use any of the following code samples to confirm that the new engine works with common deep learning libraries.

Pytorch

```
!pip3 install torch==1.4.0
from torch import cuda
assert cuda.is_available()
assert cuda.device_count() > 0
print(cuda.get_device_name(cuda.current_device()))
```

Tensorflow

```
!pip3 install tensorflow-gpu==2.1.0
from tensorflow.python.client import device_lib
assert 'GPU' in str(device_lib.list_local_devices())
device_lib.list_local_devices()
```

Keras

```
!pip3 install keras
from keras import backend
assert len(backend.tensorflow_backend._get_available_gpus()) > 0
print(backend.tensorflow_backend._get_available_gpus())
```

ML Runtimes NVIDIA RAPIDS Edition

The RAPIDS Edition Runtimes are built on top of community built RAPIDS docker images. The RAPIDS suite of software libraries gives you the freedom to execute end-to-end data science and analytics pipelines entirely on GPUs. It relies on NVIDIA CUDA primitives for low-level compute optimization, but exposes that GPU parallelism and high-bandwidth memory speed through user-friendly Python interfaces.

Note: RAPIDS require NVIDIA Pascal or better GPUs. You need to use P3 or newer EC2 instances on AWS to meet this requirement.

Visit rapids.ai for more information.

ML Runtimes RAPIDS edition differs from other Runtime Editions in the following ways:

- Python maintenance versions differ from what is being used in the Standard and NVIDIA GPU edition runtimes. These Python kernels are coming from the RAPIDS base image.
- Pre-installed Python packages and package versions differ from what's in Standard and NVIDIA GPU edition runtimes.

RAPIDS Runtimes are an optional extension of the Cloudera ML Runtime distribution. The RAPIDS images are not distributed automatically. Administrators can register them in the Runtime Catalog. The following RAPIDS editions are available for the 2021.04 Runtime version:

RAPIDS and CUDA Version	**Kernel**	**Editor**	**Base Image**	**Docker**
RAPIDS 0.18 CUDA 11.0	Python 3.7	Workbench editor	rapidsai/rapidsai-core:0.18-cuda11.0-base-ubuntu20.04-py3.7	docker.repository.cloudera.com/cloudera/cdsw/ml-runtime-workbench-python3.7-rapids:2021.12.1-b17
RAPIDS 0.18 CUDA 11.0	Python 3.8	Workbench editor	rapidsai/rapidsai-core:0.18-cuda11.0-base-ubuntu20.04-py3.8	docker.repository.cloudera.com/cloudera/cdsw/ml-runtime-workbench-python3.8-rapids:2021.12.1-b17
RAPIDS 0.18 CUDA 11.0	Python 3.7	JupyterLab editor	rapidsai/rapidsai-core:0.18-cuda11.0-base-ubuntu20.04-py3.7 Note: This image isn't based on NVIDIA's JupyterLab installation so RAPIDS library examples are not installed.	docker.repository.cloudera.com/cloudera/cdsw/ml-runtime-jupyterlab-python3.7-rapids:2021.12.1-b17
RAPIDS 0.18 CUDA 11.0	Python 3.8	JupyterLab editor	rapidsai/rapidsai-core:0.18-cuda11.0-base-ubuntu20.04-py3.8 Note: This image isn't based on NVIDIA's JupyterLab installation so RAPIDS library examples are not installed.	docker.repository.cloudera.com/cloudera/cdsw/ml-runtime-jupyterlab-python3.8-rapids:2021.12.1-b17

RAPIDS Python environment

The RAPIDS python libraries are distributed and present as a conda environment in the docker image. While it's possible to install additional libraries for your project via conda, these packages will be installed to a non-persistent part of the file system and won't persist between sessions and jobs.

Installing additional libraries via pip is supported and works the same way as in other Runtimes.

Note: the RAPIDS images have the official Anaconda channels configured for conda, if you decide to use conda to install packages, make sure you are familiar with Anaconda's license requirements.

Related Information

Testing ML Runtime GPU Setup

Using Editors for ML Runtimes

Cloudera Machine Learning provides a Workbench UI to edit and run code, but we also provide a preconfigured JupyterLab runtime to allow this. Choose the editor you prefer when launching a ML Runtime session.

Using JupyterLab with ML Runtimes

JupyterLab is a web-based interactive development environment for Jupyter notebooks, code, and data.

You can use JupyterLab to configure and arrange the user interface to support a wide range of workflows in data science, scientific computing, and machine learning. JupyterLab allows you to use extensions that add new components and integrate with existing ones.

You must install any files necessary for JupyterLab, including configuration, customization, extensions, and kernels, into /home/cdsw for each project.

Code Completion in JupyterLab

You can use JupyterLab to write and run code in notebooks or in a traditional .py file. Completion works out of the box in notebooks and consoles. If you are working in a .py file in the text editor, you must create a console to provide the completion suggestions. To do this:

1. Open the .py file.
2. Right click on the document and choose "Create console for editor".
3. Choose the option appropriate to the type of completion you want to perform.

   For example, to get completions on "math", you must first "import math" in the console.

Set JupyterLab Timeouts

You can control JupyterLab timeouts with the following environment variables:

```
JUPYTER_KERNEL_TIMEOUT_SECONDS
JUPYTER_SERVER_TIMEOUT_SECONDS
```

Installing a Jupyter extension

Extensions modify the appearance or behaviour of Jupyter applications (including JupyterLab and Jupyter Notebook).

Before you begin

You must install any files necessary for JupyterLab, including configuration, customization, extensions, and kernels, into /home/cdsw for each project.

Note: Any Jupyter Extension that is not specifically designed for JupyterLab should work fine with Jupyter Notebook, which is preinstalled in Legacy Engine engine:14.

About this task

The following example installs the ipython-sql extension. This extension adds a %sql magic command that allows you to communicate directly with any database supported by SQLAlchemy.

Procedure

1. Launch a JupyterLab session.
2. Open a terminal and run the following command:

```
pip install ipython-sql
```

Note: The previous command is only an example for installing ipython-sql.

3. Open a notebook or console and run the following command:

```
%load_ext sql
```

Results

You can now use the %sql magic command to connect to a particular database, and the %%sql magic command to create a cell containing an SQL query to run against that database. See the JupyterLab documentation for additional information on Jupyter magic commands.

Installing a Jupyter kernel

Jupyter kernels are “connections” through which a notebook (or other part of JupyterLab) can talk to a particular interpreter. CDSW includes one kernel in each JupyterLab Runtime: Python 3.6, Python 3.7, or Python 3.8.

Jupyter kernels are “connections” through which a notebook (or other part of JupyterLab) can talk to an interpreter. ML Runtimes come with a Jupyter kernel for Python 3.6, 3.7 or 3.8 preinstalled, but you may also install Jupyter kernels for bash or JavaScript/TypeScript.

bash

The following example describes how to enable a bash kernel in a particular project.

1. Launch a JupyterLab session.
2. Open a terminal window and run the following command:

```
pip install bash_kernel
python -m bash_kernel.install
```

You should now have the option to launch bash notebooks and consoles.

JavaScript and TypeScript

The following example describes how to enable JavaScript and TypeScript kernels in a particular project. .

1. Customize your PATH environment variable:
   a. Navigate to Project Settings/Advanced.
   b. Set PATH to $HOME/node_modules/.bin:$PATH.
2. Launch a JupyterLab session.
3. Open a terminal window and run the following command:

```
npm install tslab
tslab install
```

You should now have the option to launch JavaScript and TypeScript notebooks and console.

Installing Additional ML Runtimes Packages

Cloudera Machine Learning Runtimes are preloaded with a few common packages and libraries for Python. However, a key feature of Cloudera Machine Learning is the ability of different projects to install and use libraries pinned to specific versions, just as you would on your local computer.

About this task

Generally, Cloudera recommends you install all required packages locally into your project. This will ensure you have the exact versions you want and that these libraries will not be upgraded when Cloudera upgrades the ML Runtimes image. You only need to install libraries and packages once per project. From then on, they are available to any new ML Runtimes you spawn throughout the lifetime of the project.

You can install additional libraries and packages from the workbench, using either the command prompt or the terminal.

Note:

Cloudera Machine Learning does not currently support installation of packages that require root access to the hosts. For such use-cases, you will need to create a new custom runtime that extends the base image with the required packages. For instructions, see Customized Runtimes on page 18.

About this task

(Python) Install Packages Using Workbench Command Prompt

To install a package from the command prompt:

1. Navigate to your project's Overview page. Click Open Workbench and launch a session.
2. At the command prompt (see Native Workbench Console and Editor) in the bottom right, enter the command to install the package. Some examples using Python have been provided.

Python 3

```
# Installing from console using ! shell operator and pip3:
!pip3 install beautifulsoup4
# Installing from terminal
pip3 install beautifulsoup4
```

About this task

(Python Only) Using a Requirements File

For a Python project, you can specify a list of the packages you want in a requirements.txt file that lives in your project. The packages can be installed all at once using pip/pip3.

1. Create a new file called requirements.txt file within your project:

   ```
   beautifulsoup4==4.6.0
   seaborn==0.7.1
   ```

2. To install the packages in a Python 3 ML Runtimes, run the following command in the workbench command prompt.

   ```
   !pip3 install -r requirements.txt
   ```

Restrictions for upgrading R and Python packages

Some R and Python packages should not be upgraded because doing so will break the Workbench UI.

For R Runtimes

Do not upgrade the Cairo or RServe packages in your projects using R Runtimes. If you do, you may be unable to launch sessions, jobs, experiments, or applications.

If these packages are upgraded, you will need to start a new project or to delete the directory .local/lib using the CDSW/CML Files UI ("show hidden").

For Python Runtimes

Do not upgrade the ipykernel package or its dependencies (ipython, traitlets, jupyter_client, and tornado) in your project using Python Runtimes. If you do, you may be unable to launch sessions, jobs, experiments, or applications.

If these packages are upgraded, you will need to start a new project or to delete the directory .local/lib using the CDSW/CML Files UI ("show hidden").

ML Runtimes Environment Variables

This topic describes how ML Runtimes environmental variables work. It also lists the different scopes at which they can be set and the order of precedence that will be followed in case of conflicts.

ML Runtimes environment variables behave the same way for Legacy Engines and ML Runtimes.

Environmental variables allow you to customize ML Runtimes environments for projects. For example, if you need to configure a particular timezone for a project, or increase the length of the session/job timeout windows, you can use environmental variables to do so. Environmental variables can also be used to assign variable names to secrets such as passwords or authentication tokens to avoid including these directly in the code.

In general, Cloudera recommends that you do not include passwords, tokens, or any other secrets directly in your code because anyone with read access to your project will be able to view this information. A better place to store secrets is in your project's environment variables, where only project collaborators and admins have view access. They can therefore be used to securely store confidential information such as your AWS keys or database credentials.

Cloudera Machine Learning allows you to define environmental variables for the following scopes:

Global

A site administrator for your Cloudera Machine Learning deployment can set environmental variables on a global level. These values will apply to every project on the deployment.

To set global environmental variables, go to Admin Runtime/Engine .

Project

Project administrators can set project-specific environmental variables to customize the ML Runtimes launched for a project. Variables set here will override the global values set in the site administration panel.

To set environmental variables for a project, go to the project's Overview page and click Settings Advanced .

Job

Environments for individual jobs within a project can be customized while creating the job. Variables set per-job will override the project-level and global settings.

To set environmental variables for a job, go to the job's Overview page and click Settings Set Environmental Variables .

Experiments

ML Runtimes created for execution of experiments are completely isolated from the project. However, these ML Runtimes inherit values from environmental variables set at the project-level and/or global level. Variables set at the project-level will override the global values set in the site administration panel.

Models

Model environments are completely isolated from the project. Environmental variables for these ML Runtimes can be configured during the build stage of the model deployment process. Models will also inherit any environment variables set at the project and global level. However, variables set per-model build will override other settings.

ML Runtimes Environment Variables List

The following table lists Cloudera Machine Learning environment variables that you can use to customize your project environments. These can be set either as a site administrator or within the scope of a project or a job.

Environment Variable	Description
MAX_TEXT_LENGTH	Maximum number of characters that can be displayed in a single text cell. By default, this value is set to 800,000 and any more characters will be truncated. Default: 800,000
SESSION_MAXIMUM_MINUTES	Maximum number of minutes a session can run before it times out. Default: 60*24*7 minutes (7 days) Maximum Value: 35,000 minutes
JOB_MAXIMUM_MINUTES	Maximum number of minutes a job can run before it times out. Default: 60*24*7 minutes (7 days) Maximum Value: 35,000 minutes
IDLE_MAXIMUM_MINUTES	Maximum number of minutes a session can remain idle before it exits. Default: 60 minutes Maximum Value: 35,000 minutes

Per-Engine Environmental Variables: In addition to the previous table, there are some more built-in environmental variables that are set by the Cloudera Machine Learning application itself and do not need to be modified by users. These variables are set per-engine launched by Cloudera Machine Learning and only apply within the scope of each engine.

Environment Variable	Description
CDSW_PROJECT	The project to which this engine belongs.
CDSW_ENGINE_ID	The ID of this engine. For sessions, this appears in your browser's URL bar.
CDSW_MASTER_ID	If this engine is a worker, this is the CDSW_ENGINE_ID of its master.
CDSW_MASTER_IP	If this engine is a worker, this is the IP address of its master.

Environment Variable	Description
CDSW_PUBLIC_PORT	**Note:** This property is deprecated. See CDSW_APP_PORT and CDSW_READONLY_PORT for alternatives. A port on which you can expose HTTP services in the engine to browsers. HTTP services that bind CDSW_PUBLIC_PORT will be available in browsers at: http(s)://<*$CDSW_ENGINE_ID*>.<*$CDSW_DOMAIN*>. By default, CDSW_PUBLIC_PORT is set to 8080. A direct link to these web services will be available from the grid icon in the upper right corner of the Cloudera Machine Learning web application, as long as the job or session is still running. For more details, see *Accessing Web User Interfaces from Cloudera Machine Learning*. In Cloudera Machine Learning, setting CDSW_PUBLIC_PORT to a non-default port number is not supported.
CDSW_APP_PORT	A port on which you can expose HTTP services in the engine to browsers. HTTP services that bind CDSW_APP_PORT will be available in browsers at: http(s)://<*$CDSW_ENGINE_ID*>.<*$CDSW_DOMAIN*>. Use this port for applications that grant some control to the project, such as access to the session or terminal. A direct link to these web services will be available from the grid icon in the upper right corner of the Cloudera Machine Learning web application as long as the job or session runs. Even if the web UI does not have authentication, only Contributors and those with more access to the project can access it. For more details, see *Accessing Web User Interfaces from Cloudera Machine Learning*. Note that if the Site Administrator has enabled Allow only session creators to run commands on active sessions, then the UI is only available to the session creator. Other users will not be able to access it. Use 127.0.0.1 as the IP.
CDSW_READONLY_PORT	A port on which you can expose HTTP services in the engine to browsers. HTTP services that bind CDSW_READONLY_PORT will be available in browsers at: http(s)://<*$CDSW_ENGINE_ID*>.<*$CDSW_DOMAIN*>. Use this port for applications that grant read-only access to project results. A direct link to these web services will be available to users with from the grid icon in the upper right corner of the Cloudera Machine Learning web application as long as the job or session runs. Even if the web UI does not have authentication, Viewers and those with more access to the project can access it. For more details, see *Accessing Web User Interfaces from Cloudera Machine Learning*. Use 127.0.0.1 as the IP.
CDSW_DOMAIN	The domain on which Cloudera Machine Learning is being served. This can be useful for iframing services, as demonstrated in *Accessing Web User Interfaces from Cloudera Machine Learning*.
CDSW_CPU_MILLICORES	The number of CPU cores allocated to this engine, expressed in thousandths of a core.
CDSW_MEMORY_MB	The number of megabytes of memory allocated to this engine.
CDSW_IP_ADDRESS	Other engines in the Cloudera Machine Learning cluster can contact this engine on this IP address.

Accessing Environmental Variables from Projects

This topic shows you how to access environmental variables from your code.

Environmental variables are injected into every engine launched for a project, contingent on the scope at which the variable was set (global, project, etc.). The following code samples show how to access a sample environment variable called *DATABASE_PASSWORD* from your project code.

Python

```
import os
database_password = os.environ["DATABASE_PASSWORD"]
```

Appending Values to Environment Variables:

You can also set environment variables to append to existing values instead of replacing them. For example, when setting the LD_LIBRARY_PATH variable, you can set the value to LD_LIBRARY_PATH:/path/to/set.

Customized Runtimes

This topic explains how custom Runtimes work and when they should be used.

Note: Cloudera, Inc. (“Cloudera”) makes the Custom Runtime feature available to allow its users to add, run, and manage their own container images for their workloads as ‘Custom Runtimes’. Cloudera’s support covers only the integration points of these images with Cloudera Machine Learning, to the extent adding, running, and managing Custom Runtime images fulfill the documented requirements and/or pre-requisites. Cloudera does not provide any support for any other configurations and/or third party software added or installed to the image by customers.

By default, Cloudera Machine Learning Runtimes are preloaded with a few common packages and libraries for R, Python, and Scala. In addition to these, Cloudera Machine Learning also allows you to install any other packages or libraries that are required by your projects. However, directly installing a package to a project as described above might not always be feasible. For example, packages that require root access to be installed, or that must be installed to a path outside /home/cdsw (outside the project mount), cannot be installed directly from the workbench.

For such circumstances, Cloudera Machine Learning allows you to extend the base Docker image and create a new Docker image with all the libraries and packages you require. Site administrators can then add this new image in the allowlist for use in projects.

Note: You will need to remove any unnecessary Cloudera sources or repositories that are inaccessible because of the paywall.

PBJ Custom Runtimes can be built on top of any Ubuntu base image, and users have to install the kernel themselves. However, non-PBJ Runtime images can only be built on top of Cloudera-released non-PBJ Runtime images, and users cannot change the kernel.

Note that this approach can also be used to accelerate project setup across the deployment. For example, if you want multiple projects on your deployment to have access to some common dependencies (package or software or driver) out of the box, or even if a package just has a complicated setup, it might be easier to simply provide users with a Runtime that has already been customized for their project(s).

Related Resources

- The Cloudera Engineering Blog post on *Customizing Docker Images in Cloudera Machine Learning* describes an end-to-end example on how to build and publish a customized Docker image and use it as an engine in Cloudera Machine Learning.
- For an example of how to extend the base engine image to include Conda, see *Installing Additional Packages*.

Creating Customized ML Runtimes

This section walks you through the steps required to create your own custom ML Runtimes based on one of the Cloudera provided ML Runtime images.

Create a Dockerfile for the Custom Image

This topic shows you how to create a Dockerfile for a custom image.

First step is to select an appropriate source image for your customization. Image tags can be seen on the Session Start page on the user interface when you select a Runtime. The second step when building a customized image is to create a Dockerfile that specifies which packages you would like to install in addition to the base image.

For example, the following Dockerfile installs the telnet package, the sklearn Python package and upgraded base packages on top of an ML Runtime image released by Cloudera.

```
# Dockerfile
# Specify an ML Runtime base image
FROM docker.repository.cloudera.com/cloudera/cdsw/ml-runtime-jupyterlab-pyth
on3.7-standard:2021.12.1-b17
# Install telnet in the new image
RUN apt-get update && apt-get install -y --no-install-recommends telnet &&
 apt-get clean && rm -rf /var/lib/apt/lists/*
# Upgrade packages in the base image
RUN apt-get update && apt-get upgrade -y && apt-get clean && rm -rf /var/lib
/apt/lists/*
# Install the python package sklearn
RUN pip install --no-cache-dir sklearn
# Override Runtime label and environment variables metadata
ENV ML_RUNTIME_EDITION="Telnet Edition" \
        ML_RUNTIME_SHORT_VERSION="1.0" \
        ML_RUNTIME_MAINTENANCE_VERSION=1 \
        ML_RUNTIME_DESCRIPTION="This runtime includes telnet and sklearn
and upgraded packages"
ENV ML_RUNTIME_FULL_VERSION="${ML_RUNTIME_SHORT_VERSION}.${ML_RUNTIME_MAI
NTENANCE_VERSION}"
LABEL com.cloudera.ml.runtime.edition=$ML_RUNTIME_EDITION \
        com.cloudera.ml.runtime.full-version=$ML_RUNTIME_FULL_VERSION \
        com.cloudera.ml.runtime.short-version=$ML_RUNTIME_SHORT_VERSION \
        com.cloudera.ml.runtime.maintenance-version=$ML_RUNTIME_MAINTENANCE
_VERSION \
        com.cloudera.ml.runtime.description=$ML_RUNTIME_DESCRIPTION
```

Metadata for Custom ML Runtimes

This topic addresses the metadata for custom Runtimes.

All new custom Runtimes must override the Edition metadata of existing Runtimes. The rest of the metadata can be overriden to communicate the expectations for the consumers of the image. Both the Docker label and the environment variable match in a custom Runtime image. In order to add or register a custom Runtime to a deployment, the user facing metadata combination should be unique in that deployment. For example, of the following, Editor, Edition, Kernel, Version, and Maintenance Version, at least the later should be incremented for adding a next iteration of the same image.

See the following reference table for more details on ML Runtime metadata.

Environment variable	Docker Label	Description	Override in custom runtime
ML_RUNTIME_METADATA_VERSION	com.cloudera.ml.runtime.runtime-metadata-version	Metadata version	Not allowed
ML_RUNTIME_EDITOR	com.cloudera.ml.runtime.editor	CDSW/CML Editor installed in the image.	Allowed
ML_RUNTIME_EDITION	com.cloudera.ml.runtime.edition	Edition of the image, a notion of the Runtime capabilities.	Required
ML_RUNTIME_DESCRIPTION	com.cloudera.ml.runtime.description	Longer description of the Runtime image capabilities.	Recommended
ML_RUNTIME_KERNEL	com.cloudera.ml.runtime.kernel	Main kernel included in the image, e.g., Python 3.8	Not allowed
ML_RUNTIME_SHORT_VERSION	com.cloudera.ml.runtime.short-version	Main version of the image, e.g., 1.0. This shows up as Version in the selection screen.	Recommended

ML_RUNTIME_FULL_VERSION	com.cloudera.ml.runtime.full-version	Full version consists of the short version + maintenance version, e.g., 1.0.1	Required
ML_RUNTIME_MAINTENANCE_VERSION	com.cloudera.ml.runtime.maintenance-version	Maintenance version must be an integer, e.g., 1. Only the largest maintenance version of the set of the same short version images are visible for users to select. Increment this number if you create a drop in replacement of an existing Runtime. Start with 1 with a new version or edition.	Recommended
ML_RUNTIME_CUDA_VERSION	com.cloudera.ml.runtime.cuda-version	CUDA version installed in the image.	Not allowed
ML_RUNTIME_GIT_HASH	com.cloudera.ml.runtime.git-hash	Git hash of runtime source	Not allowed
ML_RUNTIME_GBN	com.cloudera.ml.runtime.gbn	Cloudera internal build number	Not allowed

Editor Customization

This topic addresses customizing a third-party editor to work with ML Runtimes.

For a third-party editor to work with ML Runtimes, you must provide a starting script. For example:

```
#! /bin/bash
"$ZEPPELIN_HOME/bin/zeppelin.sh"
```

For Cloudera Machine Learning to interpret this as an editor startup script, you must create a symlink to the editor as/usr/local/bin/ml-runtime-editor. This will be created in the Dockerfile of the customized runtime.

Note: Third-party editors provide a way to run arbitrary code that is not distributed by Cloudera. Use third-party editors at your own risk. You should absolutely trust the code that you want to run.

Build the New Docker Image

This topic shows you how to use Docker to build a custom image.

A new custom Docker image can be built on any host where Docker binaries are installed, source images are available, and OS repositories and other package repositories are available. To install these binaries, run the following command on the host where you want to build the new image:

```
docker build -t <image-name>:<tag> . -f Dockerfile
```

If your Dockerfile makes any outside connection (for example, apt-get, update, pip install, curl), you ust add the --network=host option to the build command:

```
docker build --network=host -t <image-name>:<tag> . -f Dockerfile
```

Distribute the Image

This topic explains the different methods that can be used to distribute a custom ML Runtime to all the hosts.

Once you have built a new custom ML Runtime, use one of the following methods to distribute the new image to all your Cloudera Machine Learning hosts:

Push the image to a public registry such as DockerHub

For instructions, refer to the Docker documentation *docker push* and *Push images to Docker Cloud*.

Push the image to your company's Docker registry

When using this method, make sure to tag your image with the following schema:

```
docker tag <image-name> <company-registry>/<user-name>/<image-na
me>:<tag>
```

Once the image has been tagged properly, use the following command to push the image:

```
docker push <company-registry>/<user-name>/<image-name>:<tag>
```

Add Docker registry credentials

To enable Cloudera Machine Learning to fetch custom ML Runtimes from a secure repository, as Administrator you need to add Docker registry credentials.

Create a `kubectl` secret named regcred for your secured Docker registry. The following command creates the secret in your Kubernetes cluster:

```
kubectl create secret docker-registry regcred
    --docker-server=<server host>
    --docker-username=<username>
    --docker-password=<password>
    -n <compute namespace eg. mlx>
```

The next time the ML Runtime image is pulled, the new secret will be picked up.

Adding New ML Runtimes

Cloudera Machine Learning enables you to add customized ML Runtimes from the Runtime Catalog window.

About this task

Note: You must have system administrator permission to add a new ML Runtime.

Procedure

1. Click Runtime Catalog from the Navigation panel.
2. Click the Add Runtime button in the upper right corner.
3. In the Add Runtime window, enter the url of the Runtime Docker image you want to upload.

   As ML Runtimes are identified based on certain attributes, metadata (such as Editor, Kernel, Edition, Version, and Maintenance Version) must be unique to add new Customized Runtimes to a deployment. Customized ML Runtimes must have different Edition text compared to Cloudera supported versions.
4. Click Validate.

   CML will use the provided URL to fetch the Docker image and validate if it can be used as a customized Runtime.

   If the Docker image is successfully validated, CML will display the metadata information of the image. The new customized Runtime will be visible in the Runtime Catalog and accessible over the different workloads.

Limitations

This topic lists some limitations associated with customized ML Runtime images.

- The contents of certain pre-existing standard directories such as /home/cdsw, /tmp, and so on, cannot be modified while creating customized ML Runtimes. This means any files saved in these directories will not be accessible from sessions that are running on customized ML Runtimes.

  Workaround: Create a new custom directory in the Dockerfile used to create the customized ML Runtime, and save your files to that directory.

Add Docker registry credentials

To enable Cloudera Machine Learning to fetch custom engines from a secure repository, as Administrator you need to add Docker registry credentials.

Create a `kubectl` secret named regcred for your secured Docker registry. The following command creates the secret in your Kubernetes cluster:

```
kubectl create secret docker-registry regcred
    --docker-server=<server host>
    --docker-username=<username>
    --docker-password=<password>
    -n <compute namespace eg. mlx>
```

The next time the engine image is pulled, the new secret will be picked up.

Pre-Installed Packages in ML Runtimes

Cloudera Machine Learning ships with several base engine images that include Python kernels, and frequently used libraries.

Note: New ML Runtime releases are automatically added to the deployment, if internet connection is available.

Because the software and versions in these lists is installed in the images, you should not upgrade these versions because this will cause dependency conflicts. If any software in this list needs to be at a higher version, you should use a more recent version of the legacy engine or ML Runtime.

ML Runtimes 2022.04

This section lists the Python, R, and Scala libraries that ship with ML Runtimes 2022.04.

Note: Nvidia GPU Edition comes with CUDA 11.4.1 preinstalled.

Python 3.9 Libraries for Workbench

This section lists the packages in Python 3.9 Workbench Runtimes that ship with ML Runtimes 2022.04.

Table 1: Packages in Python 3.9.11 Workbench Runtimes - Standard

Library	Version
python	3.9.6
pip	21.1.3
argcomplete	2.0.0
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6
cycler	0.10.0

Library	Version
debugpy	1.6.0
decorator	4.4.2
entrypoints	0.4
idna	3.2
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
jedi	0.17.2
jupyter-client	7.2.2
jupyter-core	4.9.2
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
matplotlib-inline	0.1.3
nest-asyncio	1.5.5
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.2
pyzmq	22.3.0
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
zipp	3.8.0

Table 2: Packages in Python 3.9.11 Workbench Runtimes - Nvidia GPU Edition

Library	Version
python	3.9.6
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
argcomplete	2.0.0
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0
decorator	4.4.2
entrypoints	0.4
idna	3.2
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
jedi	0.17.2
jupyter-client	7.2.2
jupyter-core	4.9.2
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
matplotlib-inline	0.1.3
nest-asyncio	1.5.5
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.2

Library	Version
pyzmq	22.3.0
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
zipp	3.8.0

Python 3.8 Libraries for Workbench

This section lists the packages in Python 3.8 Workbench Runtimes that ship with ML Runtimes 2022.04.

Table 3: Packages in Python 3.8.13 Workbench Runtimes - Standard

Library	Version
python	3.8.6
pip	21.1.3
argcomplete	2.0.0
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0
decorator	4.4.2
entrypoints	0.4
idna	3.2
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
jedi	0.17.2
jupyter-client	7.2.2
jupyter-core	4.9.2
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4

Library	Version
matplotlib-inline	0.1.3
nest-asyncio	1.5.5
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.2
pyzmq	22.3.0
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
zipp	3.8.0

Table 4: Packages in Python 3.8.13 Workbench Runtimes - Nvidia GPU Edition

Library	Version
python	3.8.6
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
argcomplete	2.0.0
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0

Library	Version
decorator	4.4.2
entrypoints	0.4
idna	3.2
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
jedi	0.17.2
jupyter-client	7.2.2
jupyter-core	4.9.2
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
matplotlib-inline	0.1.3
nest-asyncio	1.5.5
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.2
pyzmq	22.3.0
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
zipp	3.8.0

Python 3.7 Libraries for Workbench

This section lists the packages in Python 3.7 Workbench Runtimes that ship with ML Runtimes 2022.04.

Table 5: Packages in Python 3.7.13 Workbench Runtimes - Standard

Library	Version
python	3.7.11
pip	21.1.3
argcomplete	2.0.0
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0
decorator	4.4.2
entrypoints	0.4
idna	3.2
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
jedi	0.17.2
jupyter-client	7.2.2
jupyter-core	4.9.2
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
matplotlib-inline	0.1.3
nest-asyncio	1.5.5
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7

Library	Version
python-dateutil	2.8.2
pyzmq	22.3.0
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
zipp	3.8.0

Table 6: Packages in Python 3.7.13 Workbench Runtimes - Nvidia GPU Edition

Library	Version
python	3.7.11
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
argcomplete	2.0.0
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0
decorator	4.4.2
entrypoints	0.4
idna	3.2
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
jedi	0.17.2
jupyter-client	7.2.2
jupyter-core	4.9.2
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4

Library	Version
matplotlib-inline	0.1.3
nest-asyncio	1.5.5
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.2
pyzmq	22.3.0
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
zipp	3.8.0

Table 7: Packages in Python 3.7.13 PBJ Workbench - Standard

Library	Version
python	3.7.11
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
anyio	3.3.0
argcomplete	2.0.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0

Library	Version
beautifulsoup4	4.11.1
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.4
fastjsonschema	2.15.3
idna	2.10
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	3.1.1
json5	0.9.5
jsonschema	3.2.0
jupyter-client	7.2.2
jupyter-core	4.9.2
jupyter-server	1.16.0
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	2.1.1
matplotlib	3.3.4
matplotlib-inline	0.1.3
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.5.0
nbformat	5.3.0

Library	Version
nest-asyncio	1.5.5
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.2
pytz	2021.1
pyzmq	22.3.0
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
soupsieve	2.3.2
terminado	0.9.2
thrift	0.11.0
thrift-sasl	0.4.3
tinycss2	1.1.1
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.8.0

Scala 2.11 Libraries for Workbench

This section lists the packages in Scala 2.11.12 Workbench Runtimes that ship with ML Runtimes 2022.04.

Scala 2.11.12 Libraries for Workbench - Standard

Library	Version
org.scala-lang:scala-library	2.11.12
org.scalatest:scalatest	2.2.4
org.scala-lang:scala-reflect	2.11.12
org.scala-lang:scala-compiler	2.11.12
io.circe:circe-generic	0.11.2
io.circe:circe-parser	0.11.2
org.scalameta:scalameta	1.0.0

Python 3.9.6 Libraries for JupyterLab

This section lists the packages in Python 3.9 JupyterLab Runtimes that ship with ML Runtimes 2022.04.

Table 8: Packages in Python 3.9.11 JupyterLab Runtimes - Standard

Library	Version
python	3.9.6
pip	21.1.3
anyio	3.3.0
argcomplete	2.0.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0
beautifulsoup4	4.11.1
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.4
fastjsonschema	2.15.3

Library	Version
idna	2.10
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	3.1.1
json5	0.9.5
jsonschema	3.2.0
jupyter-client	7.2.2
jupyter-core	4.9.2
jupyter-server	1.16.0
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	2.1.1
matplotlib	3.3.4
matplotlib-inline	0.1.3
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.5.0
nbformat	5.3.0
nest-asyncio	1.5.5
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2

Library	Version
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.2
pytz	2021.1
pyzmq	22.3.0
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
soupsieve	2.3.2
terminado	0.9.2
thrift	0.11.0
thrift-sasl	0.4.3
tinycss2	1.1.1
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.8.0

Table 9: Packages in Python 3.9.11 JupyterLab Runtimes - Nvidia GPU Edition

Library	Version
python	3.9.6
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
anyio	3.3.0
argcomplete	2.0.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0

Library	Version
beautifulsoup4	4.11.1
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.4
fastjsonschema	2.15.3
idna	2.10
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	3.1.1
json5	0.9.5
jsonschema	3.2.0
jupyter-client	7.2.2
jupyter-core	4.9.2
jupyter-server	1.16.0
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	2.1.1
matplotlib	3.3.4
matplotlib-inline	0.1.3
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.5.0
nbformat	5.3.0

Library	Version
nest-asyncio	1.5.5
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.2
pytz	2021.1
pyzmq	22.3.0
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
soupsieve	2.3.2
terminado	0.9.2
thrift	0.11.0
thrift-sasl	0.4.3
tinycss2	1.1.1
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.8.0

Python 3.8 Libraries for JupyterLab

This section lists the packages in Python 3.8 JupyterLab Runtimes that ship with ML Runtimes 2022.04.

Table 10: Packages in Python 3.8.13 JupyterLab Runtimes - Standard

Library	Version
python	3.8.6
pip	21.1.3
anyio	3.3.0
argcomplete	2.0.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0
beautifulsoup4	4.11.1
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.4
fastjsonschema	2.15.3
idna	2.10
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	3.1.1
json5	0.9.5
jsonschema	3.2.0
jupyter-client	7.2.2
jupyter-core	4.9.2
jupyter-server	1.16.0

Library	Version
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	2.1.1
matplotlib	3.3.4
matplotlib-inline	0.1.3
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.5.0
nbformat	5.3.0
nest-asyncio	1.5.5
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.2
pytz	2021.1
pyzmq	22.3.0
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
soupsieve	2.3.2

Library	Version
terminado	0.9.2
thrift	0.11.0
thrift-sasl	0.4.3
tinycss2	1.1.1
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.8.0

Table 11: Packages in Python 3.8.13 JupyterLab Runtimes - Nvidia GPU Edition

Library	Version
python	3.8.6
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
anyio	3.3.0
argcomplete	2.0.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0
beautifulsoup4	4.11.1
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.4
fastjsonschema	2.15.3

Library	Version
idna	2.10
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	3.1.1
json5	0.9.5
jsonschema	3.2.0
jupyter-client	7.2.2
jupyter-core	4.9.2
jupyter-server	1.16.0
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	2.1.1
matplotlib	3.3.4
matplotlib-inline	0.1.3
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.5.0
nbformat	5.3.0
nest-asyncio	1.5.5
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2

Library	Version
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.2
pytz	2021.1
pyzmq	22.3.0
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
soupsieve	2.3.2
terminado	0.9.2
thrift	0.11.0
thrift-sasl	0.4.3
tinycss2	1.1.1
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.8.0

Python 3.7 Libraries for JupyterLab

This section lists the packages in Python 3.7 JupyterLab Runtimes that ship with ML Runtimes 2022.04.

Table 12: Packages in Python 3.7.13 JupyterLab Runtimes - Standard

Library	Version
python	3.7.11
pip	21.1.3
anyio	3.3.0
argcomplete	2.0.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1

Library	Version
backcall	0.2.0
beautifulsoup4	4.11.1
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.4
fastjsonschema	2.15.3
idna	2.10
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	3.1.1
json5	0.9.5
jsonschema	3.2.0
jupyter-client	7.2.2
jupyter-core	4.9.2
jupyter-server	1.16.0
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	2.1.1
matplotlib	3.3.4
matplotlib-inline	0.1.3
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.5.0

Library	Version
nbformat	5.3.0
nest-asyncio	1.5.5
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.2
pytz	2021.1
pyzmq	22.3.0
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
soupsieve	2.3.2
terminado	0.9.2
thrift	0.11.0
thrift-sasl	0.4.3
tinycss2	1.1.1
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.8.0

Table 13: Packages in Python 3.7.13 JupyterLab Runtimes - Nvidia GPU Edition

Library	Version
python	3.7.11
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
anyio	3.3.0
argcomplete	2.0.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0
beautifulsoup4	4.11.1
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
debugpy	1.6.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.4
fastjsonschema	2.15.3
idna	2.10
importlib-metadata	4.11.3
impyla	0.17.0
ipykernel	6.5.0
ipython	7.31.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	3.1.1
json5	0.9.5
jsonschema	3.2.0
jupyter-client	7.2.2
jupyter-core	4.9.2
jupyter-server	1.16.0
jupyterlab	3.2.8

Library	Version
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	2.1.1
matplotlib	3.3.4
matplotlib-inline	0.1.3
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.5.0
nbformat	5.3.0
nest-asyncio	1.5.5
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.0.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.2
pytz	2021.1
pyzmq	22.3.0
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
soupsieve	2.3.2
terminado	0.9.2

Library	Version
thrift	0.11.0
thrift-sasl	0.4.3
tinycss2	1.1.1
tornado	6.1
traitlets	5.1.1
typing-extensions	4.1.1
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.8.0

R 4.0 Libraries

This section lists the R 4.0 libraries that ship with ML Runtimes 2022.04.

Table 14: R 4.0.5 Libraries for Workbench

Library	Version
askpass	1.1
base	4.0.5
bitops	1.0-7
boot	1.3-27
brew	1.0-6
Cairo	1.2-0
caTools	1.18.2
cdsw	2.1
class	7.3-18
cli	3.0.1
cluster	2.1.1
codetools	0.2-18
colorspace	2.0-2
compiler	4.0.5
crayon	1.4.1
curl	4.3.2
datasets	4.0.5
digest	0.6.27
ellipsis	0.3.2
fansi	0.5.0
farver	2.1.0
foreign	0.8-81

Library	Version
ggplot2	3.3.5
glue	1.4.2
graphics	4.0.5
grDevices	4.0.5
grid	4.0.5
gtable	0.3.0
httr	1.4.2
isoband	0.2.5
jsonlite	1.7.2
KernSmooth	2.23-18
labeling	0.4.2
lattice	0.20-41
lifecycle	1.0.0
magrittr	2.0.1
MASS	7.3-53.1
Matrix	1.3-2
methods	4.0.5
mgcv	1.8-34
mime	0.11
munsell	0.5.0
nlme	3.1-152
nnet	7.3-15
openssl	1.4.4
parallel	4.0.5
pillar	1.6.2
pkgconfig	2.0.3
png	0.1-7
R6	2.5.1
RColorBrewer	1.1-2
RJSONIO	1.3-1.5
rlang	0.4.11
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.1
spatial	7.3-13
splines	4.0.5
stats	4.0.5
stats4	4.0.5

Library	Version
survival	3.2-10
sys	3.4
tcltk	4.0.5
tibble	3.1.4
tools	4.0.5
utf8	1.2.2
utils	4.0.5
vctrs	0.3.8
viridisLite	0.4.0
withr	2.4.2

R 4.1 Libraries

This section lists the R 4.1 libraries that ship with ML Runtimes 2022.04.

Table 15: R 4.1.1 Libraries for Workbench

Library	Version
askpass	1.1
base	4.1.1
bitops	1.0-7
boot	1.3-28
brew	1.0-6
Cairo	1.2-0
caTools	1.18.2
cdsw	2.1
class	7.3-19
cli	3.0.1
cluster	2.1.2
codetools	0.2-18
colorspace	2.0-2
compiler	4.1.1
crayon	1.4.1
curl	4.3.2
datasets	4.1.1
digest	0.6.27
ellipsis	0.3.2
fansi	0.5.0
farver	2.1.0
foreign	0.8-81
ggplot2	3.3.5

Library	Version
glue	1.4.2
graphics	4.1.1
grDevices	4.1.1
grid	4.1.1
gtable	0.3.0
httr	1.4.2
isoband	0.2.5
jsonlite	1.7.2
KernSmooth	2.23-20
labeling	0.4.2
lattice	0.20-44
lifecycle	1.0.0
magrittr	2.0.1
MASS	7.3-54
Matrix	1.3-4
methods	4.1.1
mgcv	1.8-36
mime	0.11
munsell	0.5.0
nlme	3.1-152
nnet	7.3-16
openssl	1.4.4
parallel	4.1.1
pillar	1.6.2
pkgconfig	2.0.3
png	0.1-7
R6	2.5.1
RColorBrewer	1.1-2
RJSONIO	1.3-1.5
rlang	0.4.11
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.1
spatial	7.3-14
splines	4.1.1
stats	4.1.1
stats4	4.1.1
survival	3.2-11

Library	Version
sys	3.4
tcltk	4.1.1
tibble	3.1.4
tools	4.1.1
utf8	1.2.2
utils	4.1.1
vctrs	0.3.8
viridisLite	0.4.0
withr	2.4.2

R 3.6 Libraries

This section lists the R 3.6 libraries that ship with ML Runtimes 2022.04.

Table 16: R 3.6.3 Libraries for Workbench

Library	Version
askpass	1.1
base	3.6.3
bitops	1.0-7
boot	1.3-24
brew	1.0-6
Cairo	1.2-0
caTools	1.18.2
cdsw	2.1
class	7.3-15
cli	3.0.1
cluster	2.1.0
codetools	0.2-16
colorspace	2.0-2
compiler	3.6.3
crayon	1.4.1
curl	4.3.2
datasets	3.6.3
digest	0.6.27
ellipsis	0.3.2
fansi	0.5.0
farver	2.1.0
foreign	0.8-75
ggplot2	3.3.5
glue	1.4.2

Library	Version
graphics	3.6.3
grDevices	3.6.3
grid	3.6.3
gtable	0.3.0
httr	1.4.2
isoband	0.2.5
jsonlite	1.7.2
KernSmooth	2.23-16
labeling	0.4.2
lattice	0.20-38
lifecycle	1.0.0
magrittr	2.0.1
MASS	7.3-51.5
Matrix	1.2-18
methods	3.6.3
mgcv	1.8-31
mime	0.11
munsell	0.5.0
nlme	3.1-144
nnet	7.3-12
openssl	1.4.4
parallel	3.6.3
pillar	1.6.2
pkgconfig	2.0.3
png	0.1-7
R6	2.5.1
RColorBrewer	1.1-2
RJSONIO	1.3-1.5
rlang	0.4.11
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.1
spatial	7.3-11
splines	3.6.3
stats	3.6.3
stats4	3.6.3
survival	3.1-8
sys	3.4

Library	Version
tcltk	3.6.3
tibble	3.1.4
tools	3.6.3
utf8	1.2.2
utils	3.6.3
vctrs	0.3.8
viridisLite	0.4.0
withr	2.4.2

ML Runtimes 2021.12

This section lists the Python, R, and Scala libraries that ship with ML Runtimes 2021.12.

Note: Nvidia GPU Edition comes with CUDA 11.4.1 preinstalled.

Python 3.9 Libraries for Workbench

This section lists the packages in Python 3.9 Workbench Runtimes that ship with ML Runtimes 2021.12.

Table 17: Packages in Python 3.9.7 Workbench Runtimes - Standard

Library	Version
python	3.9.6
pip	21.1.3
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6
cycler	0.10.0
decorator	4.4.2
idna	3.2
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4

Library	Version
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.4.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Table 18: Packages in Python 3.9.7 Workbench Runtimes - Nvidia GPU Edition

Library	Version
python	3.9.6
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6
cycler	0.10.0
decorator	4.4.2
idna	3.2
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0

Library	Version
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.4.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Python 3.8 Libraries for Workbench

This section lists the packages in Python 3.8 Workbench Runtimes that ship with ML Runtimes 2021.12.

Table 19: Packages in Python 3.8.6 Workbench Runtimes - Standard

Library	Version
python	3.8.6
pip	21.1.3
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6

Library	Version
cycler	0.10.0
decorator	4.4.2
idna	3.2
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.4.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Table 20: Packages in Python 3.8.6 Workbench Runtimes - Nvidia GPU Edition

Library	Version
python	3.8.6
pip	21.1.3

Library	Version
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6
cycler	0.10.0
decorator	4.4.2
idna	3.2
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.4.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6

Library	Version
wcwidth	0.2.5

Table 21: Packages in Python 3.8.6 Workbench Runtimes - RAPIDS

Library	Version
python	3.8.6
pip	21.1.3
_libgcc_mutex	0.1
_openmp_mutex	4.5
abseil-cpp	20210324.2
aiohttp	3.8.1
aiosignal	1.2.0
anyio	3.4.0
appdirs	1.4.4
argon2-cffi	21.1.0
arrow-cpp	5.0.0
arrow-cpp-proc	3.0.0
async-timeout	4.0.1
async_generator	1.10
attrs	21.2.0
aws-c-auth	0.6.7
aws-c-cal	0.5.12
aws-c-common	0.6.17
aws-c-compression	0.2.14
aws-c-event-stream	0.2.7
aws-c-http	0.6.10
aws-c-io	0.10.13
aws-c-mqtt	0.7.9
aws-c-s3	0.1.27
aws-c-sdkutils	0.1.1
aws-checksums	0.1.12
aws-crt-cpp	0.17.8
aws-sdk-cpp	1.9.145
backcall	0.2.0
backports	1.0
backports.functools_lru_cache	1.6.4
bleach	4.1.0
blosc	1.21.0
bokeh	2.4.0
boost	1.74.0

Library	Version
boost-cpp	1.74.0
brotli	1.0.9
brotli-bin	1.0.9
brotlipy	0.7.0
brunsli	0.1
bzip2	1.0.8
c-ares	1.18.1
c-blosc2	2.0.4
ca-certificates	2021.10.8
cachetools	4.2.4
cairo	1.16.0
cdsw	1.1.0
certifi	2021.5.30
cffi	1.15.0
cfitsio	3.470
charls	2.2.0
charset-normalizer	2.0.6
click	8.0.3
click-plugins	1.1.1
cligj	0.7.2
cloudpickle	2.0.0
colorama	0.4.4
colorcet	3.0.0
cryptography	36.0.1
cucim	21.12.00
cudatoolkit	11.0.221
cudf	21.12.02
cudf_kafka	21.12.02
cudnn	8.2.1.32
cugraph	21.12.00
cuml	21.12.00
cupy	9.6.0
curl	7.80.0
cusignal	21.12.00
cuspatial	21.12.00
custreamz	21.12.02
cuxfilter	21.12.00
cycler	0.11.0
cyrus-sasl	2.1.27

Library	Version
cytoolz	0.11.2
dask	2021.11.2
dask-core	2021.11.2
dask-cuda	21.12.00
dask-cudf	21.12.02
datashader	0.11.1
datashape	0.5.4
debugpy	1.5.1
decorator	5.1.0
defusedxml	0.7.1
distributed	2021.11.2
dlpack	0.5
entrypoints	0.3
expat	2.4.1
faiss-proc	1.0.0
fastavro	1.4.7
fastrlock	0.8
fiona	1.8.20
font-ttf-dejavu-sans-mono	2.37
font-ttf-inconsolata	3.000
font-ttf-source-code-pro	2.038
font-ttf-ubuntu	0.83
fontconfig	2.13.1
fonts-conda-ecosystem	1
fonts-conda-forge	1
fonttools	4.28.4
freetype	2.10.4
freexl	1.0.6
frozenlist	1.2.0
fsspec	2021.11.1
gdal	3.3.2
geopandas	0.9.0
geopandas-base	0.9.0
geos	3.9.1
geotiff	1.7.0
gettext	0.19.8.1
gflags	2.2.2
giflib	5.2.1
git	2.34.1

Library	Version
glog	0.5.0
gpuci-tools	0.3.1
grpc-cpp	1.41.1
hdf4	4.2.15
hdf5	1.12.1
heapdict	1.0.1
icu	68.2
idna	3.2
imagecodecs	2021.8.26
imageio	2.13.3
importlib-metadata	4.8.3
importlib_metadata	4.8.3
importlib_resources	5.4.0
ipykernel	6.6.0
ipython	7.30.1
ipython_genutils	0.2.0
ipywidgets	7.6.5
jbig	2.1
jedi	0.18.1
jinja2	3.0.3
joblib	1.1.0
jpeg	9d
json-c	0.15
jsonschema	4.3.1
jupyter-server-proxy	3.2.0
jupyter_client	7.1.0
jupyter_core	4.9.1
jupyter_server	1.13.1
jupyterlab_pygments	0.1.2
jupyterlab_widgets	1.0.2
jxrlib	1.1
kealib	1.4.14
kiwisolver	1.3.2
krb5	1.19.2
lcms2	2.12
ld_impl_linux-64	2.36.1
lerc	3.0
libaec	1.0.6
libblas	3.9.0

Library	Version
libbrotlicommon	1.0.9
libbrotlidec	1.0.9
libbrotlienc	1.0.9
libcblas	3.9.0
libcucim	21.12.00
libcudf	21.12.02
libcudf_kafka	21.12.02
libcugraph	21.12.00
libcuml	21.12.00
libcumlprims	21.12.00
libcurl	7.80.0
libcusolver	11.3.2.107
libcuspatial	21.12.00
libdap4	3.20.6
libdeflate	1.8
libedit	3.1.20191231
libev	4.33
libevent	2.1.10
libfaiss	1.7.0
libffi	3.4.2
libgcc-ng	9.4.0
libgcrypt	1.9.4
libgdal	3.3.2
libgfortran-ng	11.2.0
libgfortran5	11.2.0
libglib	2.70.2
libgpg-error	1.42
libgsasl	1.10.0
libhwloc	2.3.0
libiconv	1.16
libkml	1.3.0
liblapack	3.9.0
libllvm11	11.1.0
libnetcdf	4.8.1
libnghttp2	1.43.0
libnsl	2.0.0
libntlm	1.4
libopenblas	0.3.18
libpng	1.6.37

Library	Version
libpq	13.5
libprotobuf	3.18.1
librdkafka	1.6.1
librmm	21.12.00
librttopo	1.1.0
libsodium	1.0.18
libspatialindex	1.9.3
libspatialite	5.0.1
libssh2	1.10.0
libstdcxx-ng	9.4.0
libthrift	0.15.0
libtiff	4.3.0
libutf8proc	2.7.0
libuuid	2.32.1
libuv	1.42.0
libwebp	1.2.1
libwebp-base	1.2.1
libxcb	1.13
libxgboost	1.5.0dev.rapidsai21.12
libxml2	2.9.12
libzip	1.8.0
libzlib	1.2.11
libzopfli	1.0.3
llvm-openmp	12.0.1
llvmlite	0.37.0
locket	0.2.0
lz4-c	1.9.3
mapclassify	2.4.3
markdown	3.3.6
markupsafe	2.0.1
matplotlib-base	3.5.1
matplotlib-inline	0.1.3
mistune	0.8.4
msgpack-python	1.0.3
multidict	5.2.0
multipledispatch	0.6.0
munch	2.5.0
munkres	1.1.4
nbclient	0.5.9

Library	Version
nbconvert	6.3.0
nbformat	5.1.3
nccl	2.11.4.1
ncurses	6.2
nest-asyncio	1.5.4
networkx	2.6.3
nodejs	14.17.4
notebook	6.4.6
nspr	4.32
nss	3.73
numba	0.54.1
numpy	1.20.3
nvtx	0.2.3
olefile	0.46
openjpeg	2.4.0
openssl	1.1.1l
orc	1.7.1
packaging	21.3
pandas	1.3.5
pandoc	2.16.2
pandocfilters	1.5.0
panel	0.12.4
param	1.12.0
parquet-cpp	1.5.1
parso	0.8.3
partd	1.2.0
pcre	8.45
pcre2	10.37
perl	5.32.1
pexpect	4.8.0
pickleshare	0.7.5
pillow	8.4.0
pip	21.3.1
pixman	0.40.0
pooch	1.5.2
poppler	21.09.0
poppler-data	0.4.11
postgresql	13.5
proj	8.1.0

Library	Version
prometheus_client	0.12.0
prompt-toolkit	3.0.24
protobuf	3.18.1
psutil	5.8.0
pthread-stubs	0.4
ptxcompiler	0.2.0
ptyprocess	0.7.0
py-xgboost	1.5.0dev.rapidsai21.12
py4j	0.10.9
pyarrow	5.0.0
pycparser	2.21
pyct	0.4.6
pyct-core	0.4.6
pydeck	0.5.0
pyee	8.1.0
pygments	2.10.0
pynvml	11.4.1
pyopenssl	21.0.0
pyparsing	3.0.6
pyppeteer	0.2.6
pyproj	3.1.0
pyrsistent	0.18.0
pysocks	1.7.1
python	3.8.12
python-confluent-kafka	1.6.0
python-dateutil	2.8.2
python_abi	3.8
pytz	2021.3
pyviz_comms	2.1.0
pywavelets	1.2.0
pyyaml	6.0
pyzmq	22.3.0
rapids	21.12.00
rapids-xgboost	21.12.00
re2	2021.11.01
readline	8.1
requests	2.26.0
rmm	21.12.00
rtree	0.9.7

Library	Version
s2n	1.3.0
scikit-image	0.18.1
scikit-learn	1.0.1
scipy	1.7.3
send2trash	1.8.0
setuptools	59.6.0
shapely	1.8.0
simpervisor	0.4
six	1.16.0
snappy	1.1.8
sniffio	1.2.0
sortedcontainers	2.4.0
spdlog	1.8.5
sqlite	3.37.0
streamz	0.6.3
tblib	1.7.0
terminado	0.12.1
testpath	0.5.0
threadpoolctl	3.0.0
tifffile	2021.11.2
tiledb	2.3.4
tk	8.6.11
toolz	0.11.2
tornado	6.1
tqdm	4.62.3
traitlets	5.1.1
treelite	2.1.0
treelite-runtime	2.1.0
typing-extensions	4.0.1
typing_extensions	4.0.1
tzcode	2021e
tzdata	2021e
ucx	1.11.2+gef2bbcf
ucx-proc	1.0.0
ucx-py	0.23.0
unicodedata2	13.0.0.post2
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1

Library	Version
websocket-client	1.2.3
websockets	9.1
wheel	0.37.0
widgetsnbextension	3.5.2
xarray	0.20.2
xerces-c	3.2.3
xgboost	1.5.0dev.rapidsai21.12
xorg-kbproto	1.0.7
xorg-libice	1.0.10
xorg-libsm	1.2.3
xorg-libx11	1.7.2
xorg-libxau	1.0.9
xorg-libxdmcp	1.1.3
xorg-libxext	1.3.4
xorg-libxrender	0.9.10
xorg-renderproto	0.11.1
xorg-xextproto	7.3.0
xorg-xproto	7.0.31
xz	5.2.5
yaml	0.2.5
yarl	1.7.2
zeromq	4.3.4
zfp	0.5.5
zict	2.0.0
zipp	3.6.0
zlib	1.2.11
zstd	1.5.0

Python 3.7 Libraries for Workbench

This section lists the packages in Python 3.7 Workbench Runtimes that ship with ML Runtimes 2021.12.

Table 22: Packages in Python 3.7.11 Workbench Runtimes - Standard

Library	Version
python	3.7.11
pip	21.1.3
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6

Library	Version
cycler	0.10.0
decorator	4.4.2
idna	3.2
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.4.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Table 23: Packages in Python 3.7.11 Workbench Runtimes - Nvidia GPU Edition

Library	Version
python	3.7.11
pip	21.1.3

Library	Version
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
backcall	0.2.0
bitarray	2.1.0
certifi	2021.5.30
charset-normalizer	2.0.6
cycler	0.10.0
decorator	4.4.2
idna	3.2
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.4.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.26.0
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6

Library	Version
wcwidth	0.2.5

Table 24: Packages in Python 3.7.11 Workbench Runtimes - RAPIDS

Library	Version
python	3.7.11
pip	21.1.3
cuda	11.4.1-1
_libgcc_mutex	0.1
_openmp_mutex	4.5
abseil-cpp	20210324.2
aiohttp	3.8.1
aiosignal	1.2.0
anyio	3.4.0
appdirs	1.4.4
argcomplete	1.12.3
argon2-cffi	21.1.0
arrow-cpp	5.0.0
arrow-cpp-proc	3.0.0
async-timeout	4.0.1
async_generator	1.10
asynctest	0.13.0
attrs	21.2.0
aws-c-auth	0.6.7
aws-c-cal	0.5.12
aws-c-common	0.6.17
aws-c-compression	0.2.14
aws-c-event-stream	0.2.7
aws-c-http	0.6.10
aws-c-io	0.10.13
aws-c-mqtt	0.7.9
aws-c-s3	0.1.27
aws-c-sdkutils	0.1.1
aws-checksums	0.1.12
aws-crt-cpp	0.17.8
aws-sdk-cpp	1.9.145
backcall	0.2.0
backports	1.0
backports.functools_lru_cache	1.6.4
bleach	4.1.0

Library	Version
blosc	1.21.0
bokeh	2.4.0
boost	1.74.0
boost-cpp	1.74.0
brotli	1.0.9
brotli-bin	1.0.9
brotlipy	0.7.0
brunsli	0.1
bzip2	1.0.8
c-ares	1.18.1
c-blosc2	2.0.4
ca-certificates	2021.10.8
cachetools	4.2.4
cairo	1.16.0
cdsw	1.1.0
certifi	2021.5.30
cffi	1.15.0
cfitsio	3.470
charls	2.2.0
charset-normalizer	2.0.6
click	8.0.3
click-plugins	1.1.1
cligj	0.7.2
cloudpickle	2.0.0
colorama	0.4.4
colorcet	3.0.0
cryptography	36.0.1
cucim	21.12.00
cudatoolkit	11.0.221
cudf	21.12.02
cudf_kafka	21.12.02
cudnn	8.2.1.32
cugraph	21.12.00
cuml	21.12.00
cupy	9.6.0
curl	7.80.0
cusignal	21.12.00
cuspatial	21.12.00
custreamz	21.12.02

Library	Version
cuxfilter	21.12.00
cycler	0.11.0
cyrus-sasl	2.1.27
cytoolz	0.11.2
dask	2021.11.2
dask-core	2021.11.2
dask-cuda	21.12.00
dask-cudf	21.12.02
datashader	0.11.1
datashape	0.5.4
debugpy	1.5.1
decorator	5.1.0
defusedxml	0.7.1
distributed	2021.11.2
dlpack	0.5
entrypoints	0.3
expat	2.4.1
faiss-proc	1.0.0
fastavro	1.4.7
fastrlock	0.8
fiona	1.8.20
font-ttf-dejavu-sans-mono	2.37
font-ttf-inconsolata	3.000
font-ttf-source-code-pro	2.038
font-ttf-ubuntu	0.83
fontconfig	2.13.1
fonts-conda-ecosystem	1
fonts-conda-forge	1
fonttools	4.28.4
freetype	2.10.4
freexl	1.0.6
frozenlist	1.2.0
fsspec	2021.11.1
gdal	3.3.2
geopandas	0.9.0
geopandas-base	0.9.0
geos	3.9.1
geotiff	1.7.0
gettext	0.19.8.1

Library	Version
gflags	2.2.2
giflib	5.2.1
git	2.34.1
glog	0.5.0
gpuci-tools	0.3.1
grpc-cpp	1.41.1
hdf4	4.2.15
hdf5	1.12.1
heapdict	1.0.1
icu	68.2
idna	3.2
imagecodecs	2021.8.26
imageio	2.13.3
importlib-metadata	4.8.3
importlib_metadata	4.8.3
importlib_resources	5.4.0
ipykernel	6.6.0
ipython	7.30.1
ipython_genutils	0.2.0
ipywidgets	7.6.5
jbig	2.1
jedi	0.18.1
jinja2	3.0.3
joblib	1.1.0
jpeg	9d
json-c	0.15
jsonschema	4.3.1
jupyter-server-proxy	3.2.0
jupyter_client	7.1.0
jupyter_core	4.9.1
jupyter_server	1.13.1
jupyterlab_pygments	0.1.2
jupyterlab_widgets	1.0.2
jxrlib	1.1
kealib	1.4.14
kiwisolver	1.3.2
krb5	1.19.2
lcms2	2.12
ld_impl_linux-64	2.36.1

Library	Version
lerc	3.0
libaec	1.0.6
libblas	3.9.0
libbrotlicommon	1.0.9
libbrotlidec	1.0.9
libbrotlienc	1.0.9
libcblas	3.9.0
libcucim	21.12.00
libcudf	21.12.02
libcudf_kafka	21.12.02
libcugraph	21.12.00
libcuml	21.12.00
libcumlprims	21.12.00
libcurl	7.80.0
libcusolver	11.3.2.107
libcuspatial	21.12.00
libdap4	3.20.6
libdeflate	1.8
libedit	3.1.20191231
libev	4.33
libevent	2.1.10
libfaiss	1.7.0
libffi	3.4.2
libgcc-ng	9.4.0
libgcrypt	1.9.4
libgdal	3.3.2
libgfortran-ng	11.2.0
libgfortran5	11.2.0
libglib	2.70.2
libgpg-error	1.42
libgsasl	1.10.0
libhwloc	2.3.0
libiconv	1.16
libkml	1.3.0
liblapack	3.9.0
libllvm11	11.1.0
libnetcdf	4.8.1
libnghttp2	1.43.0
libnsl	2.0.0

Library	Version
libntlm	1.4
libopenblas	0.3.18
libpng	1.6.37
libpq	13.5
libprotobuf	3.18.1
librdkafka	1.6.1
librmm	21.12.00
librttopo	1.1.0
libsodium	1.0.18
libspatialindex	1.9.3
libspatialite	5.0.1
libssh2	1.10.0
libstdcxx-ng	9.4.0
libthrift	0.15.0
libtiff	4.3.0
libutf8proc	2.7.0
libuuid	2.32.1
libuv	1.42.0
libwebp	1.2.1
libwebp-base	1.2.1
libxcb	1.13
libxgboost	1.5.0dev.rapidsai21.12
libxml2	2.9.12
libzip	1.8.0
libzlib	1.2.11
libzopfli	1.0.3
llvm-openmp	12.0.1
llvmlite	0.37.0
locket	0.2.0
lz4-c	1.9.3
mapclassify	2.4.3
markdown	3.3.6
markupsafe	2.0.1
matplotlib-base	3.5.1
matplotlib-inline	0.1.3
mistune	0.8.4
msgpack-python	1.0.3
multidict	5.2.0
multipledispatch	0.6.0

Library	Version
munch	2.5.0
munkres	1.1.4
nbclient	0.5.9
nbconvert	6.3.0
nbformat	5.1.3
nccl	2.11.4.1
ncurses	6.2
nest-asyncio	1.5.4
networkx	2.6.3
nodejs	14.17.4
notebook	6.4.6
nspr	4.32
nss	3.73
numba	0.54.1
numpy	1.20.3
nvtx	0.2.3
olefile	0.46
openjpeg	2.4.0
openssl	1.1.1l
orc	1.7.1
packaging	21.3
pandas	1.3.5
pandoc	2.16.2
pandocfilters	1.5.0
panel	0.12.4
param	1.12.0
parquet-cpp	1.5.1
parso	0.8.3
partd	1.2.0
pcre	8.45
pcre2	10.37
perl	5.32.1
pexpect	4.8.0
pickle5	0.0.12
pickleshare	0.7.5
pillow	8.4.0
pip	21.3.1
pixman	0.40.0
pooch	1.5.2

Library	Version
poppler	21.09.0
poppler-data	0.4.11
postgresql	13.5
proj	8.1.0
prometheus_client	0.12.0
prompt-toolkit	3.0.24
protobuf	3.18.1
psutil	5.8.0
pthread-stubs	0.4
ptxcompiler	0.2.0
ptyprocess	0.7.0
py-xgboost	1.5.0dev.rapidsai21.12
py4j	0.10.9
pyarrow	5.0.0
pycparser	2.21
pyct	0.4.6
pyct-core	0.4.6
pydeck	0.5.0
pyee	8.1.0
pygments	2.10.0
pynvml	11.4.1
pyopenssl	21.0.0
pyparsing	3.0.6
pyppeteer	0.2.6
pyproj	3.1.0
pyrsistent	0.18.0
pysocks	1.7.1
python	3.7.12
python-confluent-kafka	1.6.0
python-dateutil	2.8.2
python_abi	3.7
pytz	2021.3
pyviz_comms	2.1.0
pywavelets	1.2.0
pyyaml	6.0
pyzmq	22.3.0
rapids	21.12.00
rapids-xgboost	21.12.00
re2	2021.11.01

Library	Version
readline	8.1
requests	2.26.0
rmm	21.12.00
rtree	0.9.7
s2n	1.3.0
scikit-image	0.18.1
scikit-learn	1.0.1
scipy	1.7.3
send2trash	1.8.0
setuptools	59.6.0
shapely	1.8.0
simpervisor	0.4
six	1.16.0
snappy	1.1.8
sniffio	1.2.0
sortedcontainers	2.4.0
spdlog	1.8.5
sqlite	3.37.0
streamz	0.6.3
tblib	1.7.0
terminado	0.12.1
testpath	0.5.0
threadpoolctl	3.0.0
tifffile	2021.11.2
tiledb	2.3.4
tk	8.6.11
toolz	0.11.2
tornado	6.1
tqdm	4.62.3
traitlets	5.1.1
treelite	2.1.0
treelite-runtime	2.1.0
typing-extensions	4.0.1
typing_extensions	4.0.1
tzcode	2021e
tzdata	2021e
ucx	1.11.2+gef2bbcf
ucx-proc	1.0.0
ucx-py	0.23.0

Library	Version
unicodedata2	13.0.0.post2
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.3
websockets	9.1
wheel	0.37.0
widgetsnbextension	3.5.2
xarray	0.20.2
xerces-c	3.2.3
xgboost	1.5.0dev.rapidsai21.12
xorg-kbproto	1.0.7
xorg-libice	1.0.10
xorg-libsm	1.2.3
xorg-libx11	1.7.2
xorg-libxau	1.0.9
xorg-libxdmcp	1.1.3
xorg-libxext	1.3.4
xorg-libxrender	0.9.10
xorg-renderproto	0.11.1
xorg-xextproto	7.3.0
xorg-xproto	7.0.31
xz	5.2.5
yaml	0.2.5
yarl	1.7.2
zeromq	4.3.4
zfp	0.5.5
zict	2.0.0
zipp	3.6.0
zlib	1.2.11
zstd	1.5.0

Scala 2.11 Libraries for Workbench

This section lists the packages in Scala 2.11.12 Workbench Runtimes that ship with ML Runtimes 2021.12.

Scala 2.11.12 Libraries for Workbench - Standard

Library	Version
org.scala-lang:scala-library	2.11.12
org.scalatest:scalatest	2.2.4
org.scala-lang:scala-compiler	2.11.12

Library	Version
io.circe:circe-generic	0.11.2
io.circe:circe-parser	0.11.2
org.scalameta:scalameta	1.0.0

Python 3.9.6 Libraries for JupyterLab

This section lists the packages in Python 3.9 JupyterLab Runtimes that ship with ML Runtimes 2021.12.

Table 25: Packages in Python 3.9.6 JupyterLab Runtimes - Standard

Library	Version
python	3.9.6
pip	21.1.3
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2

Library	Version
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.4.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2

Library	Version
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1

Table 26: Packages in Python 3.9.6 JupyterLab Runtimes - Nvidia GPU Edition

Library	Version
python	3.9.6
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3

Library	Version
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.4.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1

Library	Version
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1

Python 3.8 Libraries for JupyterLab

This section lists the packages in Python 3.8 JupyterLab Runtimes that ship with ML Runtimes 2021.012.

Table 27: Packages in Python 3.8.6 JupyterLab Runtimes - Standard

Library	Version
python	3.8.6
pip	21.1.3
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10

Library	Version
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.4.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1

Library	Version
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1

Table 28: Packages in Python 3.8.6 JupyterLab Runtimes - Nvidia GPU Edition

Library	Version
python	3.8.6
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6

Library	Version
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.4.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8

Library	Version
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1

Table 29: Packages in Python 3.8.6 JupyterLab Runtimes - RAPIDS

Library	Version
python	3.8.6
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
_libgcc_mutex	0.1
_openmp_mutex	4.5
abseil-cpp	20210324.2
aiohttp	3.8.1
aiosignal	1.2.0
anyio	3.3.0
appdirs	1.4.4

Library	Version
argon2-cffi	20.1.0
arrow-cpp	5.0.0
arrow-cpp-proc	3.0.0
async-timeout	4.0.1
async_generator	1.10
attrs	20.3.0
aws-c-auth	0.6.7
aws-c-cal	0.5.12
aws-c-common	0.6.17
aws-c-compression	0.2.14
aws-c-event-stream	0.2.7
aws-c-http	0.6.10
aws-c-io	0.10.13
aws-c-mqtt	0.7.9
aws-c-s3	0.1.27
aws-c-sdkutils	0.1.1
aws-checksums	0.1.12
aws-crt-cpp	0.17.8
aws-sdk-cpp	1.9.145
babel	2.9.1
backcall	0.2.0
backports	1.0
backports.functools_lru_cache	1.6.4
bleach	3.3.1
blosc	1.21.0
bokeh	2.4.0
boost	1.74.0
boost-cpp	1.74.0
brotli	1.0.9
brotli-bin	1.0.9
brotlipy	0.7.0
brunsli	0.1
bzip2	1.0.8
c-ares	1.18.1
c-blosc2	2.0.4
ca-certificates	2021.10.8
cachetools	4.2.4
cairo	1.16.0
cdsw	1.1.0

Library	Version
certifi	2020.11.8
cffi	1.14.4
cfitsio	3.470
chardet	4.0.0
charls	2.2.0
charset-normalizer	2.0.6
click	8.0.3
click-plugins	1.1.1
cligj	0.7.2
cloudpickle	2.0.0
colorama	0.4.4
colorcet	3.0.0
cryptography	36.0.1
cucim	21.12.00
cudatoolkit	11.0.221
cudf	21.12.02
cudf_kafka	21.12.02
cudnn	8.2.1.32
cugraph	21.12.00
cuml	21.12.00
cupy	9.6.0
curl	7.80.0
cusignal	21.12.00
cuspatial	21.12.00
custreamz	21.12.02
cuxfilter	21.12.00
cycler	0.11.0
cyrus-sasl	2.1.27
cytoolz	0.11.2
dask	2021.11.2
dask-core	2021.11.2
dask-cuda	21.12.00
dask-cudf	21.12.02
datashader	0.11.1
datashape	0.5.4
debugpy	1.5.1
decorator	4.4.2
defusedxml	0.6.0
distributed	2021.11.2

Library	Version
dlpack	0.5
entrypoints	0.3
expat	2.4.1
faiss-proc	1.0.0
fastavro	1.4.7
fastrlock	0.8
fiona	1.8.20
font-ttf-dejavu-sans-mono	2.37
font-ttf-inconsolata	3.000
font-ttf-source-code-pro	2.038
font-ttf-ubuntu	0.83
fontconfig	2.13.1
fonts-conda-ecosystem	1
fonts-conda-forge	1
fonttools	4.28.4
freetype	2.10.4
freexl	1.0.6
frozenlist	1.2.0
fsspec	2021.11.1
gdal	3.3.2
geopandas	0.9.0
geopandas-base	0.9.0
geos	3.9.1
geotiff	1.7.0
gettext	0.19.8.1
gflags	2.2.2
giflib	5.2.1
git	2.34.1
glog	0.5.0
gpuci-tools	0.3.1
grpc-cpp	1.41.1
hdf4	4.2.15
hdf5	1.12.1
heapdict	1.0.1
icu	68.2
idna	2.10
imagecodecs	2021.8.26
imageio	2.13.3
importlib-metadata	4.8.3

Library	Version
importlib_metadata	4.8.3
importlib_resources	5.4.0
ipykernel	5.3.4
ipython	7.16.1
ipython_genutils	0.2.0
ipywidgets	7.6.5
jbig	2.1
jedi	0.17.2
jinja2	2.11.3
joblib	1.1.0
jpeg	9d
json-c	0.15
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyter-server-proxy	3.2.0
jupyterlab	3.2.8
jupyterlab-server	2.7.2
jupyterlab_pygments	0.1.2
jupyterlab_widgets	1.0.2
jxrlib	1.1
kealib	1.4.14
kiwisolver	1.3.2
krb5	1.19.2
lcms2	2.12
ld_impl_linux-64	2.36.1
lerc	3.0
libaec	1.0.6
libblas	3.9.0
libbrotlicommon	1.0.9
libbrotlidec	1.0.9
libbrotlienc	1.0.9
libcblas	3.9.0
libcucim	21.12.00
libcudf	21.12.02
libcudf_kafka	21.12.02
libcugraph	21.12.00

Library	Version
libcuml	21.12.00
libcumlprims	21.12.00
libcurl	7.80.0
libcusolver	11.3.2.107
libcuspatial	21.12.00
libdap4	3.20.6
libdeflate	1.8
libedit	3.1.20191231
libev	4.33
libevent	2.1.10
libfaiss	1.7.0
libffi	3.4.2
libgcc-ng	9.4.0
libgcrypt	1.9.4
libgdal	3.3.2
libgfortran-ng	11.2.0
libgfortran5	11.2.0
libglib	2.70.2
libgpg-error	1.42
libgsasl	1.10.0
libhwloc	2.3.0
libiconv	1.16
libkml	1.3.0
liblapack	3.9.0
libllvm11	11.1.0
libnetcdf	4.8.1
libnghttp2	1.43.0
libnsl	2.0.0
libntlm	1.4
libopenblas	0.3.18
libpng	1.6.37
libpq	13.5
libprotobuf	3.18.1
librdkafka	1.6.1
librmm	21.12.00
librttopo	1.1.0
libsodium	1.0.18
libspatialindex	1.9.3
libspatialite	5.0.1

Library	Version
libssh2	1.10.0
libstdcxx-ng	9.4.0
libthrift	0.15.0
libtiff	4.3.0
libutf8proc	2.7.0
libuuid	2.32.1
libuv	1.42.0
libwebp	1.2.1
libwebp-base	1.2.1
libxcb	1.13
libxgboost	1.5.0dev.rapidsai21.12
libxml2	2.9.12
libzip	1.8.0
libzlib	1.2.11
libzopfli	1.0.3
llvm-openmp	12.0.1
llvmlite	0.37.0
locket	0.2.0
lz4-c	1.9.3
mapclassify	2.4.3
markdown	3.3.6
markupsafe	1.1.1
matplotlib-base	3.5.1
matplotlib-inline	0.1.3
mistune	0.8.4
msgpack-python	1.0.3
multidict	5.2.0
multipledispatch	0.6.0
munch	2.5.0
munkres	1.1.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nccl	2.11.4.1
ncurses	6.2
nest-asyncio	1.5.1
networkx	2.6.3
nodejs	14.17.4

Library	Version
notebook	6.4.3
nspr	4.32
nss	3.73
numba	0.54.1
numpy	1.20.3
nvtx	0.2.3
olefile	0.46
openjpeg	2.4.0
openssl	1.1.1l
orc	1.7.1
packaging	20.9
pandas	1.3.5
pandoc	2.16.2
pandocfilters	1.4.3
panel	0.12.4
param	1.12.0
parquet-cpp	1.5.1
parso	0.7.1
partd	1.2.0
pcre	8.45
pcre2	10.37
perl	5.32.1
pexpect	4.8.0
pickleshare	0.7.5
pillow	8.4.0
pip	21.3.1
pixman	0.40.0
pooch	1.5.2
poppler	21.09.0
poppler-data	0.4.11
postgresql	13.5
proj	8.1.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
protobuf	3.18.1
psutil	5.8.0
pthread-stubs	0.4
ptxcompiler	0.2.0
ptyprocess	0.6.0

Library	Version
py-xgboost	1.5.0dev.rapidsai21.12
py4j	0.10.9
pyarrow	5.0.0
pycparser	2.20
pyct	0.4.6
pyct-core	0.4.6
pydeck	0.5.0
pyee	8.1.0
pygments	2.8.1
pynvml	11.4.1
pyopenssl	21.0.0
pyparsing	2.4.7
pyppeteer	0.2.6
pyproj	3.1.0
pyrsistent	0.17.3
pysocks	1.7.1
python	3.8.12
python-confluent-kafka	1.6.0
python-dateutil	2.8.1
python_abi	3.8
pytz	2021.1
pyviz_comms	2.1.0
pywavelets	1.2.0
pyyaml	6.0
pyzmq	19.0.2
rapids	21.12.00
rapids-xgboost	21.12.00
re2	2021.11.01
readline	8.1
requests	2.25.1
requests-unixsocket	0.2.0
rmm	21.12.00
rtree	0.9.7
s2n	1.3.0
scikit-image	0.18.1
scikit-learn	1.0.1
scipy	1.7.3
send2trash	1.5.0
setuptools	59.6.0

Library	Version
shapely	1.8.0
simpervisor	0.4
six	1.15.0
snappy	1.1.8
sniffio	1.2.0
sortedcontainers	2.4.0
spdlog	1.8.5
sqlite	3.37.0
streamz	0.6.3
tblib	1.7.0
terminado	0.9.2
testpath	0.4.4
threadpoolctl	3.0.0
tifffile	2021.11.2
tiledb	2.3.4
tk	8.6.11
toolz	0.11.2
tornado	6.1
tqdm	4.62.3
traitlets	4.3.3
treelite	2.1.0
treelite-runtime	2.1.0
typing-extensions	4.0.1
typing_extensions	4.0.1
tzcode	2021e
tzdata	2021e
ucx	1.11.2+gef2bbcf
ucx-proc	1.0.0
ucx-py	0.23.0
unicodedata2	13.0.0.post2
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
websockets	9.1
wheel	0.37.0
widgetsnbextension	3.5.2
xarray	0.20.2
xerces-c	3.2.3

Library	Version
xgboost	1.5.0dev.rapidsai21.12
xorg-kbproto	1.0.7
xorg-libice	1.0.10
xorg-libsm	1.2.3
xorg-libx11	1.7.2
xorg-libxau	1.0.9
xorg-libxdmcp	1.1.3
xorg-libxext	1.3.4
xorg-libxrender	0.9.10
xorg-renderproto	0.11.1
xorg-xextproto	7.3.0
xorg-xproto	7.0.31
xz	5.2.5
yaml	0.2.5
yarl	1.7.2
zeromq	4.3.4
zfp	0.5.5
zict	2.0.0
zipp	3.6.0
zlib	1.2.11
zstd	1.5.0

Python 3.7 Libraries for JupyterLab

This section lists the packages in Python 3.7 JupyterLab Runtimes that ship with ML Runtimes 2021.12.

Table 30: Packages in Python 3.7.11 JupyterLab Runtimes - Standard

Library	Version
python	3.7.11
pip	21.1.3
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4

Library	Version
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
importlib-metadata	3.4.0
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5

Library	Version
Pillow	8.4.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.4.0

Table 31: Packages in Python 3.7.11 JupyterLab Runtimes - Nvidia GPU Edition

Library	Version
python	3.7.11
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
anyio	3.3.0
argon2-cffi	20.1.0

Library	Version
async-generator	1.10
attrs	20.3.0
Babel	2.9.1
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
charset-normalizer	2.0.6
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
importlib-metadata	3.4.0
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.2.8
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3

Library	Version
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.4.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.4.0

Table 32: Packages in Python 3.7.11 JupyterLab Runtimes - RAPIDS

Library	Version
python	3.7.11
pip	21.1.3
_libgcc_mutex	0.1
_openmp_mutex	4.5
abseil-cpp	20210324.2
aiohttp	3.8.1
aiosignal	1.2.0
anyio	3.3.0
appdirs	1.4.4
argcomplete	1.12.3
argon2-cffi	20.1.0
arrow-cpp	5.0.0
arrow-cpp-proc	3.0.0
async-timeout	4.0.1
async_generator	1.10
asynctest	0.13.0
attrs	20.3.0
aws-c-auth	0.6.7
aws-c-cal	0.5.12
aws-c-common	0.6.17
aws-c-compression	0.2.14
aws-c-event-stream	0.2.7
aws-c-http	0.6.10
aws-c-io	0.10.13
aws-c-mqtt	0.7.9
aws-c-s3	0.1.27
aws-c-sdkutils	0.1.1
aws-checksums	0.1.12
aws-crt-cpp	0.17.8
aws-sdk-cpp	1.9.145
babel	2.9.1
backcall	0.2.0
backports	1.0
backports.functools_lru_cache	1.6.4
bleach	3.3.1
blosc	1.21.0
bokeh	2.4.0
boost	1.74.0

Library	Version
boost-cpp	1.74.0
brotli	1.0.9
brotli-bin	1.0.9
brotlipy	0.7.0
brunsli	0.1
bzip2	1.0.8
c-ares	1.18.1
c-blosc2	2.0.4
ca-certificates	2021.10.8
cachetools	4.2.4
cairo	1.16.0
cdsw	1.1.0
certifi	2020.11.8
cffi	1.14.4
cfitsio	3.470
chardet	4.0.0
charls	2.2.0
charset-normalizer	2.0.6
click	8.0.3
click-plugins	1.1.1
cligj	0.7.2
cloudpickle	2.0.0
colorama	0.4.4
colorcet	3.0.0
cryptography	36.0.1
cucim	21.12.00
cudatoolkit	11.0.221
cudf	21.12.02
cudf_kafka	21.12.02
cudnn	8.2.1.32
cugraph	21.12.00
cuml	21.12.00
cupy	9.6.0
curl	7.80.0
cusignal	21.12.00
cuspatial	21.12.00
custreamz	21.12.02
cuxfilter	21.12.00
cycler	0.11.0

Library	Version
cyrus-sasl	2.1.27
cytoolz	0.11.2
dask	2021.11.2
dask-core	2021.11.2
dask-cuda	21.12.00
dask-cudf	21.12.02
datashader	0.11.1
datashape	0.5.4
debugpy	1.5.1
decorator	4.4.2
defusedxml	0.6.0
distributed	2021.11.2
dlpack	0.5
entrypoints	0.3
expat	2.4.1
faiss-proc	1.0.0
fastavro	1.4.7
fastrlock	0.8
fiona	1.8.20
font-ttf-dejavu-sans-mono	2.37
font-ttf-inconsolata	3.000
font-ttf-source-code-pro	2.038
font-ttf-ubuntu	0.83
fontconfig	2.13.1
fonts-conda-ecosystem	1
fonts-conda-forge	1
fonttools	4.28.4
freetype	2.10.4
freexl	1.0.6
frozenlist	1.2.0
fsspec	2021.11.1
gdal	3.3.2
geopandas	0.9.0
geopandas-base	0.9.0
geos	3.9.1
geotiff	1.7.0
gettext	0.19.8.1
gflags	2.2.2
giflib	5.2.1

Library	Version
git	2.34.1
glog	0.5.0
gpuci-tools	0.3.1
grpc-cpp	1.41.1
hdf4	4.2.15
hdf5	1.12.1
heapdict	1.0.1
icu	68.2
idna	2.10
imagecodecs	2021.8.26
imageio	2.13.3
importlib-metadata	3.4.0
importlib_metadata	4.8.3
importlib_resources	5.4.0
ipykernel	5.3.4
ipython	7.16.1
ipython_genutils	0.2.0
ipywidgets	7.6.5
jbig	2.1
jedi	0.17.2
jinja2	2.11.3
joblib	1.1.0
jpeg	9d
json-c	0.15
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyter-server-proxy	3.2.0
jupyterlab	3.2.8
jupyterlab-server	2.7.2
jupyterlab_pygments	0.1.2
jupyterlab_widgets	1.0.2
jxrlib	1.1
kealib	1.4.14
kiwisolver	1.3.2
krb5	1.19.2
lcms2	2.12

Library	Version
ld_impl_linux-64	2.36.1
lerc	3.0
libaec	1.0.6
libblas	3.9.0
libbrotlicommon	1.0.9
libbrotlidec	1.0.9
libbrotlienc	1.0.9
libcblas	3.9.0
libcucim	21.12.00
libcudf	21.12.02
libcudf_kafka	21.12.02
libcugraph	21.12.00
libcuml	21.12.00
libcumlprims	21.12.00
libcurl	7.80.0
libcusolver	11.3.2.107
libcuspatial	21.12.00
libdap4	3.20.6
libdeflate	1.8
libedit	3.1.20191231
libev	4.33
libevent	2.1.10
libfaiss	1.7.0
libffi	3.4.2
libgcc-ng	9.4.0
libgcrypt	1.9.4
libgdal	3.3.2
libgfortran-ng	11.2.0
libgfortran5	11.2.0
libglib	2.70.2
libgpg-error	1.42
libgsasl	1.10.0
libhwloc	2.3.0
libiconv	1.16
libkml	1.3.0
liblapack	3.9.0
libllvm11	11.1.0
libnetcdf	4.8.1
libnghttp2	1.43.0

Library	Version
libnsl	2.0.0
libntlm	1.4
libopenblas	0.3.18
libpng	1.6.37
libpq	13.5
libprotobuf	3.18.1
librdkafka	1.6.1
librmm	21.12.00
librttopo	1.1.0
libsodium	1.0.18
libspatialindex	1.9.3
libspatialite	5.0.1
libssh2	1.10.0
libstdcxx-ng	9.4.0
libthrift	0.15.0
libtiff	4.3.0
libutf8proc	2.7.0
libuuid	2.32.1
libuv	1.42.0
libwebp	1.2.1
libwebp-base	1.2.1
libxcb	1.13
libxgboost	1.5.0dev.rapidsai21.12
libxml2	2.9.12
libzip	1.8.0
libzlib	1.2.11
libzopfli	1.0.3
llvm-openmp	12.0.1
llvmlite	0.37.0
locket	0.2.0
lz4-c	1.9.3
mapclassify	2.4.3
markdown	3.3.6
markupsafe	1.1.1
matplotlib-base	3.5.1
matplotlib-inline	0.1.3
mistune	0.8.4
msgpack-python	1.0.3
multidict	5.2.0

Library	Version
multipledispatch	0.6.0
munch	2.5.0
munkres	1.1.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nccl	2.11.4.1
ncurses	6.2
nest-asyncio	1.5.1
networkx	2.6.3
nodejs	14.17.4
notebook	6.4.3
nspr	4.32
nss	3.73
numba	0.54.1
numpy	1.20.3
nvtx	0.2.3
olefile	0.46
openjpeg	2.4.0
openssl	1.1.1l
orc	1.7.1
packaging	20.9
pandas	1.3.5
pandoc	2.16.2
pandocfilters	1.4.3
panel	0.12.4
param	1.12.0
parquet-cpp	1.5.1
parso	0.7.1
partd	1.2.0
pcre	8.45
pcre2	10.37
perl	5.32.1
pexpect	4.8.0
pickle5	0.0.12
pickleshare	0.7.5
pillow	8.4.0
pip	21.3.1

Library	Version
pixman	0.40.0
pooch	1.5.2
poppler	21.09.0
poppler-data	0.4.11
postgresql	13.5
proj	8.1.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
protobuf	3.18.1
psutil	5.8.0
pthread-stubs	0.4
ptxcompiler	0.2.0
ptyprocess	0.6.0
py-xgboost	1.5.0dev.rapidsai21.12
py4j	0.10.9
pyarrow	5.0.0
pycparser	2.20
pyct	0.4.6
pyct-core	0.4.6
pydeck	0.5.0
pyee	8.1.0
pygments	2.8.1
pynvml	11.4.1
pyopenssl	21.0.0
pyparsing	2.4.7
pyppeteer	0.2.6
pyproj	3.1.0
pyrsistent	0.17.3
pysocks	1.7.1
python	3.7.12
python-confluent-kafka	1.6.0
python-dateutil	2.8.1
python_abi	3.7
pytz	2021.1
pyviz_comms	2.1.0
pywavelets	1.2.0
pyyaml	6.0
pyzmq	19.0.2
rapids	21.12.00

Library	Version
rapids-xgboost	21.12.00
re2	2021.11.01
readline	8.1
requests	2.25.1
requests-unixsocket	0.2.0
rmm	21.12.00
rtree	0.9.7
s2n	1.3.0
scikit-image	0.18.1
scikit-learn	1.0.1
scipy	1.7.3
send2trash	1.5.0
setuptools	59.6.0
shapely	1.8.0
simpervisor	0.4
six	1.15.0
snappy	1.1.8
sniffio	1.2.0
sortedcontainers	2.4.0
spdlog	1.8.5
sqlite	3.37.0
streamz	0.6.3
tblib	1.7.0
terminado	0.9.2
testpath	0.4.4
threadpoolctl	3.0.0
tifffile	2021.11.2
tiledb	2.3.4
tk	8.6.11
toolz	0.11.2
tornado	6.1
tqdm	4.62.3
traitlets	4.3.3
treelite	2.1.0
treelite-runtime	2.1.0
typing-extensions	3.7.4.3
tzcode	2021e
tzdata	2021e
ucx	1.11.2+gef2bbcf

Library	Version
ucx-proc	1.0.0
ucx-py	0.23.0
unicodedata2	13.0.0.post2
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
websockets	9.1
wheel	0.37.0
widgetsnbextension	3.5.2
xarray	0.20.2
xerces-c	3.2.3
xgboost	1.5.0dev.rapidsai21.12
xorg-kbproto	1.0.7
xorg-libice	1.0.10
xorg-libsm	1.2.3
xorg-libx11	1.7.2
xorg-libxau	1.0.9
xorg-libxdmcp	1.1.3
xorg-libxext	1.3.4
xorg-libxrender	0.9.10
xorg-renderproto	0.11.1
xorg-xextproto	7.3.0
xorg-xproto	7.0.31
xz	5.2.5
yaml	0.2.5
yarl	1.7.2
zeromq	4.3.4
zfp	0.5.5
zict	2.0.0
zipp	3.4.0
zlib	1.2.11
zstd	1.5.0

R 4.0 Libraries

This section lists the R 4.0 libraries that ship with ML Runtimes 2021.12.

Table 33: R 4.0.5 Libraries for Workbench

Library	Version
askpass	1.1
base	4.0.5
bitops	1.0-7
boot	1.3-27
brew	1.0-6
Cairo	1.2-0
caTools	1.18.2
cdsw	2.1
class	7.3-18
cli	3.0.1
cluster	2.1.1
codetools	0.2-18
colorspace	2.0-2
compiler	4.0.5
crayon	1.4.1
curl	4.3.2
datasets	4.0.5
digest	0.6.27
ellipsis	0.3.2
fansi	0.5.0
farver	2.1.0
foreign	0.8-81
ggplot2	3.3.5
glue	1.4.2
graphics	4.0.5
grDevices	4.0.5
grid	4.0.5
gtable	0.3.0
httr	1.4.2
jsonlite	1.7.2
KernSmooth	2.23-18
labeling	0.4.2
lattice	0.20-41
lifecycle	1.0.0
magrittr	2.0.1
MASS	7.3-53.1
Matrix	1.3-2

Library	Version
methods	4.0.5
mgcv	1.8-34
mime	0.11
munsell	0.5.0
nlme	3.1-152
nnet	7.3-15
openssl	1.4.4
parallel	4.0.5
pillar	1.6.2
pkgconfig	2.0.3
png	0.1-7
R6	2.5.1
RColorBrewer	1.1-2
RJSONIO	1.3-1.5
rlang	0.4.11
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.1
spatial	7.3-13
splines	4.0.5
stats	4.0.5
stats4	4.0.5
survival	3.2-10
sys	3.4
tcltk	4.0.5
tibble	3.1.4
tools	4.0.5
utf8	1.2.2
utils	4.0.5
vctrs	0.3.8
viridisLite	0.4.0
withr	2.4.2

R 4.1 Libraries

This section lists the R 4.1 libraries that ship with ML Runtimes 2021.12.

Table 34: R 4.0.5 Libraries for Workbench

Library	Version
askpass	1.1
base	4.1.1
bitops	1.0-7
boot	1.3-28
brew	1.0-6
Cairo	1.2-0
caTools	1.18.2
cdsw	2.1
class	7.3-19
cli	3.0.1
cluster	2.1.2
codetools	0.2-18
colorspace	2.0-2
compiler	4.1.1
crayon	1.3.4
curl	4.3.2
datasets	4.1.1
digest	0.6.27
ellipsis	0.3.2
fansi	0.5.0
farver	2.1.0
foreign	0.8-81
ggplot2	3.3.5
glue	1.4.2
graphics	4.1.1
grDevices	4.1.1
grid	4.1.1
gtable	0.3.0
httr	1.4.2
jsonlite	1.7.2
KernSmooth	2.23-20
labeling	0.4.2
lattice	0.20-44
lifecycle	1.0.0
magrittr	2.0.1
MASS	7.3-54
Matrix	1.3-4

Library	Version
methods	4.1.1
mgcv	1.8-36
mime	0.11
munsell	0.5.0
nlme	3.1-152
nnet	7.3-16
openssl	1.4.4
parallel	4.1.1
pillar	1.6.2
pkgconfig	2.0.3
png	0.1-7
R6	2.5.1
RColorBrewer	1.1-2
RJSONIO	1.3-1.5
rlang	0.4.11
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.1
spatial	7.3-14
splines	4.1.1
stats	4.1.1
stats4	4.1.1
survival	3.2-11
sys	3.4
tcltk	4.1.1
tibble	3.1.4
tools	4.1.1
utf8	1.2.2
utils	4.1.1
vctrs	0.3.8
viridisLite	0.4.0
withr	2.4.2

R 3.6 Libraries

This section lists the R 3.6 libraries that ship with ML Runtimes 2021.12.

Table 35: R 3.6.3 Libraries for Workbench

Library	Version
askpass	1.1
base	3.6.3
bitops	1.0-7
boot	1.3-24
brew	1.0-6
Cairo	1.2-0
caTools	1.18.2
cdsw	2.1
class	7.3-15
cli	3.0.1
cluster	2.1.0
codetools	0.2-16
colorspace	2.0-2
compiler	3.6.3
crayon	1.4.4
curl	4.3.2
datasets	3.6.3
digest	0.6.27
ellipsis	0.3.2
fansi	0.5.0
farver	2.1.0
foreign	0.8-75
ggplot2	3.3.5
glue	1.4.2
graphics	3.6.3
grDevices	3.6.3
grid	3.6.3
gtable	0.3.0
httr	1.4.2
jsonlite	1.7.2
KernSmooth	2.23-16
labeling	0.4.2
lattice	0.20-38
lifecycle	0.1.0
magrittr	2.0.1
MASS	7.3-51.5
Matrix	1.2-18

Library	Version
methods	3.6.3
mgcv	1.8-31
mime	0.11
munsell	0.5.0
nlme	3.4-144
nnet	7.3-12
openssl	1.4.4
parallel	3.6.3
pillar	1.6.2
pkgconfig	2.0.3
png	0.1-7
R6	2.5.1
RColorBrewer	1.1-2
RJSONIO	1.3-1.5
rlang	0.4.11
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.1
spatial	7.3-11
splines	3.6.3
stats	3.6.3
stats4	3.6.3
survival	3.1-8
sys	3.4
tcltk	3.6.3
tibble	3.1.4
tools	3.6.3
utf8	1.2.2
utils	3.6.3
vctrs	0.3.8
viridisLite	0.4.0
withr	2.4.2

ML Runtimes 2021.09

This section lists the Python, R, and Scala libraries that ship with ML Runtimes 2021.09.

Note: Nvidia GPU Edition comes with CUDA 11.4.1 preinstalled.

Python 3.9 Libraries for Workbench

This section lists the packages in Python 3.9 Workbench Runtimes that ship with ML Runtimes 2021.09.

Table 36: Packages in Python 3.9.6 Workbench Runtimes - Standard

Library	Version
python	3.9.6
pip	21.1.3
backcall	0.2.0
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0

Library	Version
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Table 37: Packages in Python 3.9.6 Workbench Runtimes - Nvidia GPU Edition

Library	Version
python	3.9.6
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
backcall	0.2.0
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1

Library	Version
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Python 3.8 Libraries for Workbench

This section lists the packages in Python 3.8 Workbench Runtimes that ship with ML Runtimes 2021.09.

Table 38: Packages in Python 3.8.6 Workbench Runtimes - Standard

Library	Version
python	3.8.6
pip	21.1.3
backcall	0.2.0
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0

Library	Version
pickleshare	0.7.5
Pillow	8.3.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Table 39: Packages in Python 3.8.6 Workbench Runtimes - Nvidia GPU Edition

Library	Version
python	3.8.6
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
backcall	0.2.0
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3

Library	Version
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Python 3.7 Libraries for Workbench

This section lists the packages in Python 3.7 Workbench Runtimes that ship with ML Runtimes 2021.09.

Table 40: Packages in Python 3.7.11 Workbench Runtimes - Standard

Library	Version
python	3.7.11
pip	21.1.3
backcall	0.2.0
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10

Library	Version
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Table 41: Packages in Python 3.7.11 Workbench Runtimes - Nvidia GPU Edition

Library	Version
python	3.7.11
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
backcall	0.2.0

Library	Version
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Python 3.6 Libraries for Workbench

This section lists the packages in Python 3.6 Workbench Runtimes that ship with ML Runtimes 2021.09.

Table 42: Packages in Python 3.6.14 Workbench Runtimes - Standard

Library	Version
python	3.6.14
pip	21.1.3
backcall	0.2.0
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1

Library	Version
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Table 43: Packages in Python 3.6.14 Workbench Runtimes - Nvidia GPU Edition

Library	Version
python	3.6.14
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
backcall	0.2.0
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kerberos	1.3.1
kiwisolver	1.3.1
matplotlib	3.3.4
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1

Library	Version
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5

Scala 2.11 Libraries for Workbench

This section lists the packages in Scala 2.11.12 Workbench Runtimes that ship with ML Runtimes 2021.09.

Scala 2.11.12 Libraries for Workbench - Standard

- org.scala-lang:scala-library:2.11.12
- org.scalatest:scalatest:2.2.4:test
- org.scala-lang:scala-reflect:2.11.12
- org.scala-lang:scala-compiler:2.11.12
- io.circe:circe-generic:0.11.2
- io.circe:circe-parser:0.11.2
- org.scalameta:scalameta:1.0.0

Python 3.9.6 Libraries for JupyterLab

This section lists the packages in Python 3.9 JupyterLab Runtimes that ship with ML Runtimes 2021.09.

Table 44: Packages in Python 3.9.6 JupyterLab Runtimes - Standard

Library	Version
python	3.9.6
pip	21.1.3
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0

Library	Version
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.0.17
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0

Library	Version
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1

Table 45: Packages in Python 3.9.6 JupyterLab Runtimes - Nvidia GPU Edition

Library	Version
python	3.9.6
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1

Library	Version
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.0.17
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5

Library	Version
Pillow	8.3.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1

Python 3.8 Libraries for JupyterLab

This section lists the packages in Python 3.8 JupyterLab Runtimes that ship with ML Runtimes 2021.09.

Table 46: Packages in Python 3.8.6 JupyterLab Runtimes - Standard

Library	Version
python	3.8.6
pip	21.1.3
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10

Library	Version
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.0.17
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4

Library	Version
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1

Table 47: Packages in Python 3.8.6 JupyterLab Runtimes - Nvidia GPU Edition

Library	Version
python	3.8.6
pip	21.1.3
cuda	11.4.1-1

Library	Version
libcudnn8	8.2.2.26-1
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.0.17
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7

Library	Version
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1

Python 3.7 Libraries for JupyterLab

This section lists the packages in Python 3.7 JupyterLab Runtimes that ship with ML Runtimes 2021.09.

Table 48: Packages in Python 3.7.11 JupyterLab Runtimes - Standard

Library	Version
python	3.7.11
pip	21.1.3
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
importlib-metadata	3.4.0
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.0.17
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4

Library	Version
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.6

Library	Version
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.4.0

Table 49: Packages in Python 3.7.11 JupyterLab Runtimes - Nvidia GPU Edition

Library	Version
python	3.7.11
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
importlib-metadata	3.4.0
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2

Library	Version
jupyterlab	3.0.17
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2

Library	Version
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.4.0

Python 3.6 Libraries for JupyterLab

This section lists the packages in Python 3.6 JupyterLab Runtimes that ship with ML Runtimes 2021.09.

Table 50: Packages in Python 3.6.14 JupyterLab Runtimes - Standard

Library	Version
python	3.6.14
pip	21.1.3
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
contextvars	2.4
cycler	0.10.0
dataclasses	0.8
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
immutables	0.14
importlib-metadata	3.4.0

Library	Version
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.0.17
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1

Library	Version
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.4.0

Table 51: Packages in Python 3.6.14 JupyterLab Runtimes - Nvidia GPU Edition

Library	Version
python	3.6.14
pip	21.1.3
cuda	11.4.1-1
libcudnn8	8.2.2.26-1
anyio	3.3.0
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.1
certifi	2020.11.8
cffi	1.14.4

Library	Version
chardet	4.0.0
contextvars	2.4
cycler	0.10.0
dataclasses	0.8
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
immutables	0.14
importlib-metadata	3.4.0
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.10.2
jupyterlab	3.0.17
jupyterlab-pygments	0.1.2
jupyterlab-server	2.7.2
kerberos	1.3.1
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.4
mistune	0.8.4
nbclassic	0.3.1
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.3
nest-asyncio	1.5.1
notebook	6.4.3
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1

Library	Version
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.3.1
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
requests-unixsocket	0.2.0
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.6
wcwidth	0.2.5
webencodings	0.5.1
websocket-client	1.2.1
zipp	3.4.0

R 4.0 Libraries

This section lists the R 4.0 libraries that ship with ML Runtimes 2021.09.

Table 52: R 4.0.5 Libraries for Workbench

Library	Version
askpass	1.1

Library	Version
assertthat	0.2.1
base	4.0.5
bitops	1.0-6
boot	1.3-27
brew	1.0-6
Cairo	1.2-0
caTools	1.18.0
cdsw	2.1
class	7.3-18
cli	2.0.1
cluster	2.1.1
codetools	0.2-18
colorspace	1.4-1
compiler	4.0.5
crayon	1.3.4
curl	4.3
datasets	4.0.5
digest	0.6.23
ellipsis	0.3.0
fansi	0.4.1
farver	2.0.3
foreigns	0.8-81
ggplot2	3.2.1
glue	1.3.1
graphics	4.0.5
grDevices	4.0.5
grid	4.0.5
gtable	0.3.0
httr	1.4.1
jsonlite	1.6
KernSmooth	2.23-18
labeling	0.3
lattice	0.20-41
lazyeval	0.2.2
lifecycle	0.1.0
magrittr	1.5
MASS	7.3-53.1
Matrix	1.3-2
methods	4.0.5

Library	Version
mgcv	1.8-34
mime	0.8
munsell	0.5.0
nlme	3.1-152
nnet	7.3-15
openssl	1.4.1
parallel	4.0.5
pillar	1.4.3
pkgconfig	2.0.3
plyr	1.8.5
png	0.1-7
R6	2.4.1
RColorBrewer	1.1-2
Rcpp	1.0.3
reshape2	1.4.3
RJSONIO	1.3-1.4
rlang	0.4.4
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.0
spatial	7.3-13
splines	4.0.5
stats	4.0.5
stats4	4.0.5
stringi	1.4.5
stringr	1.4.0
survival	3.2-10
sys	3.3
tcltk	4.0.5
tibble	2.1.3
tools	4.0.5
utf8	1.1.4
utils	4.0.5
vctrs	0.2.2
viridisLite	0.3.0
withr	2.1.2

R 3.6 Libraries

This section lists the R 3.6 libraries that ship with ML Runtimes 2021.09.

Table 53: R 3.6.3 Libraries for Workbench

Library	Version
askpass	1.1
assertthat	0.2.1
base	3.6.3
bitops	1.0-6
boot	1.3-24
brew	1.0-6
Cairo	1.2-0
caTools	1.18.0
cdsw	2.1
class	7.3-15
cli	2.0.1
cluster	2.1.0
codetools	0.2-16
colorspace	1.4-1
compiler	3.6.3
crayon	1.3.4
curl	4.3
datasets	3.6.3
digest	0.6.23
ellipsis	0.3.0
fansi	0.4.1
farver	2.0.3
foreigns	0.8-75
ggplot2	3.2.1
glue	1.3.1
graphics	3.6.3
grDevices	3.6.3
grid	3.6.3
gtable	0.3.0
httr	1.4.1
jsonlite	1.6
KernSmooth	2.23-16
labeling	0.3
lattice	0.20-38
lazyeval	0.2.2
lifecycle	0.1.0
magrittr	1.5

Library	Version
MASS	7.3-51.5
Matrix	1.2-18
methods	3.6.3
mgcv	1.8-31
mime	0.8
munsell	0.5.0
nlme	3.4-144
nnet	7.3-12
openssl	1.4.1
parallel	3.6.3
pillar	1.4.3
pkgconfig	2.0.3
plyr	1.8.5
png	0.1-7
R6	2.4.1
RColorBrewer	1.1-2
Rcpp	1.0.3
reshape2	1.4.3
RJSONIO	1.3-1.4
rlang	0.4.4
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.0
spatial	7.3-11
splines	3.6.3
stats	3.6.3
stats4	3.6.3
stringi	1.4.5
stringr	1.4.0
survival	3.1-8
sys	3.3
tcltk	3.6.3
tibble	2.1.3
tools	3.6.3
utf8	1.1.4
utils	3.6.3
vctrs	0.2.2
viridisLite	0.3.0

Library	Version
withr	2.1.2

ML Runtimes 2021.06

This section lists the Python and R libraries that ship with ML Runtimes 2021.06.

Note: Nvidia GPU Edition comes with CUDA 11.1 preinstalled.

Python 3.8.6 Libraries for Workbench

This section lists the Python 3.8.6 libraries for Workbench that ship with ML Runtimes 2021.06.

Table 54: Python 3.8.6 Libraries for Workbench - Standard

Library	Version
backcall	0.2.0
bitarray	2.10.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kiwisolver	1.3.1
matplotlib	3.3.2
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1

Library	Version
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Table 55: Python 3.8.6 Libraries for Workbench - Nvidia GPU Edition

Library	Version
backcall	0.2.0
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kiwisolver	1.3.1
matplotlib	3.3.2
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1

Library	Version
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Python 3.7.9 Libraries for Workbench

This section lists the Python 3.7.9 libraries for Workbench that ship with ML Runtimes 2021.06.

Table 56: Python 3.7.9 Libraries for Workbench - Standard

Library	Version
backcall	0.2.0
bitarray	2.10.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kiwisolver	1.3.1
matplotlib	3.3.2
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0

Library	Version
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Table 57: Python 3.7.9 Libraries for Workbench - Nvidia GPU Edition

Library	Version
backcall	0.2.0
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kiwisolver	1.3.1
matplotlib	3.3.2
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5

Library	Version
Pillow	8.2.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Python 3.6.12 Libraries for Workbench

This section lists the Python 3.6.12 Scala libraries for Workbench that ship with ML Runtimes 2021.06.

Table 58: Python 3.6.12 Libraries for Workbench - Standard

Library	Version
backcall	0.2.0
bitarray	2.10.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kiwisolver	1.3.1
matplotlib	3.3.2

Library	Version
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Table 59: Python 3.6.12 Libraries for Workbench - Nvidia GPU Edition

Library	Version
backcall	0.2.0
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kiwisolver	1.3.1

Library	Version
matplotlib	3.3.2
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Python 3.8.6 Libraries for JupyterLab

This section lists the Python 3.8.6 libraries for JupyterLab that ship with ML Runtimes 2021.06.

Table 60: Python 3.8.6 Libraries for JupyterLab - Standard

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bleach	3.3.0
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0

Library	Version
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2

Library	Version
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1

Table 61: Python 3.8.6 Libraries for JupyterLab - Nvidia GPU Edition

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.0
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3

Library	Version
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1

Library	Version
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1

Python 3.7.9 Libraries for JupyterLab

This section lists the Python 3.7.9 libraries for JupyterLab that ship with ML Runtimes 2021.06.

Table 62: Python 3.7.9 Libraries for JupyterLab - Standard

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.0
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3

Library	Version
idna	2.10
importlib-metadata	3.4.0
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20

Library	Version
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1
zipp	3.4.0

Table 63: Python 3.7.9 Libraries for JupyterLab - Nvidia GPU Edition

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.0
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3

Library	Version
idna	2.10
importlib-metadata	3.4.0
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20

Library	Version
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1
zipp	3.4.0

Python 3.6.12 Libraries for JupyterLab

This section lists the Python 3.6.12 libraries for JupyterLab that ship with ML Runtimes 2021.06.

Table 64: Python 3.6.12 Libraries for JupyterLab - Standard

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bleach	3.3.0
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
contextvars	2.4
cycler	0.10.0

Library	Version
dataclasses	0.8
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
immutables	0.14
importlib-metadata	3.4.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8

Library	Version
ptyprocess	0.6.0
py4j	0.10.9.1
pycparser	2.20
Pygments	2.7.2
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1
zipp	3.4.0

Table 65: Python 3.6.12 Libraries for JupyterLab - Nvidia GPU Edition

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bleach	3.3.0
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
contextvars	2.4
cycler	0.10.0
dataclasses	0.8
decorator	4.4.2

Library	Version
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
immutables	0.14
importlib-metadata	3.4.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
py4j	0.10.9.1

Library	Version
pycparser	2.20
Pygments	2.7.2
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1
zipp	3.4.0

R 4.0 Libraries

This section lists the R 4.0 libraries that ship with ML Runtimes 2021.06.

Table 66: R 4.0 Libraries for Workbench

Library	Version
askpass	1.1
assertthat	0.2.1
base	4.0.4
bitops	1.0-6
boot	1.3-26
brew	1.0-6
Cairo	1.2-0
caTools	1.18.0
cdsw	2.1
class	7.3-18
cli	2.0.1
cluster	2.1.0
codetools	0.2-18

Library	Version
colorspace	1.4-1
compiler	4.0.4
crayon	1.3.4
curl	4.3
datasets	4.0.4
digest	0.6.23
ellipsis	0.3.0
fansi	0.4.1
farver	2.0.3
foreigns	0.8-81
ggplot2	3.2.1
glue	1.3.1
graphics	4.0.4
grDevices	4.0.4
grid	4.0.4
gtable	0.3.0
httr	1.4.1
jsonlite	1.6
KernSmooth	2.23-18
labeling	0.3
lattice	0.20-41
lazyeval	0.2.2
lifecycle	0.1.0
magrittr	1.5
MASS	7.3-53
Matrix	1.3-2
methods	4.0.4
mgcv	1.8-33
mime	0.8
munsell	0.5.0
nlme	3.1-152
nnet	7.3-15
openssl	1.4.1
parallel	4.0.4
pillar	1.4.3
pkgconfig	2.0.3
plyr	1.8.5
png	0.1-7
R6	2.4.1

Library	Version
RColorBrewer	1.1-2
Rcpp	1.0.3
reshape2	1.4.3
RJSONIO	1.3-1.4
rlang	0.4.4
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.0
spatial	7.3-13
splines	4.0.4
stats	4.0.4
stats4	4.0.4
stringi	1.4.5
stringr	1.4.0
survival	3.2-7
sys	3.3
tcltk	4.0.4
tibble	2.1.3
tools	4.0.4
utf8	1.1.4
utils	4.0.4
vctrs	0.2.2
viridisLite	0.3.0
withr	2.1.2

R 3.6 Libraries

This section lists the R 3.6 libraries that ship with ML Runtimes 2021.06.

Table 67: R 3.6 Libraries for Workbench

Library	Version
askpass	1.1
assertthat	0.2.1
base	3.6.3
bitops	1.0-6
boot	1.3-24
brew	1.0-6
Cairo	1.2-0
caTools	1.18.0

Library	Version
cdsw	2.1
class	7.3-15
cli	2.0.1
cluster	2.1.0
codetools	0.2-16
colorspace	1.4-1
compiler	3.6.3
crayon	1.3.4
curl	4.3
datasets	3.6.3
digest	0.6.23
ellipsis	0.3.0
fansi	0.4.1
farver	2.0.3
foreigns	0.8-75
ggplot2	3.2.1
glue	1.3.1
graphics	3.6.3
grDevices	3.6.3
grid	3.6.3
gtable	0.3.0
httr	1.4.1
jsonlite	1.6
KernSmooth	2.23-16
labeling	0.3
lattice	0.20-38
lazyeval	0.2.2
lifecycle	0.1.0
magrittr	1.5
MASS	7.3-51.5
Matrix	1.2-18
methods	3.6.3
mgcv	1.8-31
mime	0.8
munsell	0.5.0
nlme	3.4-144
nnet	7.3-12
openssl	1.4.1
parallel	3.6.3

Library	Version
pillar	1.4.3
pkgconfig	2.0.3
plyr	1.8.5
png	0.1-7
R6	2.4.1
RColorBrewer	1.1-2
Rcpp	1.0.3
reshape2	1.4.3
RJSONIO	1.3-1.4
rlang	0.4.4
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.0
spatial	7.3-11
splines	3.6.3
stats	3.6.3
stats4	3.6.3
stringi	1.4.5
stringr	1.4.0
survival	3.1-8
sys	3.3
tcltk	3.6.3
tibble	2.1.3
tools	3.6.3
utf8	1.1.4
utils	3.6.3
vctrs	0.2.2
viridisLite	0.3.0
withr	2.1.2

ML Runtimes 2021.04

This section lists the Python and R libraries that ship with ML Runtimes 2021.04.

Note: Nvidia GPU Edition comes with CUDA 11.1 preinstalled.

RAPIDS Runtime PIP Python 3.7.8 Libraries for Workbench

This section lists the RAPIDS Runtime Python 3.8 libraries for Workbench that ship with ML Runtimes 2021.04.

Table 68: RAPIDS Runtime Python 3.7.8 Libraries for Workbench - Standard

Package	Version
aiohttp	3.7.3
appdirs	1.4.4
argon2-cffi	20.1.0
async-generator	1.10
async-timeout	3.0.1
attrs	20.3.0
bleach	3.3.0
bokeh	2.2.3
brotlipy	0.7.0
cdsw	1.0.0
certifi	2020.12.5
cffi	1.14.5
chardet	4.0.0
click	7.1.2
click-plugins	1.1.1
cligj	0.7.1
cloudpickle	1.6.0
colorcet	2.0.6
confluent-kafka	1.5.0
cryptography	3.4.4
cudf	0.18.0a0+254.g1544474166
cudf-kafka	0.18.0a0+254.g1544474166
cugraph	0.18.0a0+301.g0cc951f7.dirty
cuml	0.18.0a0+134.g7ca2db287
cupy	8.0.0
cusignal	0.18.0a0+33.gbc8598c
cuspatial	0.18.0a0+24.g1a2fc18
custreamz	0.18.0a0+254.g1544474166
cuxfilter	0.18.0a0+68.g236aa39
cycler	0.10.0
cytoolz	0.11.0
dask	2021.2.0
dask-cuda	0.18.0a210225
dask-cudf	0.18.0a0+254.g1544474166
datashader	0.11.1
datashape	0.5.4
decorator	4.4.2

Package	Version
defusedxml	0.6.0
distributed	2021.2.0
entrypoints	0.3
fastavro	1.3.2
fastrlock	0.5
Fiona	1.8.18
fsspec	0.8.7
GDAL	3.1.4
geopandas	0.8.1
HeapDict	1.0.1
idna	2.10
importlib-metadata	3.7.0
ipykernel	5.5.0
ipython	7.20.0
ipython-genutils	0.2.0
ipywidgets	7.6.3
jedi	0.18.0
Jinja2	2.11.3
joblib	1.0.1
jsonschema	3.2.0
jupyter-client	6.1.11
jupyter-core	4.7.1
jupyter-server-proxy	1.6.0
jupyterlab-pygments	0.1.2
jupyterlab-widgets	1.0.0
kiwisolver	1.3.1
llvmlite	0.35.0
locket	0.2.0
Markdown	3.3.3
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
msgpack	1.0.2
multidict	5.1.0
multipledispatch	0.6.0
munch	2.5.0
nbclient	0.5.2
nbconvert	6.0.7
nbformat	5.1.2

Package	Version
nest-asyncio	1.4.3
networkx	2.5
notebook	6.2.0
numba	0.52.0
numpy	1.19.5
nvtx	0.2.3
olefile	0.46
packaging	20.9
pandas	1.1.5
pandocfilters	1.4.2
panel	0.10.3
param	1.10.1
parso	0.8.1
partd	1.1.0
pexpect	4.8.0
pickle5	0.0.11
pickleshare	0.7.5
Pillow	8.1.0
pip	21.0.1
prometheus-client	0.9.0
prompt-toolkit	3.0.16
protobuf	3.15.2
psutil	5.8.0
ptyprocess	0.7.0
py4j	0.10.9.1
pyarrow	1.0.1
pycparser	2.20
pyct	0.4.6
pydeck	0.5.0
pyee	7.0.4
Pygments	2.8.0
pynvml	8.0.4
pyOpenSSL	20.0.1
pyparsing	2.4.7
pyppeteer	0.2.2
pyproj	2.6.1.post1
PyQt5	5.12.3
PyQt5-sip	4.19.18
PyQtChart	5.12

Package	Version
PyQtWebEngine	5.12.1
pyrsistent	0.17.3
PySocks	1.7.1
python-dateutil	2.8.1
pytz	2021.1
pyviz-comms	2.0.1
PyYAML	5.4.1
pyzmq	22.0.3
requests	2.25.1
rmm	0.18.0
Rtree	0.9.7
scikit-learn	0.24.1
scipy	1.6.0
Send2Trash	1.5.0
setuptools	49.6.0.post20210108
Shapely	1.7.1
simpervisor	0.4
six	1.15.0
sortedcontainers	2.3.0
streamz	0.6.2
tblib	1.6.0
terminado	0.9.2
testpath	0.4.4
threadpoolctl	2.1.0
toolz	0.11.1
tornado	6.1
tqdm	4.57.0
traitlets	5.0.5
treelite	1.0.0
treelite-runtime	1.0.0
typing-extensions	3.7.4.3
ucx-py	0.18.0a0+19.ge17a4dc
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1
websockets	8.1
wheel	0.36.2
widgetsnbextension	3.5.1
xarray	0.16.2

Package	Version
xgboost	1.3.3
yarl	1.6.3
zict	2.0.0
zipp	3.4.0

RAPIDS Runtime PIP Python 3.8.6 Libraries for Workbench

This section lists the RAPIDS Runtime Python 3.8 libraries for Workbench that ship with ML Runtimes 2021.04.

Table 69: RAPIDS Runtime Python 3.7.8 Libraries for Workbench - Standard

Package	Version
aiohttp	3.7.3
appdirs	1.4.4
argon2-cffi	20.1.0
async-generator	1.10
async-timeout	3.0.1
attrs	20.3.0
backcall	0.2.0
backports.functools-lru-cache	1.6.1
bleach	3.3.0
bokeh	2.2.3
brotlipy	0.7.0
cdsw	1.0.0
certifi	2020.12.5
cffi	1.14.5
chardet	4.0.0
click	7.1.2
click-plugins	1.1.1
cligj	0.7.1
cloudpickle	1.6.0
colorcet	2.0.6
confluent-kafka	1.5.0
cryptography	3.4.4
cudf	0.18.0a0+254.g1544474166
cudf-kafka	0.18.0a0+254.g1544474166
cugraph	0.18.0a0+301.g0cc951f7.dirty
cuml	0.18.0a0+134.g7ca2db287
cupy	8.0.0
cusignal	0.18.0a0+33.gbc8598c
cuspatial	0.18.0a0+24.g1a2fc18

Package	Version
custreamz	0.18.0a0+254.g1544474166
cycler	0.10.0
cytoolz	0.11.0
dask	2021.2.0
dask-cuda	0.18.0a210225
dask-cudf	0.18.0a0+254.g1544474166
datashader	0.11.1
datashape	0.5.4
decorator	4.4.2
defusedxml	0.6.0
distributed	2021.2.0
entrypoints	0.3
fastavro	1.3.2
fastrlock	0.5
Fiona	1.8.18
fsspec	0.8.7
GDAL	3.1.4
geopandas	0.8.1
HeapDict	1.0.1
hupper	1.10.2
idna	2.10
importlib-metadata	3.7.0
ipykernel	5.5.0
ipython	7.20.0
ipython-genutils	0.2.0
ipywidgets	7.6.3
jedi	0.18.0
Jinja2	2.11.3
joblib	1.0.1
jsonschema	3.2.0
jupyter-client	6.1.11
jupyter-core	4.7.1
jupyter-server-proxy	1.6.0
jupyterlab-pygments	0.1.2
jupyterlab-widgets	1.0.0
kiwisolver	1.3.1
llvmlite	0.35.0
locket	0.2.0
Markdown	3.3.3

Package	Version
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
msgpack	1.0.2
multidict	5.1.0
multipledispatch	0.6.0
munch	2.5.0
nbclient	0.5.2
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.4.3
networkx	2.5
notebook	6.2.0
numba	0.52.0
numpy	1.19.5
nvtx	0.2.3
olefile	0.46
packaging	20.9
pandas	1.1.5
pandocfilters	1.4.2
panel	0.10.3
param	1.10.1
parso	0.8.1
partd	1.1.0
PasteDeploy	2.1.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
pip	21.0.1
plaster	1.0
plaster-pastedeploy	0.7
prometheus-client	0.9.0
prompt-toolkit	3.0.16
protobuf	3.15.2
psutil	5.8.0
ptyprocess	0.7.0
py4j	0.10.9.1
pyarrow	1.0.1
pycparser	2.20

Package	Version
pyct	0.4.6
pydeck	0.5.0
pyee	7.0.4
Pygments	2.8.0
pynvml	8.0.4
pyOpenSSL	20.0.1
pyparsing	2.4.7
pyppeteer	0.2.2
pyproj	2.6.1.post1
PyQt5	5.12.3
PyQt5-sip	4.19.18
PyQtChart	5.12
PyQtWebEngine	5.12.1
pyramid	2.0
pyrsistent	0.17.3
PySocks	1.7.1
python-dateutil	2.8.1
pytz	2021.1
pyviz-comms	2.0.1
PyYAML	5.4.1
pyzmq	22.0.3
rapids	0.0.1
requests	2.25.1
rmm	0.18.0
Rtree	0.9.7
scikit-learn	0.24.1
scipy	1.6.0
Send2Trash	1.5.0
setuptools	49.6.0.post20210108
Shapely	1.7.1
simpervisor	0.4
six	1.15.0
sortedcontainers	2.3.0
streamz	0.6.2
tblib	1.6.0
terminado	0.9.2
testpath	0.4.4
threadpoolctl	2.1.0
toolz	0.11.1

Package	Version
tornado	6.1
tqdm	4.57.0
traitlets	5.0.5
translationstring	1.4
treelite	1.0.0
treelite-runtime	1.0.0
typing-extensions	3.7.4.3
ucx-py	0.18.0a0+19.ge17a4dc
urllib3	1.26.3
venusian	3.0.0
wcwidth	0.2.5
webencodings	0.5.1
WebOb	1.8.7
websockets	8.1
wheel	0.36.2
widgetsnbextension	3.5.1
xarray	0.16.2
xgboost	1.3.3
yarl	1.6.3
zict	2.0.0
zipp	3.4.0
zope.deprecation	4.4.0
zope.interface	5.4.0

RAPIDS Runtime PIP Python 3.7.8 Libraries for JupyterLab

This section lists the RAPIDS Runtime Python 3.7.8 libraries for JupyterLab that ship with ML Runtimes 2021.04.

Table 70: RAPIDS Runtime Python 3.7.8 Libraries for JupyterLab - Standard

Package	Version
aiohttp	3.7.3
anyio	2.0.2
appdirs	1.4.4
argon2-cffi	20.1.0
async-generator	1.10
async-timeout	3.0.1
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
backports.functools-lru-cache	1.6.1

Package	Version
bleach	3.3.0
bokeh	2.2.3
brotlipy	0.7.0
cdsw	1.0.0
certifi	2020.12.5
cffi	1.14.5
chardet	4.0.0
click	7.1.2
click-plugins	1.1.1
cligj	0.7.1
cloudpickle	1.6.0
colorcet	2.0.6
confluent-kafka	1.5.0
cryptography	3.4.4
cudf	0.18.0a0+254.g1544474166
cudf-kafka	0.18.0a0+254.g1544474166
cugraph	0.18.0a0+301.g0cc951f7.dirty
cuml	0.18.0a0+134.g7ca2db287
cupy	8.0.0
cusignal	0.18.0a0+33.gbc8598c
cuspatial	0.18.0a0+24.g1a2fc18
custreamz	0.18.0a0+254.g1544474166
cuxfilter	0.18.0a0+68.g236aa39
cycler	0.10.0
cytoolz	0.11.0
dask	2021.2.0
dask-cuda	0.18.0a210225
dask-cudf	0.18.0a0+254.g1544474166
datashader	0.11.1
datashape	0.5.4
decorator	4.4.2
defusedxml	0.6.0
distributed	2021.2.0
entrypoints	0.3
fastavro	1.3.2
fastrlock	0.5
Fiona	1.8.18
fsspec	0.8.7
GDAL	3.1.4

Package	Version
geopandas	0.8.1
HeapDict	1.0.1
idna	2.10
importlib-metadata	3.7.0
ipykernel	5.5.0
ipython	7.20.0
ipython-genutils	0.2.0
ipywidgets	7.6.3
jedi	0.18.0
Jinja2	2.11.3
joblib	1.0.1
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.11
jupyter-core	4.7.1
jupyter-server	1.2.2
jupyter-server-proxy	1.6.0
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
jupyterlab-widgets	1.0.0
kiwisolver	1.3.1
llvmlite	0.35.0
locket	0.2.0
Markdown	3.3.3
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
msgpack	1.0.2
multidict	5.1.0
multipledispatch	0.6.0
munch	2.5.0
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.4.3
networkx	2.5
notebook	6.2.0

Package	Version
numba	0.52.0
numpy	1.19.5
nvtx	0.2.3
olefile	0.46
packaging	20.9
pandas	1.1.5
pandocfilters	1.4.2
panel	0.10.3
param	1.10.1
parso	0.8.1
partd	1.1.0
pexpect	4.8.0
pickle5	0.0.11
pickleshare	0.7.5
Pillow	8.1.0
pip	21.0.1
prometheus-client	0.9.0
prompt-toolkit	3.0.16
protobuf	3.15.2
psutil	5.8.0
ptyprocess	0.7.0
py4j	0.10.9.1
pyarrow	1.0.1
pycparser	2.20
pyct	0.4.6
pydeck	0.5.0
pyee	7.0.4
Pygments	2.8.0
pynvml	8.0.4
pyOpenSSL	20.0.1
pyparsing	2.4.7
pyppeteer	0.2.2
pyproj	2.6.1.post1
PyQt5	5.12.3
PyQt5-sip	4.19.18
PyQtChart	5.12
PyQtWebEngine	5.12.1
pyrsistent	0.17.3
PySocks	1.7.1

Package	Version
python-dateutil	2.8.1
pytz	2021.1
pyviz-comms	2.0.1
PyYAML	5.4.1
pyzmq	22.0.3
requests	2.25.1
rmm	0.18.0
Rtree	0.9.7
scikit-learn	0.24.1
scipy	1.6.0
Send2Trash	1.5.0
setuptools	49.6.0.post20210108
Shapely	1.7.1
simpervisor	0.4
six	1.15.0
sniffio	1.2.0
sortedcontainers	2.3.0
streamz	0.6.2
tblib	1.6.0
terminado	0.9.2
testpath	0.4.4
threadpoolctl	2.1.0
toolz	0.11.1
tornado	6.1
tqdm	4.57.0
traitlets	5.0.5
treelite	1.0.0
treelite-runtime	1.0.0
typing-extensions	3.7.4.3
ucx-py	0.18.0a0+19.ge17a4dc
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1
websockets	8.1
wheel	0.36.2
widgetsnbextension	3.5.1
xarray	0.16.2
xgboost	1.3.3
yarl	1.6.3

Package	Version
zict	2.0.0
zipp	3.4.0

RAPIDS Runtime PIP Python 3.8.6 Libraries for JupyterLab

This section lists the RAPIDS Runtime Python 3.8.6 libraries for JupyterLab that ship with ML Runtimes 2021.04.

Table 71: RAPIDS Runtime Python 3.86 Libraries for JupyterLab - Standard

Package	Version
aiohttp	3.7.3
anyio	2.0.2
appdirs	1.4.4
argon2-cffi	20.1.0
async-generator	1.10
async-timeout	3.0.1
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
backports.functools-lru-cache	1.6.1
bleach	3.3.0
bokeh	2.2.3
brotlipy	0.7.0
cdsw	1.0.0
certifi	2020.12.5
cffi	1.14.5
chardet	4.0.0
click	7.1.2
click-plugins	1.1.1
cligj	0.7.1
cloudpickle	1.6.0
colorcet	2.0.6
confluent-kafka	1.5.0
cryptography	3.4.4
cudf	0.18.0a0+254.g1544474166
cudf-kafka	0.18.0a0+254.g1544474166
cugraph	0.18.0a0+301.g0cc951f7.dirty
cuml	0.18.0a0+134.g7ca2db287
cupy	8.0.0
cusignal	0.18.0a0+33.gbc8598c
cuspatial	0.18.0a0+24.g1a2fc18

Package	Version
custreamz	0.18.0a0+254.g1544474166
cycler	0.10.0
cytoolz	0.11.0
dask	2021.2.0
dask-cuda	0.18.0a210225
dask-cudf	0.18.0a0+254.g1544474166
datashader	0.11.1
datashape	0.5.4
decorator	4.4.2
defusedxml	0.6.0
distributed	2021.2.0
entrypoints	0.3
fastavro	1.3.2
fastrlock	0.5
Fiona	1.8.18
fsspec	0.8.7
GDAL	3.1.4
geopandas	0.8.1
HeapDict	1.0.1
hupper	1.10.2
idna	2.10
importlib-metadata	3.7.0
ipykernel	5.5.0
ipython	7.20.0
ipython-genutils	0.2.0
ipywidgets	7.6.3
jedi	0.18.0
Jinja2	2.11.3
joblib	1.0.1
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.11
jupyter-core	4.7.1
jupyter-server	1.2.2
jupyter-server-proxy	1.6.0
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
jupyterlab-widgets	1.0.0

Package	Version
kiwisolver	1.3.1
llvmlite	0.35.0
locket	0.2.0
Markdown	3.3.3
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
msgpack	1.0.2
multidict	5.1.0
multipledispatch	0.6.0
munch	2.5.0
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.4.3
networkx	2.5
notebook	6.2.0
numba	0.52.0
numpy	1.19.5
nvtx	0.2.3
olefile	0.46
packaging	20.9
pandas	1.1.5
pandocfilters	1.4.2
panel	0.10.3
param	1.10.1
parso	0.8.1
partd	1.1.0
PasteDeploy	2.1.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
pip	21.0.1
plaster	1.0
plaster-pastedeploy	0.7
prometheus-client	0.9.0
prompt-toolkit	3.0.16
protobuf	3.15.2

Package	Version
psutil	5.8.0
ptyprocess	0.7.0
py4j	0.10.9.1
pyarrow	1.0.1
pycparser	2.20
pyct	0.4.6
pydeck	0.5.0
pyee	7.0.4
Pygments	2.8.0
pynvml	8.0.4
pyOpenSSL	20.0.1
pyparsing	2.4.7
pyppeteer	0.2.2
pyproj	2.6.1.post1
PyQt5	5.12.3
PyQt5-sip	4.19.18
PyQtChart	5.12
PyQtWebEngine	5.12.1
pyramid	2.0
pyrsistent	0.17.3
PySocks	1.7.1
python-dateutil	2.8.1
pytz	2021.1
pyviz-comms	2.0.1
PyYAML	5.4.1
pyzmq	22.0.3
rapids	0.0.1
requests	2.25.1
rmm	0.18.0
Rtree	0.9.7
scikit-learn	0.24.1
scipy	1.6.0
Send2Trash	1.5.0
setuptools	49.6.0.post20210108
Shapely	1.7.1
simpervisor	0.4
six	1.15.0
sniffio	1.2.0
sortedcontainers	2.3.0

Package	Version
streamz	0.6.2
tblib	1.6.0
terminado	0.9.2
testpath	0.4.4
threadpoolctl	2.1.0
toolz	0.11.1
tornado	6.1
tqdm	4.57.0
traitlets	5.0.5
translationstring	1.4
treelite	1.0.0
treelite-runtime	1.0.0
typing-extensions	3.7.4.3
ucx-py	0.18.0a0+19.ge17a4dc
urllib3	1.26.3
venusian	3.0.0
wcwidth	0.2.5
webencodings	0.5.1
WebOb	1.8.7
websockets	8.1
wheel	0.36.2
widgetsnbextension	3.5.1
xarray	0.16.2
xgboost	1.3.3
yarl	1.6.3
zict	2.0.0
zipp	3.4.0
zope.deprecation	4.4.0
zope.interface	5.4.0

ML Runtimes 2021.02

This section lists the Python and R libraries that ship with ML Runtimes 2021.02.

Note: Nvidia GPU Edition comes with CUDA 11.1 preinstalled.

Python 3.8 Libraries for Workbench

This section lists the Python 3.8 libraries for Workbench that ship with ML Runtimes 2021.02.

Table 72: Python 3.8.6 Libraries for Workbench - Standard

Library	Version
backcall	0.2.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kiwisolver	1.3.1
matplotlib	3.3.2
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
py4j	0.10.9.1
Pygments	2.7.2
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Table 73: Python 3.8.6 Libraries for Workbench - Nvidia GPU Edition

Library	Version
backcall	0.2.0
certifi	2020.12.5
chardet	4.0.0

Library	Version
cycler	0.10.0
decorator	4.4.2
idna	2.10
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kiwisolver	1.3.1
matplotlib	3.3.2
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
py4j	0.10.9.1
Pygments	2.7.2
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Python 3.7 Libraries for Workbench

This section lists the Python 3.7 libraries for Workbench that ship with ML Runtimes 2021.02.

Table 74: Python 3.7.9 Libraries for Workbench - Standard

Library	Version
backcall	0.2.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0

Library	Version
decorator	4.4.2
idna	2.10
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kiwisolver	1.3.1
matplotlib	3.3.2
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
py4j	0.10.9.1
Pygments	2.7.2
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Table 75: Python 3.7.9 Libraries for Workbench - Nvidia GPU Edition

Library	Version
backcall	0.2.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
ipykernel	5.3.4
ipython	7.16.1

Library	Version
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kiwisolver	1.3.1
matplotlib	3.3.2
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
py4j	0.10.9.1
Pygments	2.7.2
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Python 3.6 Libraries for Workbench

This section lists the Python 3.6 Scala libraries for Workbench that ship with ML Runtimes 2021.02.

Table 76: Python 3.6.12 Libraries for Workbench - Standard

Library	Version
backcall	0.2.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0

Library	Version
jedi	0.17.2
jupyter-client	6.1.7
jupyter-core	4.6.3
kiwisolver	1.3.1
matplotlib	3.3.2
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
py4j	0.10.9.1
Pygments	2.7.2
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Table 77: Python 3.6.12 Libraries for Workbench - Nvidia GPU Edition

Library	Version
backcall	0.2.0
bitarray	2.1.0
certifi	2020.12.5
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
jupyter-client	6.1.7

Library	Version
jupyter-core	4.6.3
kiwisolver	1.3.1
matplotlib	3.3.2
numpy	1.19.4
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
Pygments	2.8.1
pyparsing	2.4.7
python-dateutil	2.8.1
pyzmq	19.0.2
requests	2.25.1
six	1.15.0
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5

Python 3.8 Libraries for JupyterLab

This section lists the Python 3.8 libraries for JupyterLab that ship with ML Runtimes 2021.02.

Table 78: Python 3.8.6 Libraries for JupyterLab - Standard

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bleach	3.3.0
certifi	2020.11.8
cffi	1.14.4

Library	Version
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8

Library	Version
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1

Table 79: Python 3.8.6 Libraries for JupyterLab - Nvidia GPU Edition

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bleach	3.3.0
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0

Library	Version
entrypoints	0.3
idna	2.10
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
py4j	0.10.9.1
pycparser	2.20
Pygments	2.7.2
pyparsing	2.4.7

Library	Version
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
tornado	6.1
traitlets	4.3.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1

Python 3.7 Libraries for JupyterLab

This section lists the Python 3.7 libraries for JupyterLab that ship with ML Runtimes 2021.02.

Table 80: Python 3.7.9 Libraries for JupyterLab - Standard

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bleach	3.3.0
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
importlib-metadata	3.4.0
ipykernel	5.3.4
ipython	7.16.1

Library	Version
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
py4j	0.10.9.1
pycparser	2.20
Pygments	2.7.2
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2

Library	Version
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1
zipp	3.4.0

Table 81: Python 3.7.9 Libraries for JupyterLab - Nvidia GPU Edition

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bleach	3.3.0
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
cycler	0.10.0
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
importlib-metadata	3.4.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0

Library	Version
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
py4j	0.10.9.1
pycparser	2.20
Pygments	2.7.2
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2

Library	Version
testpath	0.4.4
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1
zipp	3.4.0

Python 3.6 Libraries for JupyterLab

This section lists the Python 3.6 libraries for JupyterLab that ship with ML Runtimes 2021.02.

Table 82: Python 3.6.12 Libraries for JupyterLab - Standard

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bitarray	2.1.0
bleach	3.3.0
certifi	2020.12.8
cffi	1.14.4
chardet	4.0.0
contextvars	2.4
cycler	0.10.0
dataclasses	0.8
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
immutables	0.14
importlib-metadata	3.4.0
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1
ipython-genutils	0.2.0
jedi	0.17.2

Library	Version
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.2.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
pure-sasl	0.6.2
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2
requests	2.25.1

Library	Version
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1
zipp	3.4.0

Table 83: Python 3.6.12 Libraries for JupyterLab - Nvidia GPU Edition

Library	Version
anyio	2.0.2
argon2-cffi	20.1.0
async-generator	1.10
attrs	20.3.0
Babel	2.9.0
backcall	0.2.0
bleach	3.3.0
certifi	2020.11.8
cffi	1.14.4
chardet	4.0.0
contextvars	2.4
cycler	0.10.0
dataclasses	0.8
decorator	4.4.2
defusedxml	0.6.0
entrypoints	0.3
idna	2.10
immutables	0.14
importlib-metadata	3.4.0
impyla	0.17.0
ipykernel	5.3.4
ipython	7.16.1

Library	Version
ipython-genutils	0.2.0
jedi	0.17.2
Jinja2	2.11.3
json5	0.9.5
jsonschema	3.2.0
jupyter-client	6.1.7
jupyter-core	4.6.3
jupyter-server	1.2.2
jupyterlab	3.0.6
jupyterlab-pygments	0.1.2
jupyterlab-server	2.1.3
kiwisolver	1.3.1
MarkupSafe	1.1.1
matplotlib	3.3.2
mistune	0.8.4
nbclassic	0.2.6
nbclient	0.5.1
nbconvert	6.0.7
nbformat	5.1.2
nest-asyncio	1.5.1
notebook	6.2.0
numpy	1.19.4
packaging	20.9
pandocfilters	1.4.3
parso	0.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	8.1.0
prometheus-client	0.9.0
prompt-toolkit	3.0.8
ptyprocess	0.6.0
py4j	0.10.9.1
pycparser	2.20
Pygments	2.8.1
pyparsing	2.4.7
pyrsistent	0.17.3
python-dateutil	2.8.1
pytz	2021.1
pyzmq	19.0.2

Library	Version
requests	2.25.1
Send2Trash	1.5.0
six	1.15.0
sniffio	1.2.0
terminado	0.9.2
testpath	0.4.4
thrift	0.11.0
thrift-sasl	0.4.3
tornado	6.1
traitlets	4.3.3
typing-extensions	3.7.4.3
urllib3	1.26.3
wcwidth	0.2.5
webencodings	0.5.1
zipp	3.4.0

R 4.0 Libraries

This section lists the R 4.0 libraries that ship with ML Runtimes 2021.02.

Table 84: R 4.0 Libraries for Workbench

Library	Version
askpass	1.1
assertthat	0.2.1
base	4.0.3
bitops	1.0-6
boot	1.3-25
brew	1.0-6
Cairo	1.2-0
caTools	1.18.0
cdsw	2.1
class	7.3-17
cli	2.0.1
cluster	2.1.0
codetools	0.2-16
colorspace	1.4-1
compiler	4.0.3
crayon	1.3.4
curl	4.3
datasets	4.0.3

Library	Version
digest	0.6.23
ellipsis	0.3.0
fansi	0.4.1
farver	2.0.3
foreigns	0.8-80
ggplot2	3.2.1
glue	1.3.1
graphics	4.0.3
grDevices	4.0.3
grid	4.0.3
gtable	0.3.0
httr	1.4.1
jsonlite	1.6
KernSmooth	2.23-17
labeling	0.3
lattice	0.20-41
lazyeval	0.2.2
lifecycle	0.1.0
magrittr	1.5
MASS	7.3-53
Matrix	1.2-18
methods	4.0.3
mgcv	1.8-33
mime	0.8
munsell	0.5.0
nlme	3.1-149
nnet	7.3-14
openssl	1.4.1
parallel	4.0.3
pillar	1.4.3
pkgconfig	2.0.3
plyr	1.8.5
png	0.1-7
R6	2.4.1
RColorBrewer	1.1-2
Rcpp	1.0.3
reshape2	1.4.3
RJSONIO	1.3-1.4
rlang	0.4.4

Library	Version
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.0
spatial	7.3-12
splines	4.0.3
stats	4.0.3
stats4	4.0.3
stringi	1.4.5
stringr	1.4.0
survival	3.2-7
sys	3.3
tcltk	4.0.3
tibble	2.1.3
tools	4.0.3
utf8	1.1.4
utils	4.0.3
vctrs	0.2.2
viridisLite	0.3.0
withr	2.1.2

R 3.6 Libraries

This section lists the R 3.6 libraries that ship with ML Runtimes 2021.02.

Table 85: R 3.6 Libraries for Workbench

Library	Version
askpass	1.1
assertthat	0.2.1
base	3.6.3
bitops	1.0-6
boot	1.3-24
brew	1.0-6
Cairo	1.2-0
caTools	1.18.0
cdsw	2.1
class	7.3-15
cli	2.0.1
cluster	2.1.0
codetools	0.2-16

Library	Version
colorspace	1.4-1
compiler	3.6.3
crayon	1.3.4
curl	4.3
datasets	3.6.3
digest	0.6.23
ellipsis	0.3.0
fansi	0.4.1
farver	2.0.3
foreigns	0.8-75
ggplot2	3.2.1
glue	1.3.1
graphics	3.6.3
grDevices	3.6.3
grid	3.6.3
gtable	0.3.0
httr	1.4.1
jsonlite	1.6
KernSmooth	2.23-16
labeling	0.3
lattice	0.20-38
lazyeval	0.2.2
lifecycle	0.1.0
magrittr	1.5
MASS	7.3-51.5
Matrix	1.2-18
methods	3.6.3
mgcv	1.8-31
mime	0.8
munsell	0.5.0
nlme	3.4-144
nnet	7.3-12
openssl	1.4.1
parallel	3.6.3
pillar	1.4.3
pkgconfig	2.0.3
plyr	1.8.5
png	0.1-7
R6	2.4.1

Library	Version
RColorBrewer	1.1-2
Rcpp	1.0.3
reshape2	1.4.3
RJSONIO	1.3-1.4
rlang	0.4.4
Rook	1.1-1
rpart	4.1-15
Rserve	1.7-0
scales	1.1.0
spatial	7.3-11
splines	3.6.3
stats	3.6.3
stats4	3.6.3
stringi	1.4.5
stringr	1.4.0
survival	3.1-8
sys	3.3
tcltk	3.6.3
tibble	2.1.3
tools	3.6.3
utf8	1.1.4
utils	3.6.3
vctrs	0.2.2
viridisLite	0.3.0
withr	2.1.2

ML Runtimes 2020.11

This section lists the Python and R libraries that ship with ML Runtimes 2020.11.

All ML Runtimes 2020.11 contain NumPy 1.19.2 and Matpolotlib 3.1.2.

- Matplotlib - 3.1.2
- NumPy - 1.19.2 and the Python versions, which are 3.6.10, 3.7.9, and 3.8.3