



# INTERACTIVE HPC WITH JUPYTERLAB

Training Course – JupyterLab extensions

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# JUPYTERLAB EXTENSIONS

# TERMINOLOGY

## What is a JupyterLab Extension?

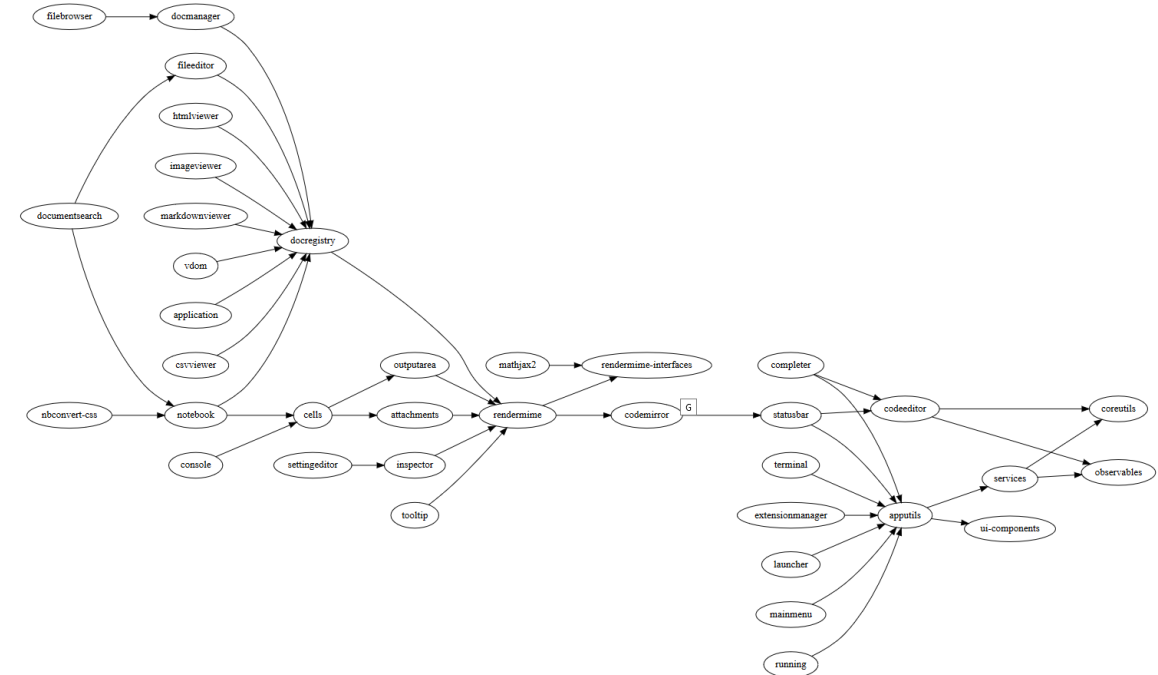
### JupyterLab Extension

JupyterLab extensions can customize or enhance any part of JupyterLab.

### JupyterLab Extensions

- provide new file viewers, editors, themes
  - provide renderers for rich outputs in notebooks
  - add items to the menu or command palette
  - add keyboard shortcuts
  - add settings in the settings system.
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- Extensions can even provide an API for other extensions to use and can depend on other extensions.

The whole JupyterLab itself is simply a **collection of extensions** that are no more powerful or privileged than any custom extension.



<https://jupyterlab.readthedocs.io/en/stable/user/extensions.html>  
<https://github.com/topics/jupyterlab-extension>



# JUPYTERLAB EXTENSIONS

## Installed by default at Jupyter-JSC

Core packages	Version	Link	Description
jupyterlab	3.6.5	<a href="https://jupyterlab.readthedocs.io/en/3.6.x/">https://jupyterlab.readthedocs.io/en/3.6.x/</a>	-
nbdclassic	1.0.0	<a href="https://nbdclassic.readthedocs.io">https://nbdclassic.readthedocs.io</a>	Jupyter Notebook as a Jupyter Server extension
jupyterlab_server	2.23.0	<a href="https://jupyterlab-server.readthedocs.io">https://jupyterlab-server.readthedocs.io</a>	Server components for JupyterLab applications
jupyterhub	3.1.1	<a href="https://jupyterhub.readthedocs.io">https://jupyterhub.readthedocs.io</a>	Multi-user server for Jupyter notebooks

Optional extension	Version	Link	Description
jupyterlab-nvdashboard	0.8.0	<a href="https://github.com/rapidsai/jupyterlab-nvdashboard">https://github.com/rapidsai/jupyterlab-nvdashboard</a> , <a href="#">eb-file</a>	A JupyterLab extension for displaying dashboards of GPU usage.
jupyter-slurm-provisioner	0.6.0	<a href="https://github.com/FZJ-JSC/jupyter-slurm-provisioner">https://github.com/FZJ-JSC/jupyter-slurm-provisioner</a> , <a href="#">eb-file</a>	Allows to start Jupyter kernels as a SLURM job remote from the Jupyter server
nglview	3.0.6	<a href="http://nglviewer.org/nglview/latest/">http://nglviewer.org/nglview/latest/</a> , <a href="#">eb-file</a>	Jupyter widget to interactively view molecular structures and trajectories
jupyter-ai	0.9.0	<a href="https://jupyter-ai.readthedocs.io/">https://jupyter-ai.readthedocs.io/</a> , <a href="#">eb-file</a>	A generative AI extension for JupyterLab

Core Kernels	Version	Link	Description
Bash	0.9.0	<a href="https://github.com/takuyver/bash_kernel">https://github.com/takuyver/bash_kernel</a> , <a href="#">eb-file</a>	A bash kernel for IPython
Cling (C++)	20230205	<a href="https://github.com/root-project/cling/">https://github.com/root-project/cling/</a> , <a href="#">eb-file</a>	Jupyter kernel for the C++ programming language
Julia	1.8.5	<a href="https://github.com/JuliaPy/pyjulia">https://github.com/JuliaPy/pyjulia</a> , <a href="#">eb-file</a>	python interface to julia
LFortran	0.19.0	<a href="https://lfortran.org/">https://lfortran.org/</a> , <a href="#">eb-file</a>	Modern interactive LLVM-based Fortran compiler
Octave	8.2.0	<a href="https://www.octave.org/">https://www.octave.org/</a> , <a href="#">eb-file</a>	Scientific Programming Language - Powerful mathematics-oriented syntax with built-in 2D/3D plotting and visualization tools
R	4.2.1	<a href="https://irkernel.github.io">https://irkernel.github.io</a> , <a href="#">eb-file</a>	R kernel for Jupyter
Ruby	3.0.5	<a href="https://github.com/SciRuby/iruby">https://github.com/SciRuby/iruby</a> , <a href="#">eb-file</a>	Ruby kernel for Jupyter

Community Kernels	Version	Link	Description
DeepLearning	2023.5	<a href="#">eb-file</a>	Python kernel incl. a collection of extra modules/packages for Deep Learning
PyEarthSystem	2023.5	<a href="#">eb-file</a>	Python kernel incl. a collection of extra modules/packages for the Earth System community
QuantumComputing	2023.5	<a href="#">eb-file</a>	Python kernel incl. a collection of extra modules/packages for the quantum computing community
Visualization	2023.5	<a href="#">eb-file</a>	Python kernel incl. a collection of extra modules/packages for visualization

JupyterLab Applications	Version	Link	Description
Xpra	4.4.6	<a href="https://xpra.org">https://xpra.org</a> <a href="#">eb-file</a>	Remote desktop for X11 applications in the browser

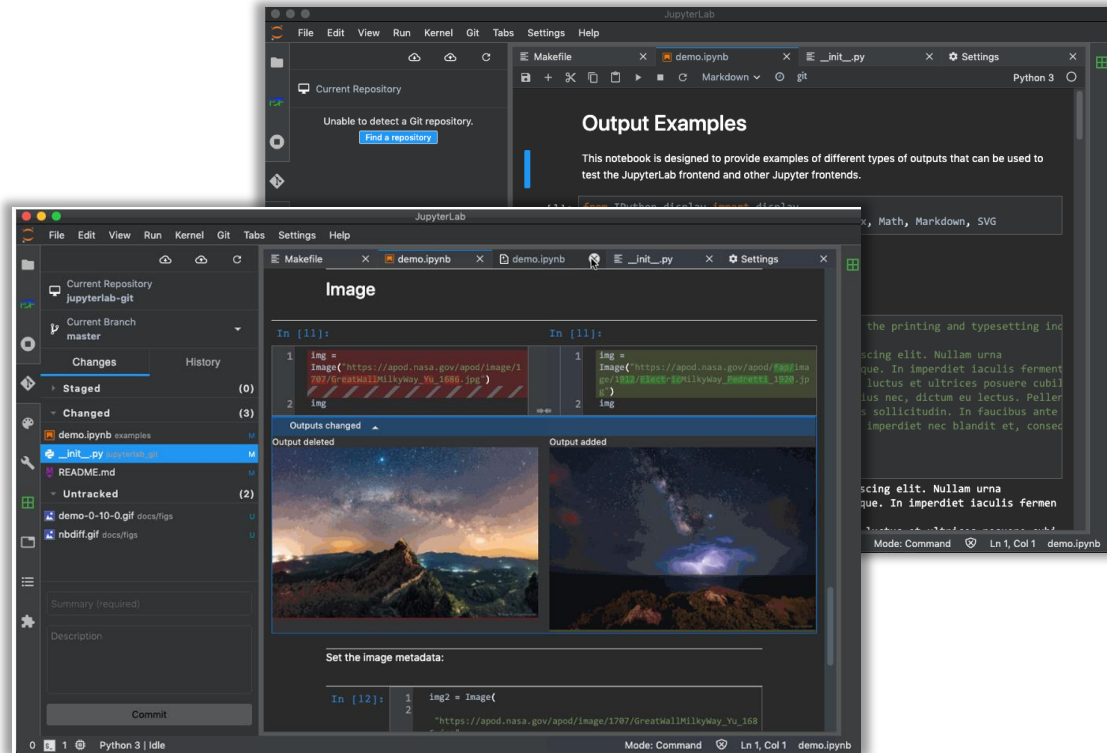
Core Extensions	Version	Link	Description
jupyter-server-proxy	4.0.0	<a href="https://jupyter-server-proxy.readthedocs.io">https://jupyter-server-proxy.readthedocs.io</a>	Jupyter notebook server extension to proxy web services.
jupyterlab-lsp	4.2.0	<a href="https://github.com/jupyter-lsp/jupyterlab-lsp">https://github.com/jupyter-lsp/jupyterlab-lsp</a>	Coding assistance for JupyterLab using Language Server Protocol
ipyml	0.9.3	<a href="https://matplotlib.org/ipyml/">https://matplotlib.org/ipyml/</a>	Interactive features of matplotlib in Jupyter
ipyleaflet	0.17.3	<a href="https://ipyleaflet.readthedocs.io">https://ipyleaflet.readthedocs.io</a>	Interactive maps in the Jupyter notebook
bqplot	0.12.39	<a href="https://bqplot.github.io/bqplot/">https://bqplot.github.io/bqplot/</a>	Plotting library for IPython/Jupyter notebooks
ipyvolume	0.6.3	<a href="https://github.com/widgetti/ipyvolume">https://github.com/widgetti/ipyvolume</a>	3d plotting for Python in the Jupyter notebook based on IPython widgets using WebGL
jupyterlab_gitlab	3.0.0	<a href="https://gitlab.com/beenje/jupyterlab-gitlab">https://gitlab.com/beenje/jupyterlab-gitlab</a>	A JupyterLab extension for browsing GitLab repositories
jupyterlab_git	0.41.0	<a href="https://github.com/jupyterlab/jupyterlab-git">https://github.com/jupyterlab/jupyterlab-git</a>	A Git extension for JupyterLab
nbdime	3.2.1	<a href="https://nbdime.readthedocs.io/">https://nbdime.readthedocs.io/</a>	Tools for diffing and merging of Jupyter notebooks.
jupyterlab_latex	3.2.0	<a href="https://github.com/jupyterlab/jupyterlab-latex">https://github.com/jupyterlab/jupyterlab-latex</a>	JupyterLab extension for live editing of LaTeX documents
jupyterlab_s3_browser	0.13.0	<a href="https://github.com/IBM/jupyterlab-s3-browser">https://github.com/IBM/jupyterlab-s3-browser</a>	A JupyterLab extension for browsing S3-compatible object storage
plotly	5.15.0	<a href="https://plotly.com/python/">https://plotly.com/python/</a>	Python graphing library for interactive, publication-quality graphs.
jupyter_bokeh	3.0.4	<a href="https://github.com/bokeh/jupyter_bokeh">https://github.com/bokeh/jupyter_bokeh</a>	An extension for rendering Bokeh content in JupyterLab notebooks
panel	0.14.4	<a href="https://panel.holoviz.org/">https://panel.holoviz.org/</a>	The powerful data exploration & web app framework for Python
holoviews	1.16.0	<a href="https://holoviews.org/">https://holoviews.org/</a>	With Holoviews, your data visualizes itself.
jupyterlab_hdf	1.3.0	<a href="https://github.com/jupyterlab/jupyterlab-hdf5">https://github.com/jupyterlab/jupyterlab-hdf5</a>	Open and explore HDF5 files in JupyterLab. Can handle very large (TB) sized files, and datasets of any dimensionality
ipyparallel	8.6.1	<a href="https://ipyparallel.readthedocs.io">https://ipyparallel.readthedocs.io</a>	IPython Parallel: Interactive Parallel Computing in Python
dask_labextension	6.1.0	<a href="https://github.com/dask/dask-labextension">https://github.com/dask/dask-labextension</a>	JupyterLab extension for Dask
voila	0.5.0a4	<a href="https://voila.readthedocs.io">https://voila.readthedocs.io</a>	Voilà turns Jupyter notebooks into standalone web applications
nbdev	2.3.12	<a href="https://nbdev.fast.ai/">https://nbdev.fast.ai/</a>	Create delightful software with Jupyter Notebooks
sidecar	0.5.2	<a href="https://github.com/jupyter-widgets/jupyterlab-sidecar">https://github.com/jupyter-widgets/jupyterlab-sidecar</a>	A sidecar output widget for JupyterLab
dash	2.11.1	<a href="https://plotly.com/dash">https://plotly.com/dash</a>	Data Apps & Dashboards for Python. No JavaScript Required.
ipyvue	1.9.2	<a href="https://github.com/widgetti/ipyvue">https://github.com/widgetti/ipyvue</a>	Jupyter widgets base for Vue libraries
ipywebrtc	0.6.0	<a href="https://github.com/maartenbreddels/ipywebrtc">https://github.com/maartenbreddels/ipywebrtc</a>	WebRTC for Jupyter notebook/lab
jupyterlab-spellchecker	0.7.3	<a href="https://github.com/jupyterlab-contrib/spellchecker">https://github.com/jupyterlab-contrib/spellchecker</a>	Spellchecker for JupyterLab notebook markdown cells and file editor.
jupyterlab_code_formatter	1.6.1	<a href="https://github.com/ryantam826/jupyterlab_code_formatter">https://github.com/ryantam826/jupyterlab_code_formatter</a>	A JupyterLab plugin to facilitate invocation of code formatters.
jupyterlab_recents	3.2.0	<a href="https://github.com/NERSC/jupyterlab-recents">https://github.com/NERSC/jupyterlab-recents</a>	A JupyterLab extension that tracks recent files and directories.
jupyterlab-favorites	3.1.1	<a href="https://github.com/NERSC/jupyterlab-favorites">https://github.com/NERSC/jupyterlab-favorites</a>	Add the ability to save favorite folders to JupyterLab for quicker browsing
jupyterlab-system-monitor	0.8.0	<a href="https://github.com/tpio/jupyterlab-system-monitor">https://github.com/tpio/jupyterlab-system-monitor</a>	JupyterLab extension to display system metrics
jupyterlab_iframe	0.4.4	<a href="https://github.com/timkpaine/jupyterlab_iframe">https://github.com/timkpaine/jupyterlab_iframe</a>	View html as an embedded iframe in JupyterLab
jupyterlab-tour	3.1.4	<a href="https://github.com/jupyterlab-contrib/jupyterlab-tour">https://github.com/jupyterlab-contrib/jupyterlab-tour</a>	A JupyterLab UI tour built on jupyterlab-tutorial and react-joyride.
papermill	2.4.0	<a href="https://papermill.readthedocs.io">https://papermill.readthedocs.io</a>	Parameterize, execute, and analyze notebooks
pyunicore	0.15.0	<a href="https://github.com/HumanBrainProject/pyunicore">https://github.com/HumanBrainProject/pyunicore</a>	UNICORE REST bindings for python

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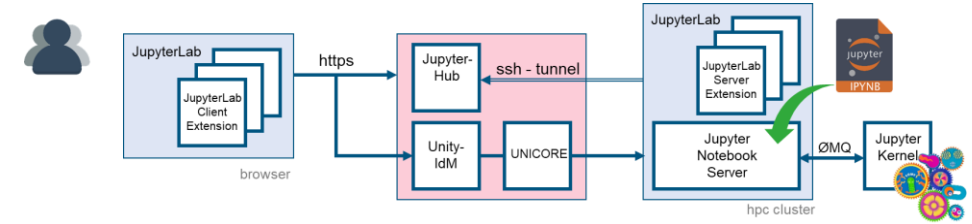
## Installed by default at Jupyter-JSC

### JupyterLab-Git

JupyterLab extension for version control using Git

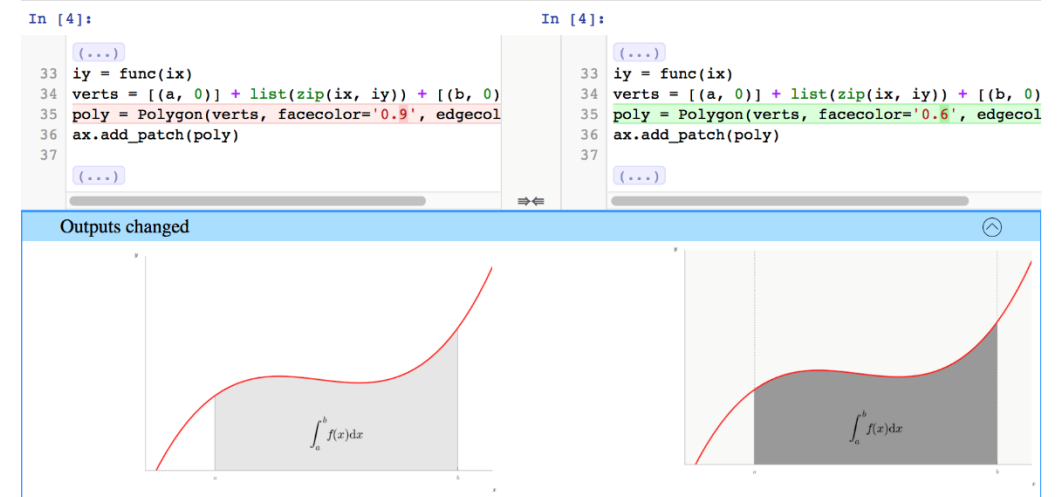


<https://github.com/jupyterlab/jupyterlab-git>



### NBDime

Tools for diffing and merging of Jupyter notebooks.



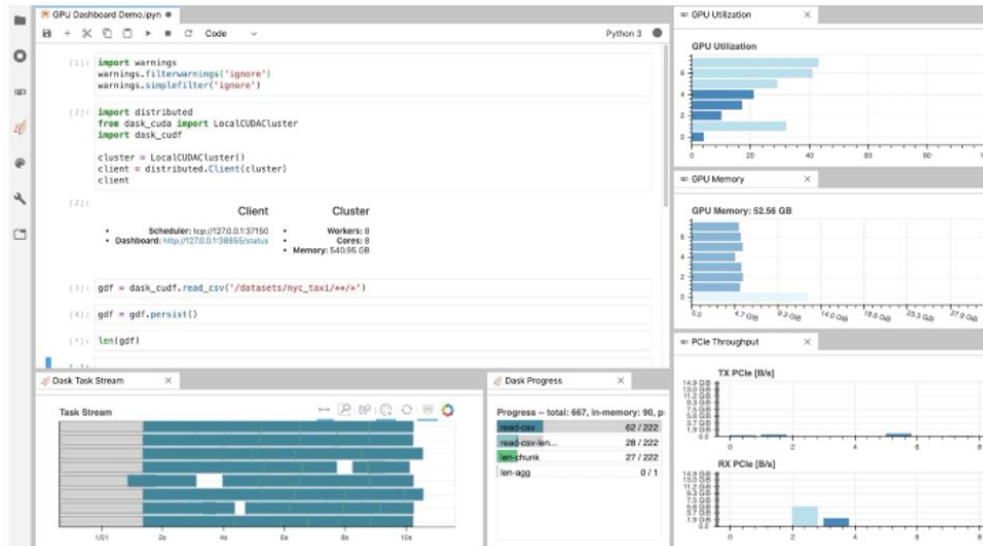
<https://github.com/jupyter/nbdime>

# JUPYTERLAB EXTENSIONS

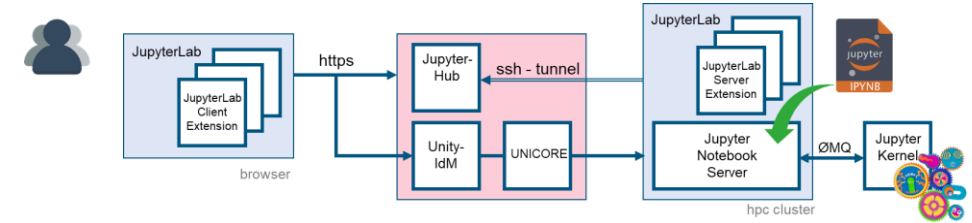
## Installed by default at Jupyter-JSC

### NVDashboard

NVDashboard is an open-source package for the real-time visualization of NVIDIA GPU metrics in interactive Jupyter Lab environments.

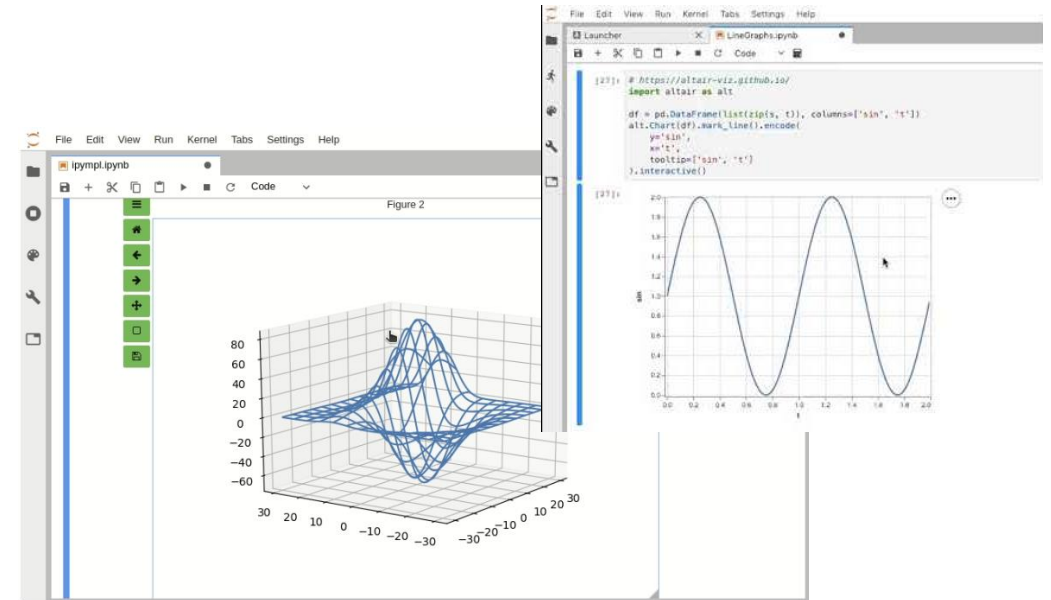


<https://github.com/rapidsai/jupyterlab-nvdashboard>  
<https://developer.nvidia.com/blog/gpu-dashboards-in-jupyter-lab/>



### IPyMPL - matplotlib

Leveraging the Jupyter interactive widgets framework, ipympl enables the interactive features of matplotlib in the Jupyter notebook and in JupyterLab.



<https://github.com/matplotlib/ipympl>

