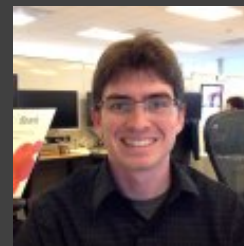




JUPYTERLAB EXTENSIONS



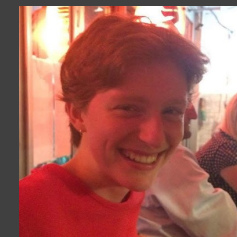
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What is JupyterLab

What are JupyterLab Extensions

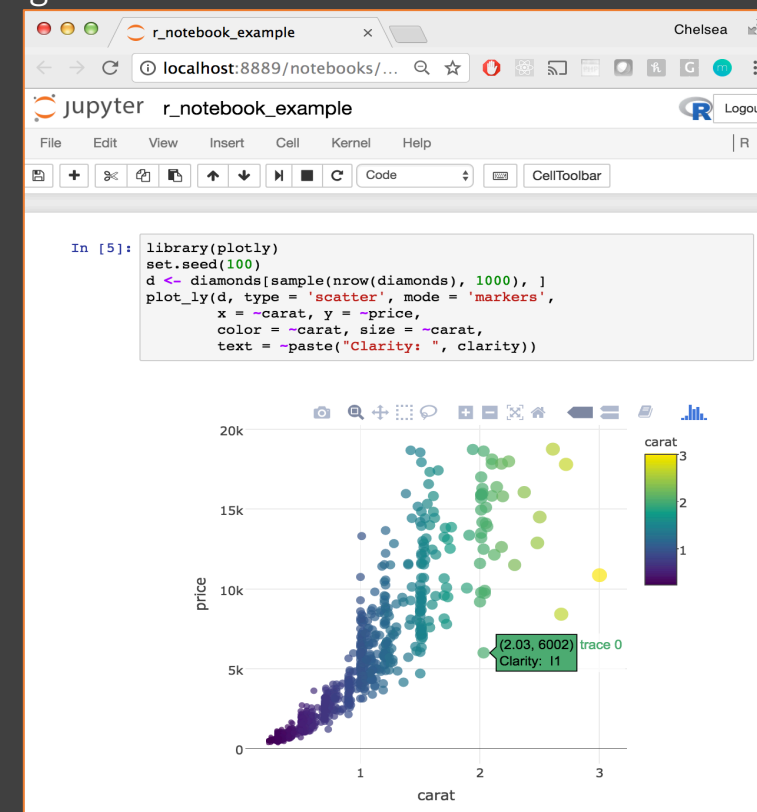
Why use JupyterLab Extensions

Installing Extensions

Creating an Extension

What is JupyterLab?

- Started from classic Jupyter Notebook, a web-based interface that can execute code, edit in-place, contain text, images, etc.
- Notebooks presents a document-like view rendered by modern browsers
- Kernels interpret/execute cell contents with support for over 50 programming languages
- Classic Notebook:



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What is JupyterLab?

- JupyterLab is the next generation UI for Project Jupyter
- It provides a modular and extensible architecture
- It will eventually replace the classic Jupyter Notebook UI
- JupyterLab:

The screenshot displays the JupyterLab user interface. On the left is the 'File Explorer' sidebar showing a file tree with folders like 'my-samples / notebook-sample /' and files such as 'hi.ipynb', 'ml-linearreg.ipynb', and 'pandas_sample.ipynb'. The main workspace is split into three panes: a 'Terminal' pane at the top left showing a shell prompt, a 'sample.md' file in the top right, and a 'ml-linearreg.ipynb' notebook in the bottom right. The notebook is in 'Code' mode and shows a scatter plot titled 'Predicted Profit vs. Population Size'. The plot has 'Population' on the x-axis (0 to 25) and 'Profit' on the y-axis (-5 to 30). It displays blue dots for 'Training Data' and a red line for 'Prediction'. Below the plot, there is explanatory text about the gradient descent function and its cost vector. At the bottom of the notebook, a code cell contains the line: `[19]: fig, ax = plt.subplots(figsize=(12,8))`. Annotations with arrows point to the 'File Explorer', 'Terminal', 'sample.md', 'ml-linearreg.ipynb', and the 'Split screen' area.

What is JupyterLab?

- On [JupyterLab Org Github](https://github.com/jupyterlab) :

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A screenshot of the JupyterLab GitHub repository page. The page shows the repository 'jupyterlab' as the first pinned repository, highlighted with an orange border. Two callout boxes with arrows point to the 'jupyterlab' repository: 'JupyterLab and core extensions' points to the repository name, and 'JupyterLab extension repos' points to the repository description. Other pinned repositories include 'jupyter-renderers', 'lumino', 'team-compass', 'extension-cookiecutter-ts', and 'extension-examples'. The bottom of the page shows a search bar, filters for 'Type: All' and 'Language: All', and a section for 'Top languages' including TypeScript, Python, Jupyter Notebook, JavaScript, and CSS.

JupyterLab
JupyterLab: The Next Generation UI for Project Jupyter
https://jupyter.org project.jupyter@gmail.com

Repositories 43 Packages People 72 Projects

Pinned repositories

- jupyterlab**
JupyterLab computational environment.
JavaScript ★ 9.7k 🍴 1.6k
- jupyter-renderers**
Renderers and renderer extensions for JupyterLab
Jupyter Notebook ★ 347 🍴 51
- lumino**
Lumino is a library for building interactive web applications
TypeScript ★ 101 🍴 26
- team-compass**
A repository for team interaction, syncing, and handling meeting notes across the JupyterLab ecosystem.
★ 15 🍴 5
- extension-cookiecutter-ts**
A cookiecutter recipe for JupyterLab extensions in TypeScript
Python ★ 67 🍴 27
- extension-examples**
JupyterLab Extensions by Examples
TypeScript ★ 60 🍴 13

Find a repository... Type: All Language: All

debugger
A visual debugger for Jupyter notebooks, consoles, and source files
TypeScript BSD-3-Clause 🍴 18 ★ 240 44 (1 issue needs help) 🍴 4
Updated 22 minutes ago

Top languages

- TypeScript Python
- Jupyter Notebook JavaScript
- CSS

What is JupyterLab?

- On [JupyterLab Github](#) :

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Backend code:

- Handlers
- Commands
- Debug
- Extension setup
- etc

Core extensions:

- Application
- Utils
- Code editor
- Notebook
- etc

A screenshot of the JupyterLab GitHub repository page. The page shows the repository name "jupyterlab / jupyterlab" at the top, followed by statistics: 16.8k stars, 338 watches, 9.7k forks, and 1.6k pulls. Below this, there are tabs for Code, Issues (1,335), Pull requests (68), Actions, Projects (2), Wiki, Security (0), and Insights. The main content area displays the repository description: "JupyterLab computational environment. https://jupyterlab.readthedocs.io/". Below the description, there are statistics: 18,671 commits, 22 branches, 0 packages, 10,532 releases, 293 contributors, and a link to view the license. A list of recent commits is shown, including "Merge pull request #8191 from blink1073/es-lint" and "Fix string quoting". A callout box with an arrow points to the "jupyterlab" directory in the file list, which is highlighted in blue. Another callout box points to the "packages" directory, which is also highlighted in blue.

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What are JupyterLab Extensions

JupyterLab is designed to be extendable

Extensions enable users and developers to:

- Create new editors and output visualization
- Add buttons and menu items to existing functionality
- Provide APIs for other extensions to use

JupyterLab itself is just a collection of core extensions

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Why use JupyterLab Extensions

The core extensions are intentionally limited in scope

Every user needs slightly different tools for their own work

By installing extensions specific to their scenario they can create a customized environment tailored to their work

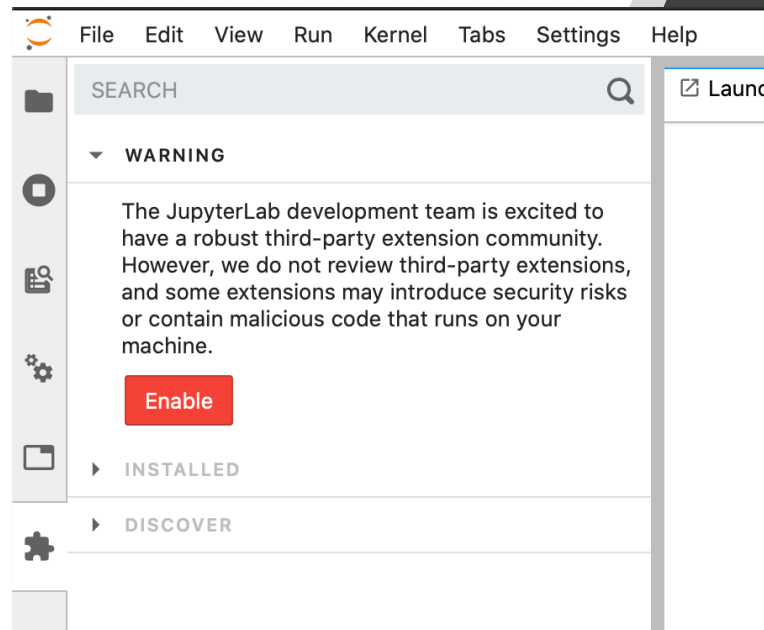
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Installing Extensions

1. Start JupyterLab

```
$ jupyter lab
```

2. To install an extension via the UI open the Extension Manager tab in the side bar

- The UI is still experimental and will show a warning prior to enablement

3. Once enabled it will list currently installed extensions in the Installed section and extensions available to install in the Discover tab.

- You can search both sections using the search bar
- The Discover tab displays packages published on npm with the keyword 'jupyterlab-extension'



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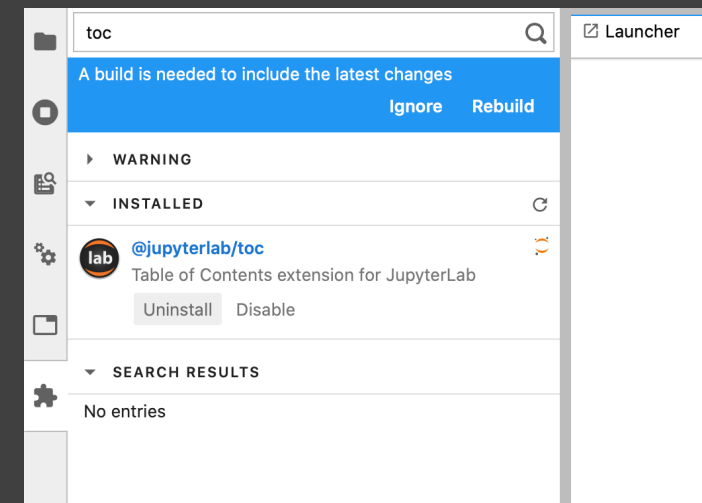
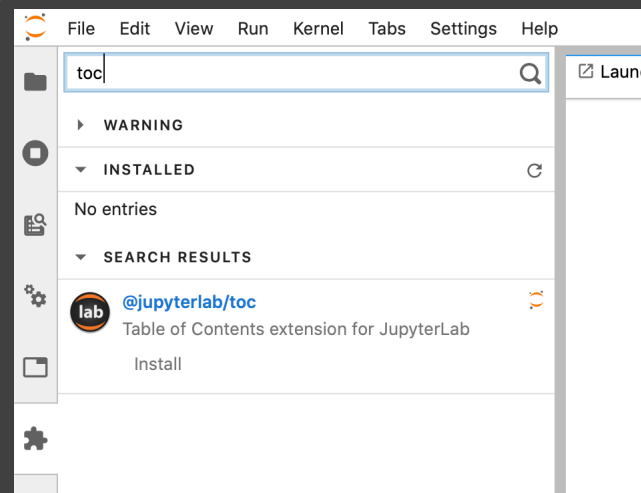
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4. In the search bar, search for "toc" and click Install
5. After installing it will prompt you to rebuild jupyterlab





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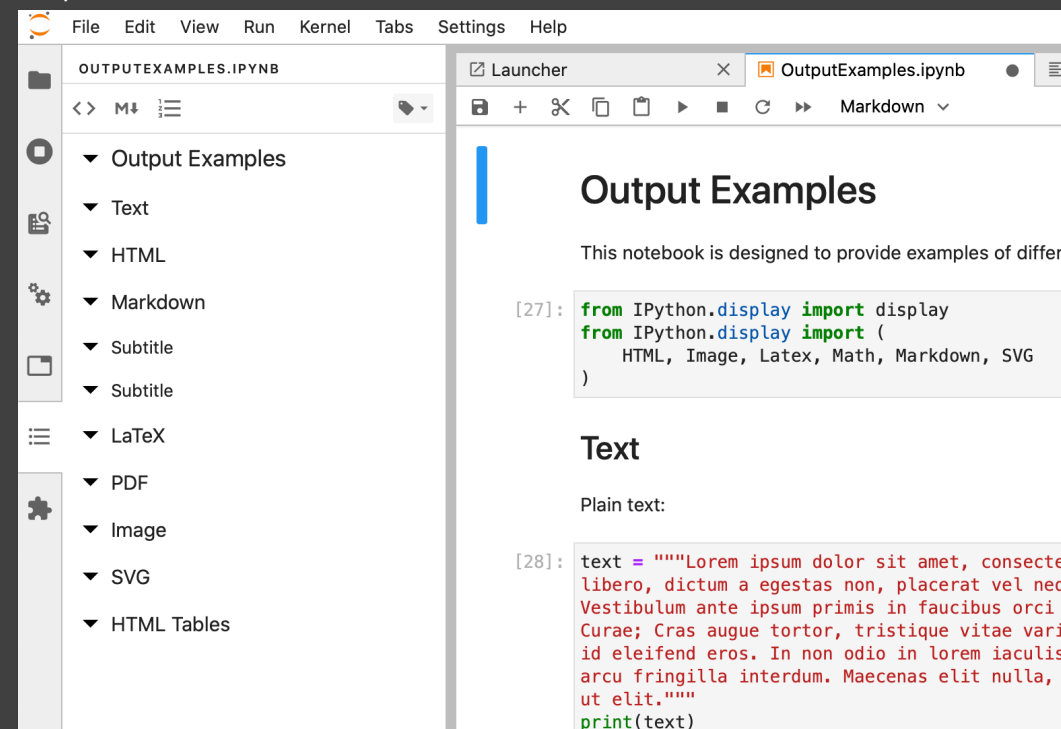
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6. Once it finishes installing it will prompt you to refresh
7. After refreshing you will see the new TOC tab in your sidebar, try opening the TOC tab while a notebook, markdown, or python file is open





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8. Some extensions can't be installed via the UI. Try searching for and installing "git". It will display a message telling you that the extension requires requires a corresponding server extension.

9. For server extensions we need to install via the CLI

1. Go back to your terminal and (double) ctrl-C lab

2. Then install the git extension:

```
$ pip install jupyterlab-git
```

```
$ jupyter lab build
```

3. This will install both the lab extension and the server extension. Once it's finished start JupyterLab again:

```
$ jupyter lab
```

Definitions:

labextension – front end extensions; can be installed and built via UI without restarting JupyterLab

serverextension – back end extensions; must be installed via CLI and require restarting JupyterLab

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Creating an Extension

1. Creating a new extension using the cookie-cutter

```
$ pip install cookiecutter
```

```
$ cookiecutter  
https://github.com/jupyterlab/extension-  
cookiecutter-ts
```

2. Customizing your extension (following the guide on the next slide)
3. Installing your extension (following the generated README)
4. Running JupyterLab with your extension

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Creating an Extension

A few quick steps to an example custom extension

- Add these dependencies to package.json

```
"@jupyterlab/apputils": "^2.0.0",  
"@jupyterlab/docregistry": "^2.0.0",  
"@jupyterlab/notebook": "^2.0.0",  
"@lumino/disposable": "^1.3.5"
```

- Copy button.ts in examples to src and import it in index.ts

```
import {ButtonExtension} from "../button";
```

- Add this code to the activate function in index.ts

```
let buttonExtension = new ButtonExtension();  
app.docRegistry.addWidgetExtension('Notebook',  
buttonExtension);
```

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Useful Links

JupyterLab Docs: <https://jupyterlab.readthedocs.io/>

Extension cookie-cutter: <https://github.com/jupyterlab/extension-cookiecutter-ts>

GitHub Topics filter for finding extensions:
<https://github.com/topics/jupyterlab-extension>