

FORMAT | LINT | PRE-COMMIT



Speaker notes

Today we are going to talk about tools that will help you achieve python code style consistency across projects and teams. And how to keep it that way by automating the process with the pre-commit package.

 linkedin.com/in/arthurio

 notivize.com

 github.com/arthurio/pre-commit

Speaker notes

I'm Arthur Rio, CTO at Notivize. We have built a notification system platform so you don't have to build your own. If you need notifications with complicated rules, multiple channels, templates, make sure to check us out!

And if you know someone who loves code quality as much as I do and wants to join an early seed-funded startup, please reach out to me.

The slides, configuration samples and code examples are available on the github repo you see here.

TOOLS



FORMATTERS

isort: isort your imports, so you don't have to.

black: The Uncompromising Code Formatter.

flynt: String formatting converter.

Speaker notes

- isort: Helps you keep your imports ordered and grouped properly: Standard library, third party, local/application.
- black: Break things down to fit max line length, use double quotes everywhere, proper spacing between function and class definitions, etc.
- flynt: Transform as many string formatting as possible into f strings.

TIP: Formatters will make modifications to your code in place. So, if you want to run them manually, I would suggest you to stage your changes first (`git add`) so that you can see the changes easily with `git diff`.

LINTERS

bandit: Find common security issues.

flake8: Your Tool For Style Guide Enforcement.

flake8-docstrings: Flake8 plugin to include checks provided by pep257.

mypy: Static type checker.

Speaker notes

- bandit:
 1. api key, password, token leaks.
 2. usage of "unsafe" packages (random, pickle) or algorithms (md5)
 3. bad file permissions
 4. mark safe
 5. etc.
- flake8:
 1. Unused/undefined variable
 2. Unused/missing import
 3. wildcard import
 4. missing formatting argument
 5. etc.
- flake8 plugins: flake8-fastapi, flake8-eradicate, etc. <https://github.com/DmytroLitvinov/awesome-flake8-extensions>
Linters help you identify problems before they become one and most of all can help with code completion and hints if you use an IDE or editor that supports it.

AUTOMATION

pre-commit: A framework for managing and maintaining multi-language pre-commit hooks.

Speaker notes

All sorts of hooks are supported, not just pre-commit, but that's the only one I personally have a use for.

CONFIGURATION



Keep it to a minimum

Speaker notes

If you can, try not to change any of the defaults, especially if you have multiple projects. They'll get out of sync quickly. And what makes it somewhat worse is that there is not yet a consensus on using `pyproject.toml` for configuration, only `black` and `isort` are using it at the moment.

BLACK

```
# pyproject.toml  
  
[tool.black]  
line-length = 120
```

Speaker notes

Black is opinionated for a reason and I agree with most of their decisions so I would recommend to stick to the defaults, especially if you don't want to justify yourself, you can just blame it on Łukasz Langa and cut the conversation short. Here you can see that I changed the line length but it's based on my code style.

ISORT

```
# pyproject.toml

[tool.isort]
profile = "black"
line_length = 120
skip_gitignore = true
```


Speaker notes

- Skipping gitignore is critical if you place your virtualenv in your repo or have a node_modules folder lying around for example.
- profile = "black" is important to make it compatible otherwise they'll fight each other for the formatting of the imports.
- line_length is just there to keep things consistent across tools.

FLYNT

Nothing to see here 🙄 ...

Speaker notes

Flynt just magically works all the time. I haven't had a single issue with it after 2 years of use.

BANDIT

```
# .bandit

[bandit]
targets: src,tests
skips: B101
```

- B101: assert used

Speaker notes

The configuration for bandit is a bit painful... But it might catch big mistakes like committing a token, api key or password. So worth having IMO.

- ⚠ Don't confuse the "ini" file **AND/OR** the "yaml" config file. ⚠
- assert is removed with compiling to optimized byte code.
- Bandit likes to complain about random, use the secrets module instead if you can or silent individual lines with #
nosec: B311

FLAKE8/FLAKE8-DOCSTRINGS

```
# .flake8

[flake8]
max_line_length = 120
ignore = W503,D1
docstring-convention = google
```

- **W503**: Line break occurred before a binary operator
- **D1**: Missing docstring

Speaker notes

Gives you great insights like unused imports, undefined variables, etc.

- W503: is not compatible with black and goes against PEP 8.
- D1: I don't care about missing docstrings as I try to keep them to a minimum. Instead I prefer to rely on explicit variable and function names, as well as type hints.

MYPY

```
# mypy.ini
```

```
[mypy]
```

```
mypy_path = src
```


Speaker notes

- Mypy doesn't support pyproject.toml configuration, only mypy.ini and setup.cfg.
- `mypy_path`: May not be required if you work on a library or package. You might need it for an application.

PRE-COMMIT

```
repos:
  - repo: local
    hooks:
      - id: isort
        name: isort
        entry: isort
        types: [python]
        language: python
      - id: flynt
        name: flynt
        entry: flynt
        args: [--fail-on-change]
        types: [python]
        language: python
      - id: black
        name: black
        entry: black
        language: python
        types: [python]
        exclude: node_modules
      - id: flake8
        name: flake8
        entry: flake8
        language: python
        types: [python]
        exclude: .serverless,node_modules
      - id: bandit
        name: bandit
        entry: bandit
        language: python
        types: [python]
        args: [--ini, .bandit, --recursive]
      - id: mypy
        name: mypy
        entry: mypy
        types: [python]
        language: python
  - repo: https://github.com/pre-commit/pre-commit-hooks
    rev: v4.0.1
    hooks:
      - id: end-of-file-fixer
        exclude: .*(min.js|min.css|html|svg|css.map|js.map)
      - id: trailing-whitespace
        exclude: .*(md)
```

Speaker notes

Notice that everything is setup as "local" because I keep track of the packages (black, flake8, etc.) in my dev

- Tools are installed for IDEs instead of separate virtual environment just for pre-commit.
- You can have dependabot keep your tools up to date.

requirements. Benefits are:

- Keeps things in sync between dev environment and pre-commit.

DEV REQUIREMENTS

```
# dev-requirements.in  
  
bandit==1.7.0  
black==21.4b2  
flake8-docstrings==1.6.0  
flake8==3.9.1  
flynt==0.64  
isort==5.8.0  
mypy==0.812  
pre-commit==2.12.1
```

Speaker notes

We use pip-tools to compile our requirements.txt files with pinned libraries for dependencies.

USAGE

SETUP YOUR IDE/EDITOR



Speaker notes

This is the first place where having those tools running in the background helps tremendously. Take the time to setup your IDE or editor, this is your most important environment.

INSTALL PRE-COMMIT HOOK

```
pre-commit install  
git add .  
git commit -m "Some bad code"
```

Speaker notes

- pre-commit runs only for the staged files, not the entire project. And only relevant linters/formatters are applied.
- Also, because pre-commit will run everytime you commit, make sure you keep it fast otherwise nobody will want to use it.

```

~/code/pre-commit  pysprings-pre-commit  main  git commit -m "Move tests and add presentation"
10120 03:12:34
[INFO] Installing environment for https://github.com/pre-commit/pre-commit-hooks.
[INFO] Once installed this environment will be reused.
[INFO] This may take a few minutes...
isort.....Passed
flynt.....Passed
black.....Passed
flake8.....Failed
- hook id: flake8
- exit code: 1

src/isort/test.py:2:1: F401 'sys' imported but unused
src/isort/test.py:8:11: F821 undefined name 'password'
src/isort/test.py:9:5: F841 local variable 'access_token' is assigned to but never used
src/isort/test.py:10:5: F841 local variable 'password' is assigned to but never used
src/isort/test.py:13:121: E501 line too long (121 > 120 characters)

bandit.....Passed
mypy.....Failed
- hook id: mypy
- exit code: 1

src/bandit/test.py:2: error: Missing return statement
src/isort/test.py:4: error: Cannot find implementation or library stub for module named 'utils'
src/isort/test.py:4: note: See https://mypy.readthedocs.io/en/latest/running\_mypy.html#missing-imports
src/isort/test.py:8: error: Cannot determine type of 'password'
src/isort/test.py:17: error: Incompatible return value type (got "None", expected "str")
src/isort/test.py:19: error: Incompatible return value type (got "int", expected "str")
src/isort/test.py:22: error: Argument 1 to "test" has incompatible type "str"; expected "int"
src/isort/test.py:23: error: Argument 1 to "test" has incompatible type "Optional[str]"; expected "int"
src/isort/test.py:27: error: Argument 1 to "int" has incompatible type "Optional[str]"; expected "Union[str, SupportsInt, _SupportsIndex, _SupportsTrunc]"
Found 8 errors in 2 files (checked 4 source files)

Fix End of Files.....Failed
- hook id: end-of-file-fixer
- exit code: 1
- files were modified by this hook

Fixing presentation/dist/theme/blood.css
Fixing presentation/dist/theme/sky.css
Fixing presentation/dist/theme/moon.css
Fixing presentation/dist/theme/black.css
Fixing presentation/dist/theme/beige.css
Fixing presentation/dist/theme/serif.css
Fixing presentation/dist/theme/solarized.css
Fixing presentation/dist/theme/night.css
Fixing presentation/dist/theme/white.css
Fixing presentation/dist/theme/simple.css
Fixing presentation/dist/theme/league.css
Fixing presentation/dist/reveal.css

Trim Trailing Whitespace.....Passed

```

Speaker notes

- Linters only show errors.
- Formatters automatically fix the code so you might have unstaged changes.

```
~/code/ [REDACTED] [REDACTED] [REDACTED] git commit
isort.....Passed
flynt.....Passed
black.....Passed
flake8.....Passed
bandit.....Passed
mypy.....Passed
Fix End of Files.....Passed
Trim Trailing Whitespace.....Passed
```

```
~/code/pre-commit  pysprings-pre-commit  main  git commit -m "Add updated css files and usage"
git isort.....(no files to check)Skipped
flynt.....(no files to check)Skipped
black.....(no files to check)Skipped
flake8.....(no files to check)Skipped
bandit.....(no files to check)Skipped
mypy.....(no files to check)Skipped
Fix End of Files.....pPassed
Trim Trailing Whitespace.....usPassed
h[main 7226ce6] Add updated css files and usage
 14 files changed, 20 insertions(+), 13 deletions(-)
 create mode 100644 presentation/images/git_commit_fail.png
```

CONTINUOUS INTEGRATION

```
pre-commit run --all-files
```

Speaker notes

Devs can skip hooks with `git commit --no-verify`.

Q&A



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github.com/arthurio/pre-commit