

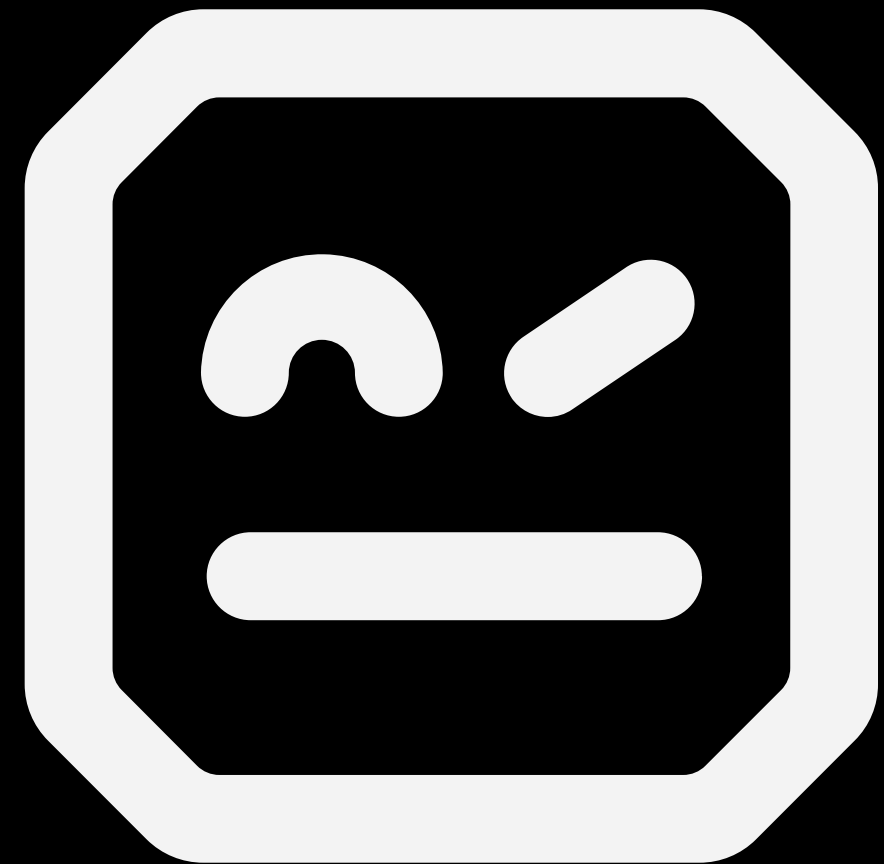
expo IQA 25

MADRID
May 20th,
21st & 22nd
2025

expoqqa.eu

Test automation at scale

with Robot Framework





Sander van Beek

Test automation engineer

Speaker

Writer of articles

Collector of test pyramids

Certified Tall Person™

bartosz

Rabobank

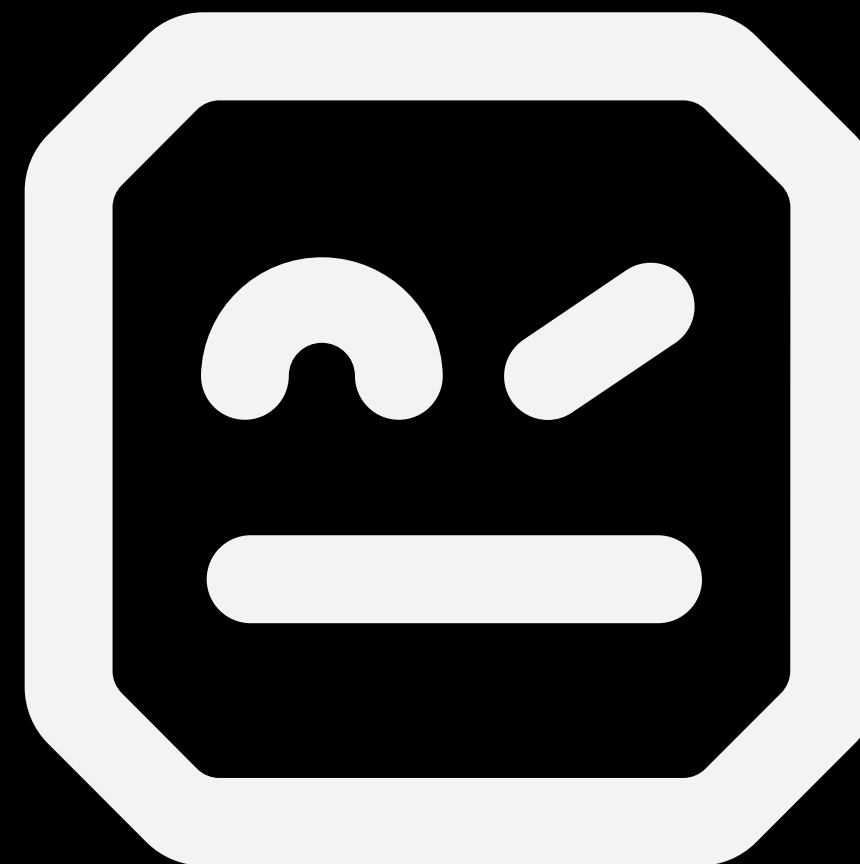
Slides and more shared
directly after the talk

Test automation at scale

with Robot Framework



Robot Framework



Robot Framework

 an open source [...] framework for test automation and robotic process automation.

*** Test Cases ***

Login User with Password

Connect to Server

Login User **ironman** 1234567890

Verify Valid Login **Tony Stark**

[Teardown] Close Server Connection


```
*** Settings ***
```

```
# Use an API
```

```
Library      RequestsLibrary
```

```
# Use a browser
```

```
Library      SeleniumLibrary
```

```
Library      Browser
```

```
*** Settings ***
```

```
# Use an API
```

```
Library      RequestsLibrary
```

```
# Use a browser
```

```
Library      SeleniumLibrary
```

```
Library      Browser
```

```
# Use a mobile app
```

```
Library      AppiumLibrary
```

```
*** Settings ***
```

```
# Use an API
```

```
Library      RequestsLibrary
```

```
# Use a browser
```

```
Library      SeleniumLibrary
```

```
Library      Browser
```

```
# Use a mobile app
```

```
Library      AppiumLibrary
```

```
# Use a database
```

```
Library      DatabaseLibrary
```



Automation with
modular, readable language
and large community

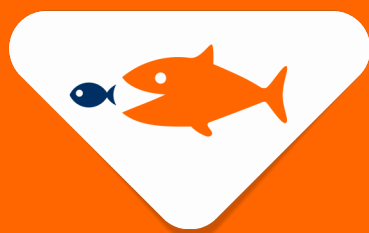


**NEDERLANDSE
LOTTERIJ**



NEDERLANDSE
LOTTERIJ

Staatsloterij



1 24 6 37 15 45

Lotto.

EURO
JACKPOT

TOTO[®]
WINKEL

TOTO[®]
SPORT

TOTO[®]
CASINO

Lucky
Day

Miljoenenspel

KRASLOTEN

WINN
ITT



NEDERLANDSE
LOTTERIJ

Staatsloterij



1 24 6 37 15 45

Lotto.

EURO
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KRASLOTEN

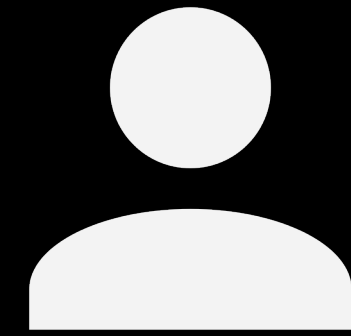
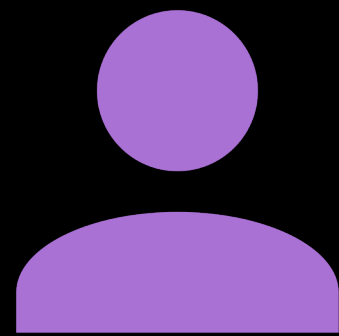
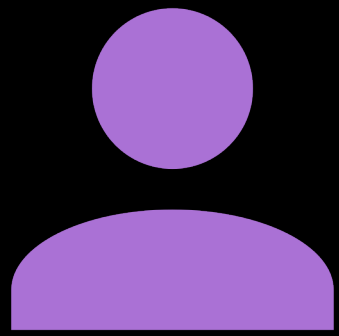
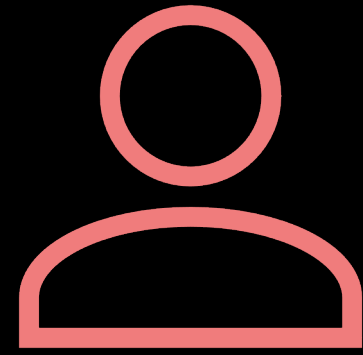
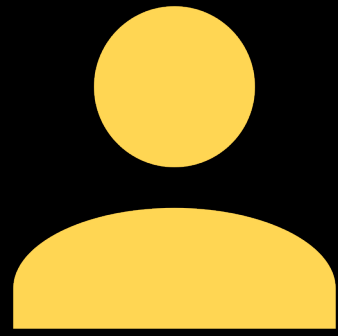
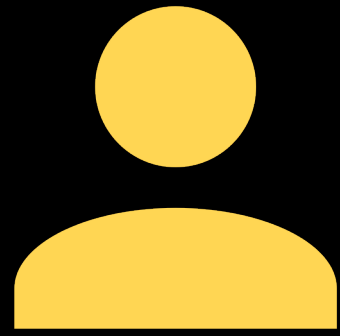
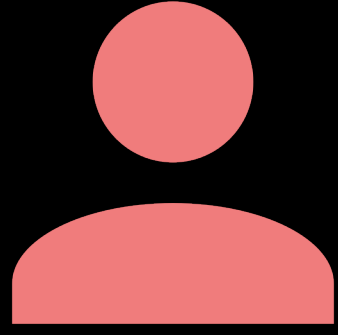
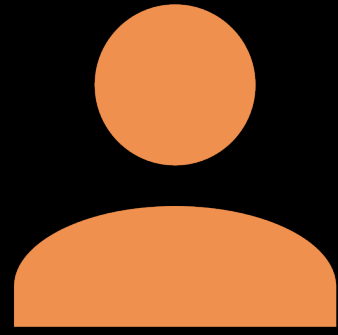
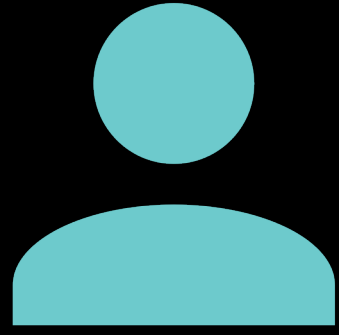
WINN
ITT

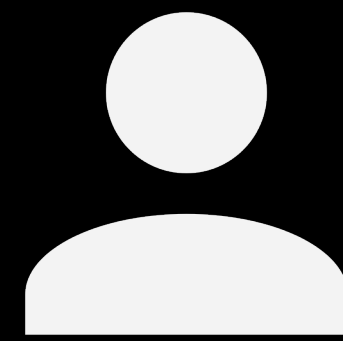
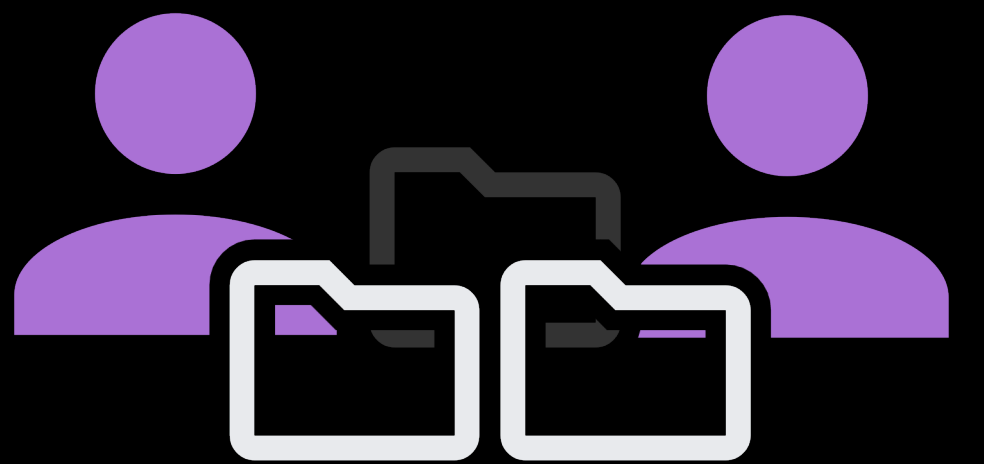
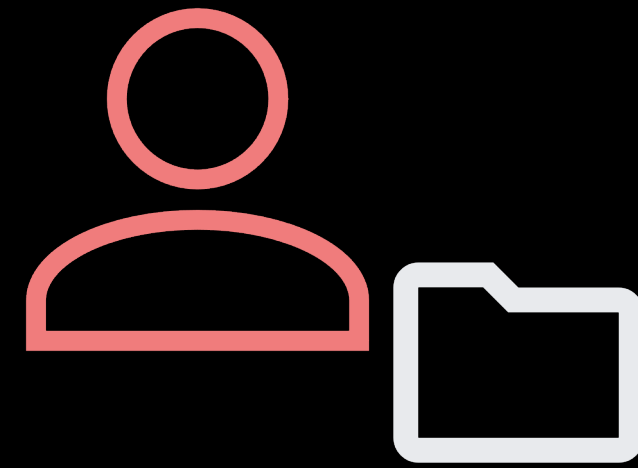
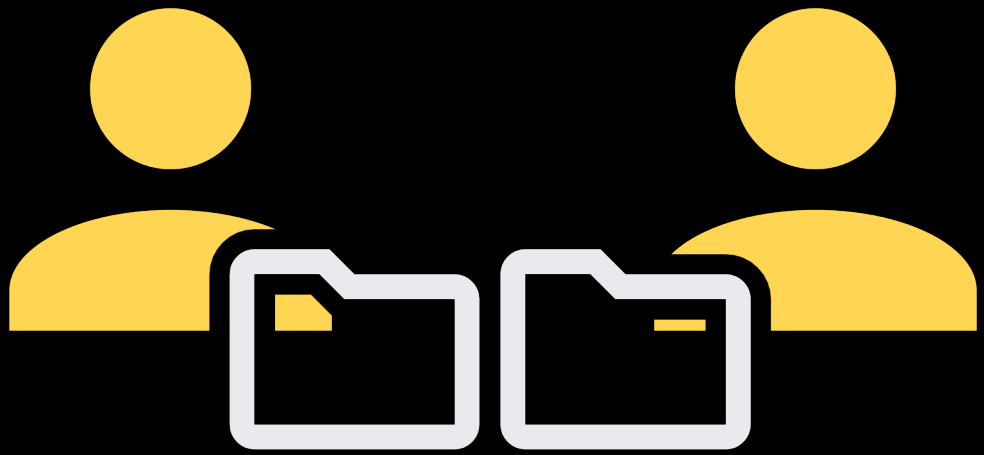
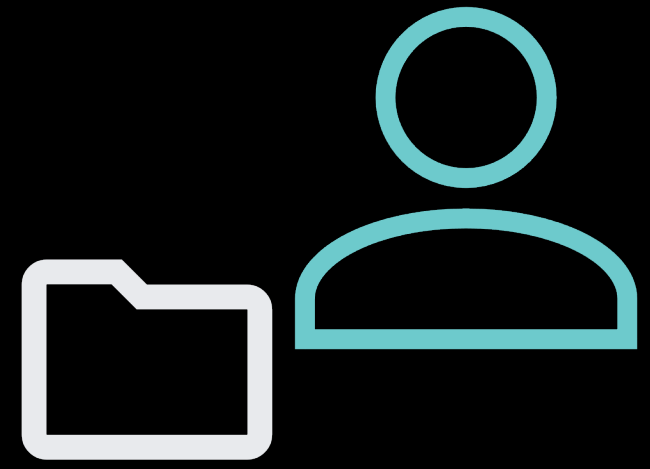
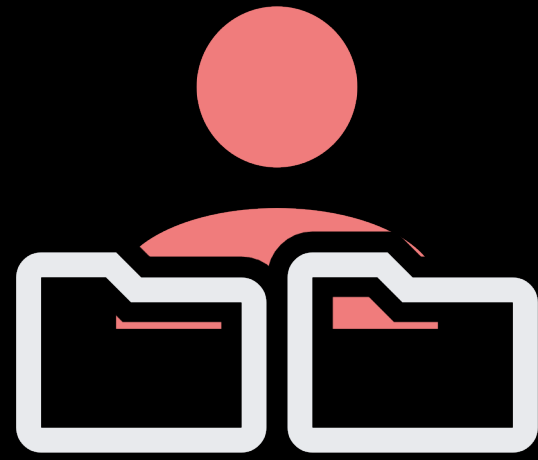
Lotteries

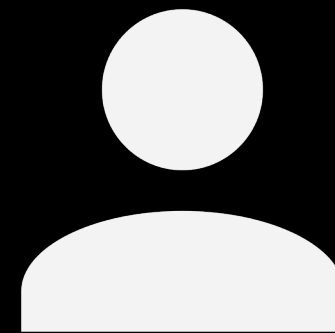
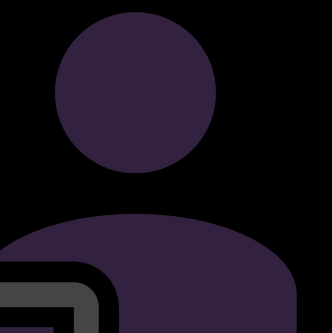
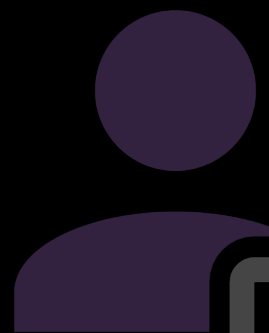
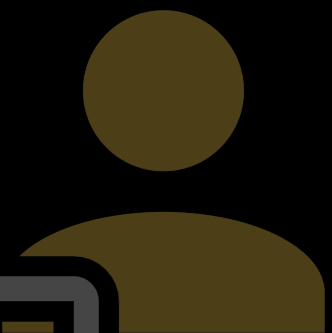
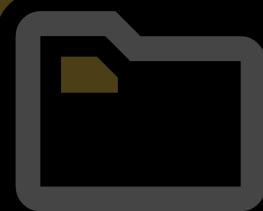
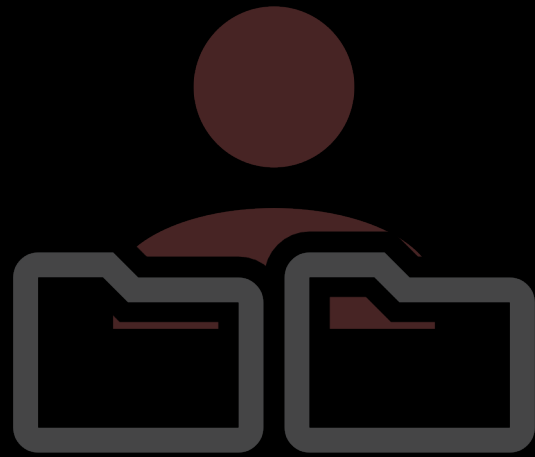


iGaming

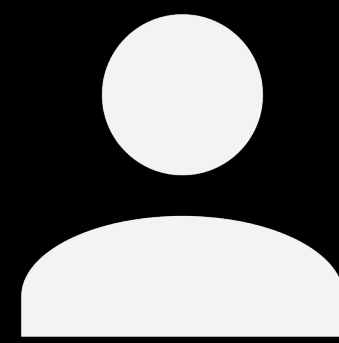
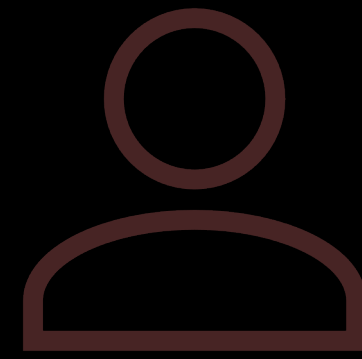
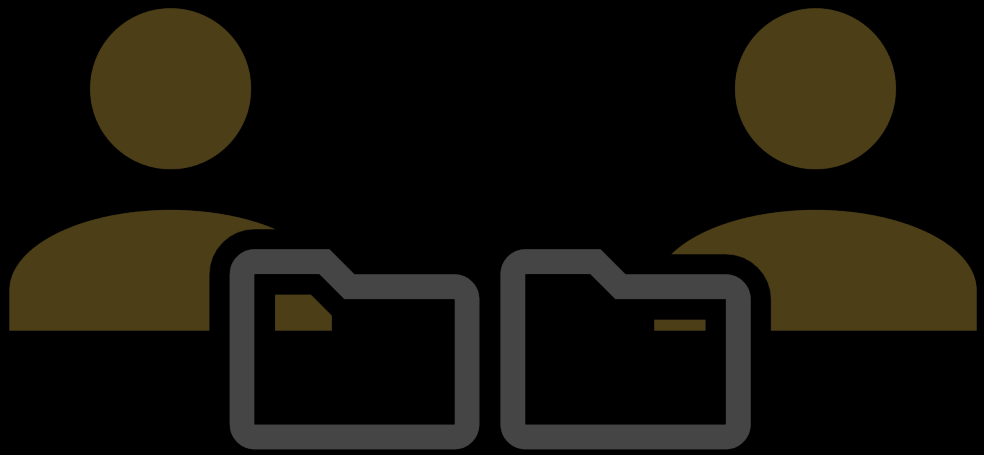
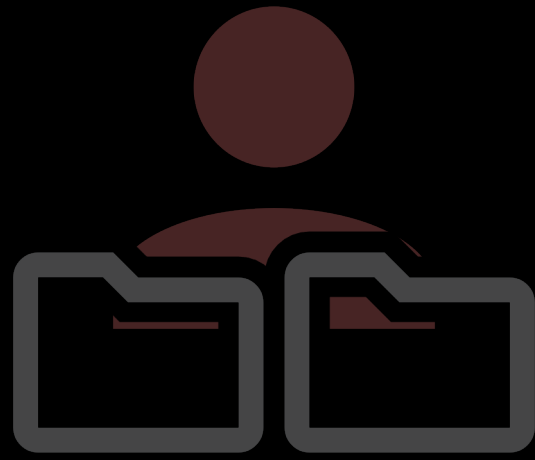




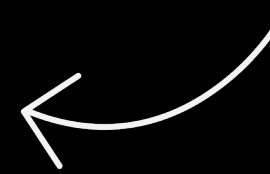




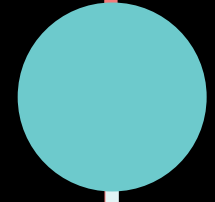
Me



Test
Automation
Support



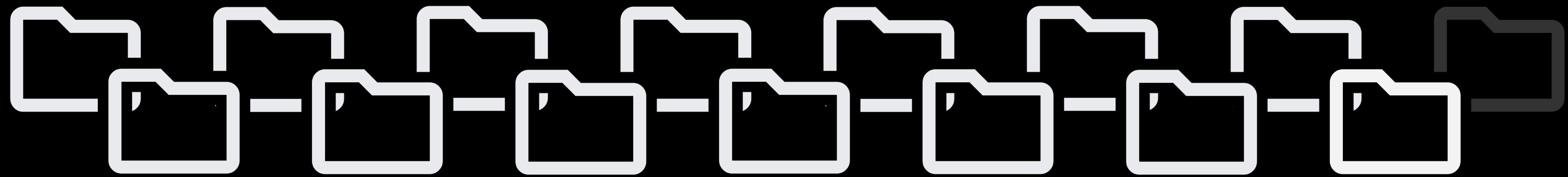
today



Start in dev team

2 years ago

today

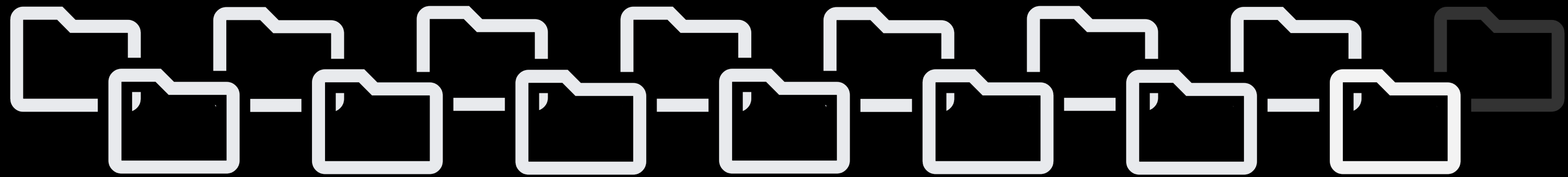


Framework

Nobody wanted to work
on the framework



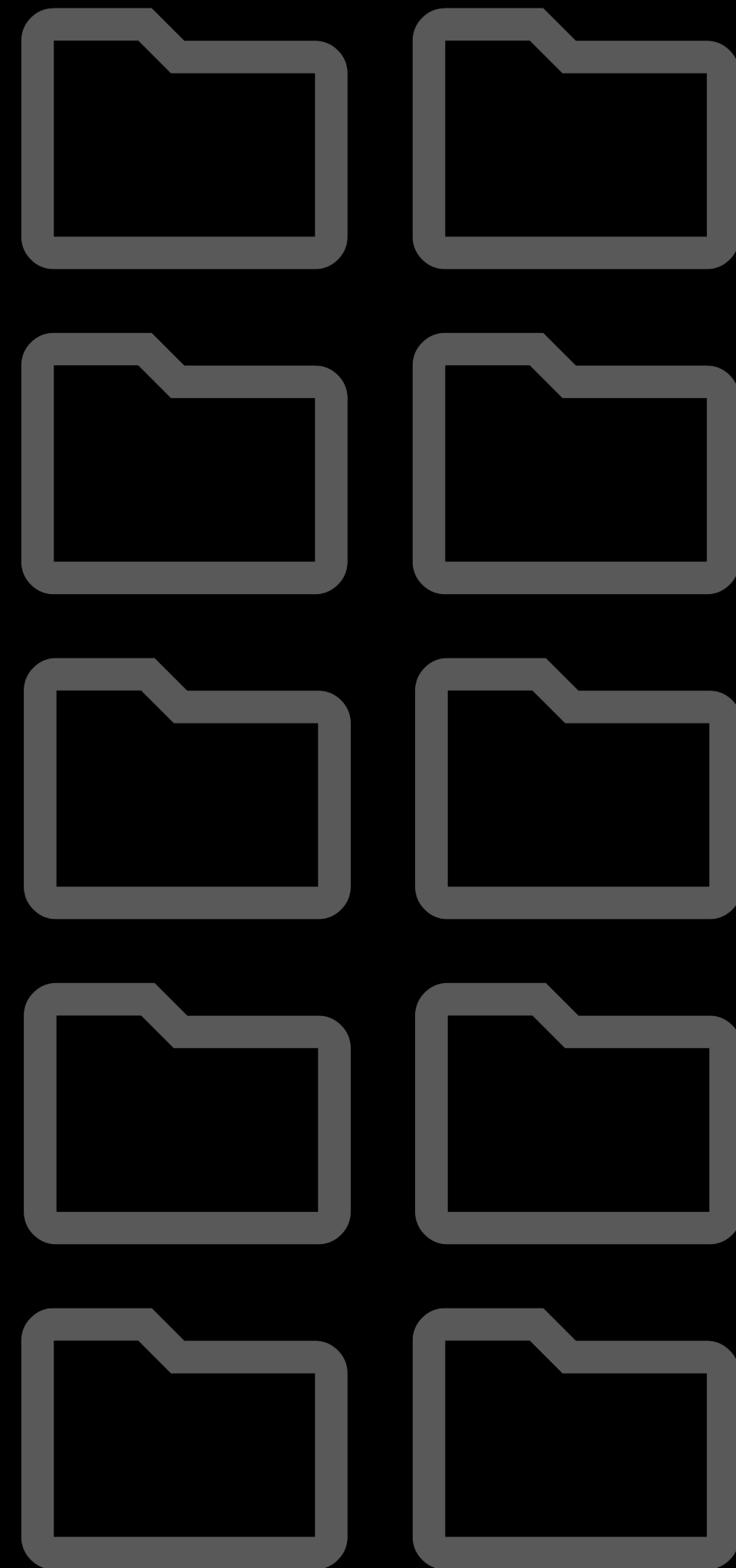
It rotted



Framework

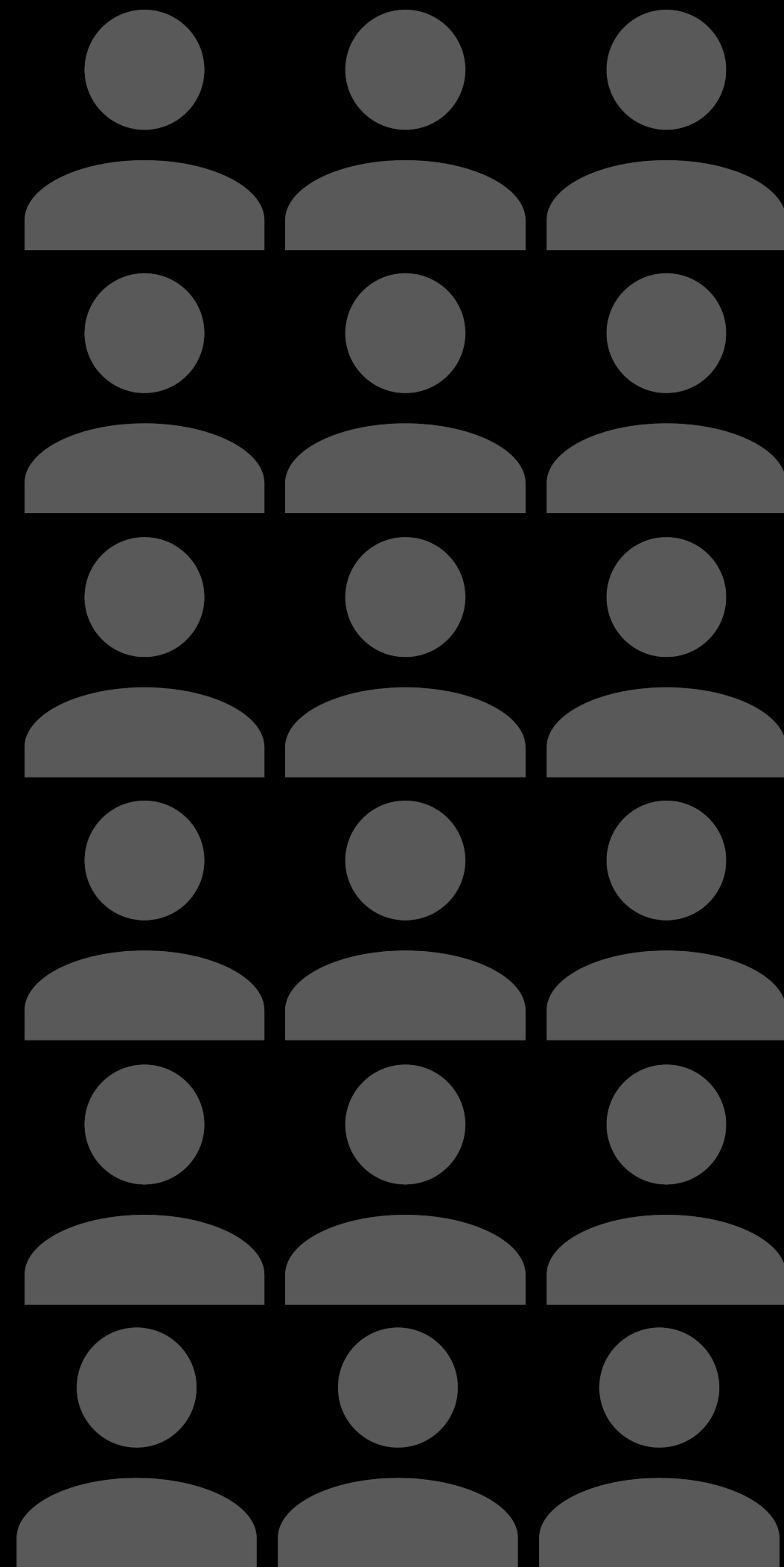
Test suite issues

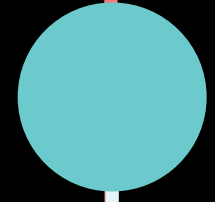
- Slow
- Brittle
- Code duplication
- Hard to maintain



Organizational issues

- Missing skills
- No time
- No strategy for structural change





Start in dev team

2 years ago

today

A vertical timeline on a black background. A thin red line runs vertically. A teal circle is on the line. Two white rectangular boxes with rounded corners are attached to the line. The top box contains the text 'Fix annoying framework bits' and the bottom box contains 'Start in dev team'. At the bottom of the line, the text '2 years ago' is on the left and 'today' is on the right.

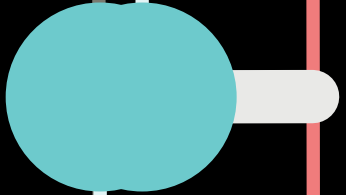
Fix annoying framework bits

Start in dev team

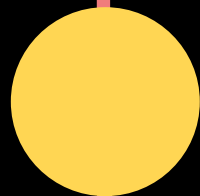
2 years ago

today

Fix annoying framework bits



Start in dev team



Created TA board

2 years ago

today

Fix annoying framework bits

Start in dev team

Start Test Automation Guild

Created TA board

2 years ago

today

Test Automation Guild



Teach team members

1 hour every month

Start at the beginning

Git

Parallel test runs

How to: Review code

Early returns

How to: Browserstack

More Git

Even more Git

Naming Boolean variables

Variable scopes

Auto formatting code

How to: Postman

Start at the beginning

Framework changes explained

Framework changes explained

Parallel test runs

Framework changes explained

Git

Framework changes explained

Early returns

Framework changes explained

How to: Review code

More Git

Framework changes explained

How to: Browserstack

Framework changes explained

Framework changes explained

Even more Git

Naming Boolean variables

Framework changes explained

Variable scopes

Framework changes explained

Auto formatting code

Framework changes explained

How to: Postman

Fix annoying framework bits

Start in dev team

Start Test Automation Guild

Created TA board

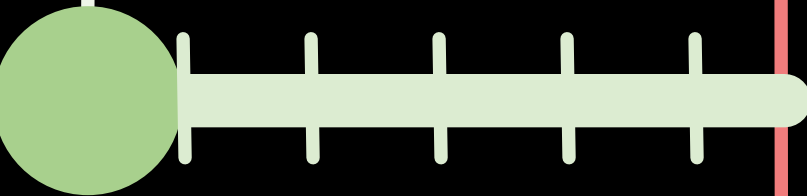
2 years ago

today

Fix annoying framework bits

Start in dev team

Start Test Automation Guild



Created TA board

Start Test Automation Support

2 years ago

today

Test
Automation
Support





Teach



Enforce



Do



Teach



Enforce



Do

- Test Automation Guild
- Code reviews
- Provide support
- Challenge
- Coach
- Answer questions



Teach

- Test Automation Guild
- Code reviews
- Provide support
- Challenge
- Coach
- Answer questions



Enforce

- Code reviews
- Framework features
- Pipelines
- Standards
- Linting
- Formatting



Do



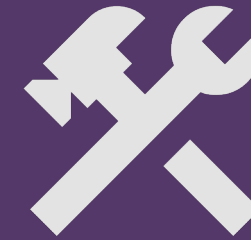
Teach

- Test Automation Guild
- Code reviews
- Provide support
- Challenge
- Coach
- Answer questions



Enforce

- Code reviews
- Framework features
- Pipelines
- Standards
- Linting
- Formatting



Do

- Framework development
- Communicate changes
- Fix tests
- Write documentation



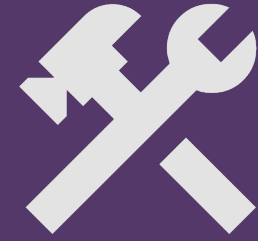
Teach

- Test Automation Guild
- Code reviews
- Provide support
- Challenge
- Coach
- Answer questions



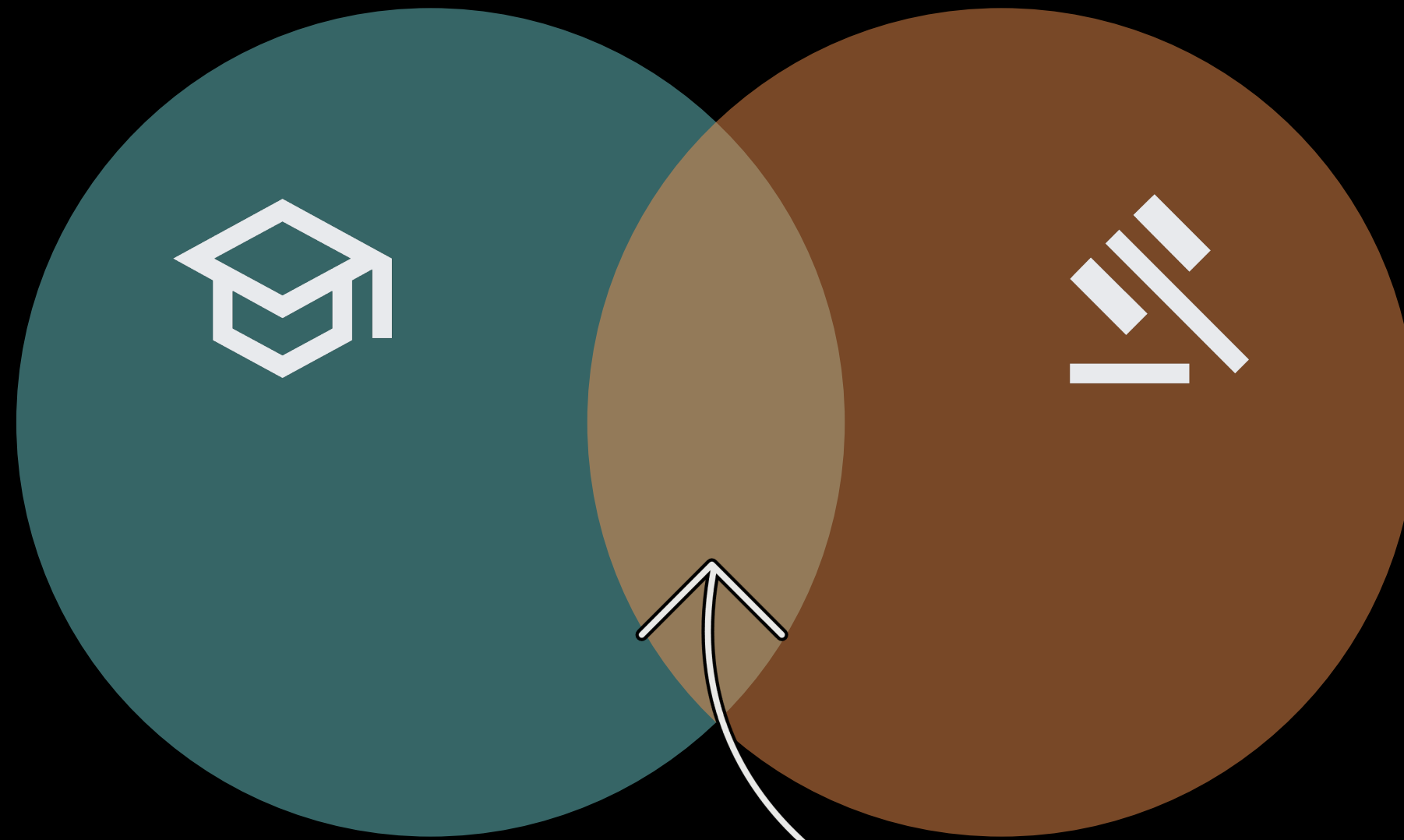
Enforce

- Code reviews
- Framework features
- Pipelines
- Standards
- Linting
- Formatting

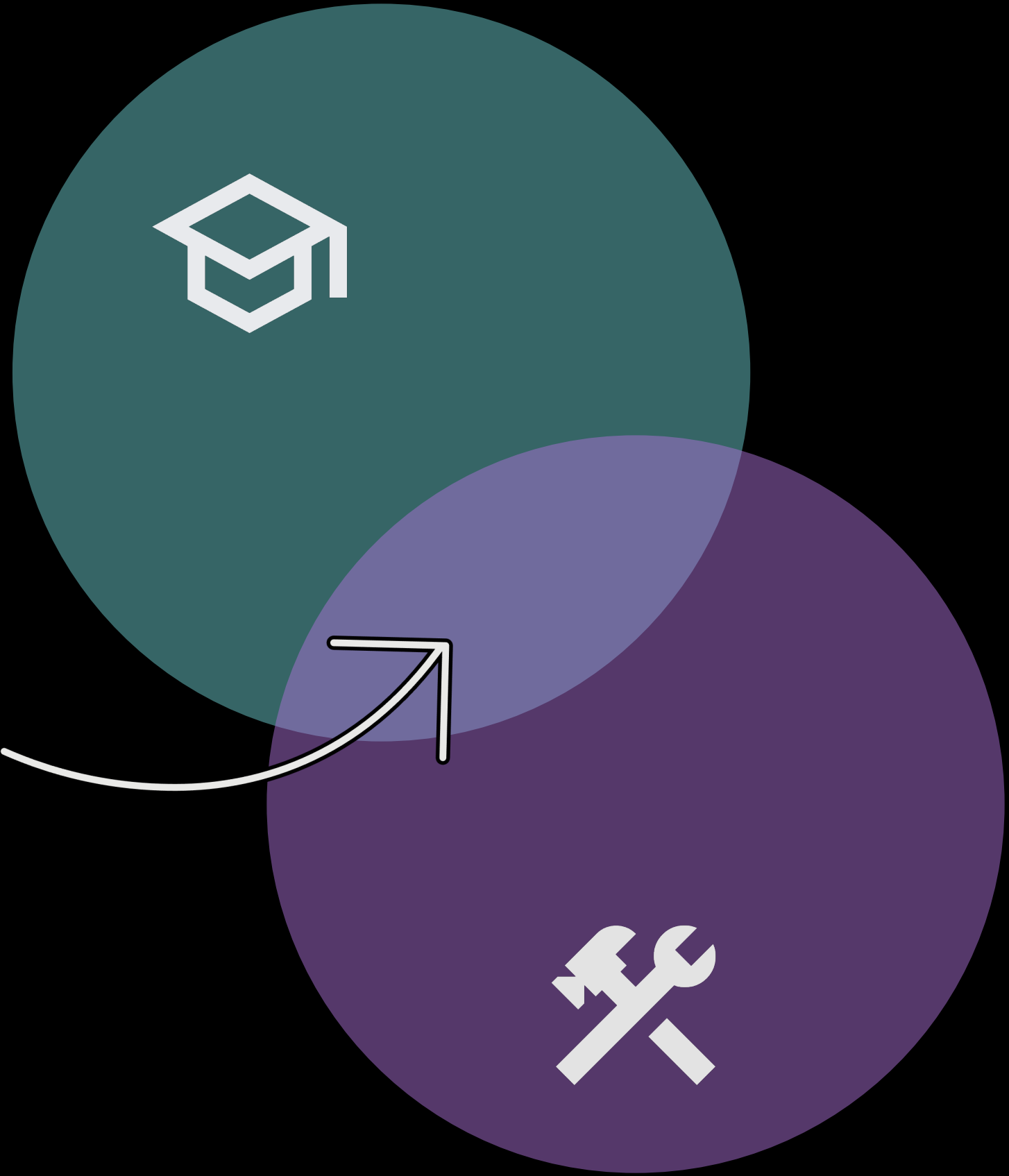


Do

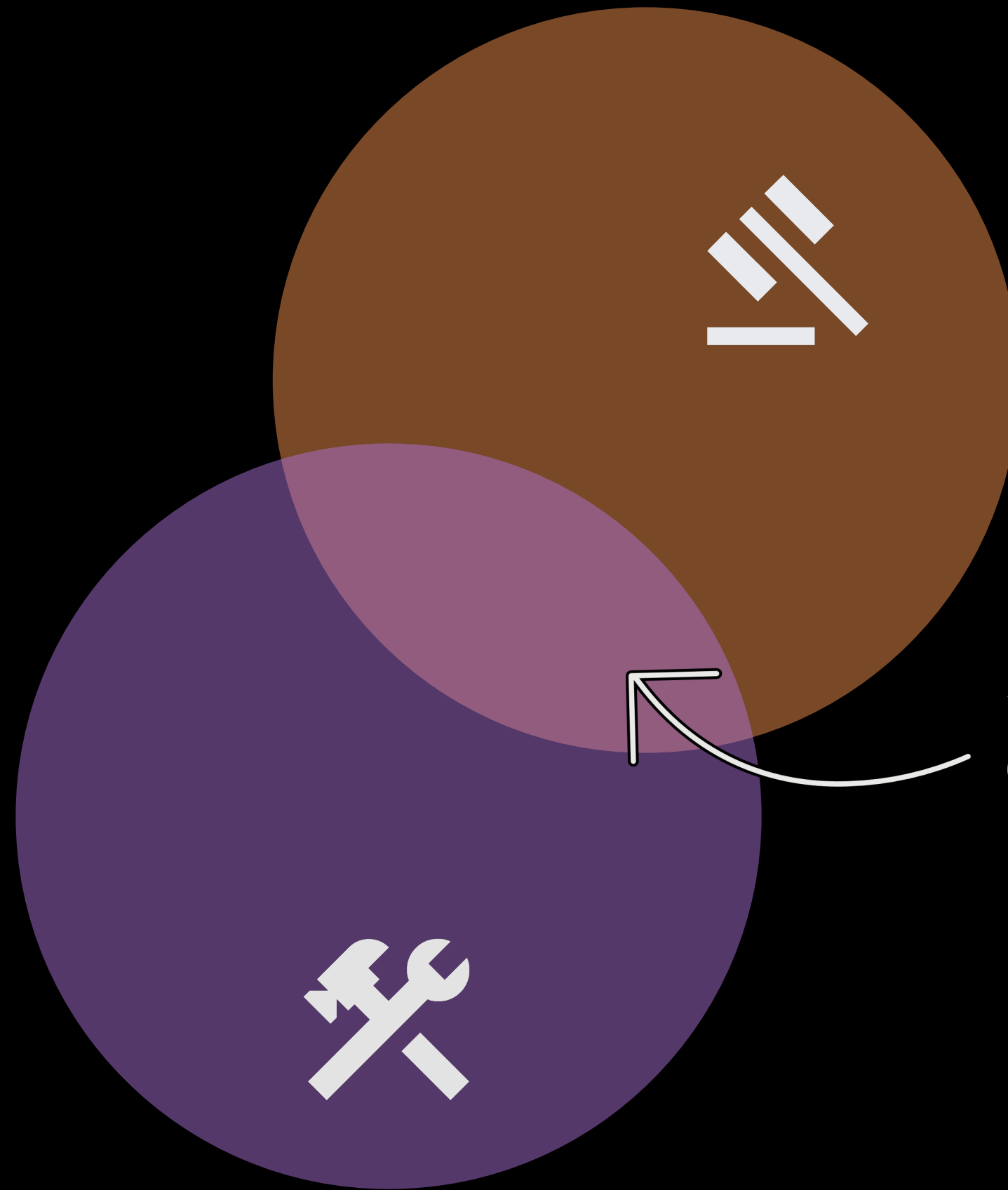
- Framework development
- Communicate changes
- Fix tests
- Write documentation



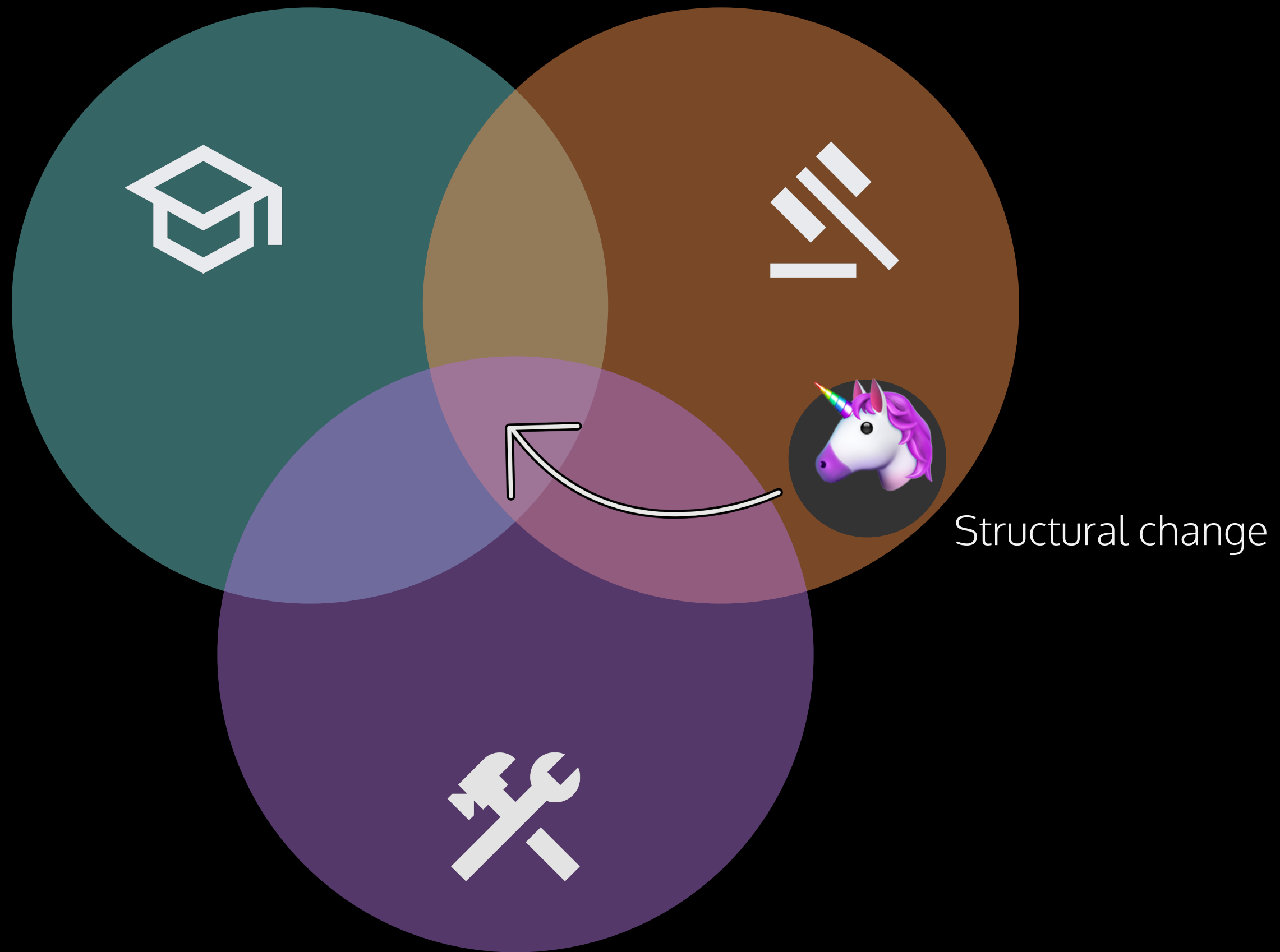
"Yes, mister boss man"



"I have better things to do"
"You do it"



"I don't know what to do"
(◡‿◡) ㄣ ㄣ





Teach



Enforce

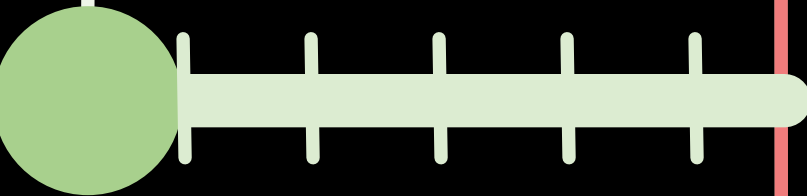


Do

Fix annoying framework bits

Start in dev team

Start Test Automation Guild



Created TA board

Start Test Automation Support

2 years ago

today

Fix annoying framework bits

Start in dev team

Start Test Automation Guild

Mandatory code reviews

Created TA board

Start Test Automation Support

2 years ago

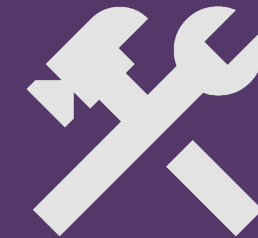
today



Teach



Enforce



Do

> Code reviews



Enforce

Enforce standards

> Code reviews



Enforce

Block **bad** code



Teach

Teach a concept the
exact moment
someone needs it



At their skill level



Do

Show how I
make changes

Fix annoying framework bits

Start in dev team

Start Test Automation Guild

Mandatory code reviews

Created TA board

Start Test Automation Support

2 years ago

today

Fix annoying framework bits

Start in dev team

Start Test Automation Guild

Mandatory code reviews

First standards

Created TA board

Start Test Automation Support

2 years ago

today



Teach



Enforce



Do



Teach

A standard is
distilled knowledge

3. Don't use meaningless HTML tags



Teach

✓ Do

✗ Don't



Enforce

Agree on
what to enforce



Enforce

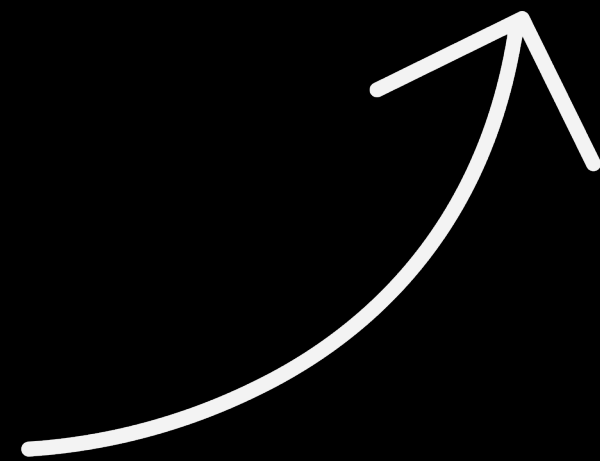
Automate enforcement



Do

Adhere to standards in
your code. **Always**

Rules for thee
and for me



Fix annoying framework bits

Start in dev team

Start Test Automation Guild

Mandatory code reviews

First standards

Created TA board

Start Test Automation Support

2 years ago

today

Fix annoying framework bits

Start in dev team

Start Test Automation Guild

Mandatory code reviews

First standards

Created TA board

Start Test Automation Support

2 years ago

today

Fix annoying framework bits

Start in dev team

Start Test Automation Guild

Mandatory code reviews

First standards

Created TA board

Start Test Automation Support

2 years ago

today

Where is the `code`?

Writing
test automation is easyTM

Writing *stable*
test automation is *hard*

Writing maintainable
test automation is hard

Writing high-quality
test automation is hard

Writing high-quality
test automation is way harder
at scale

Quality is way harder at scale

Anything is *way* harder at scale

Team culture

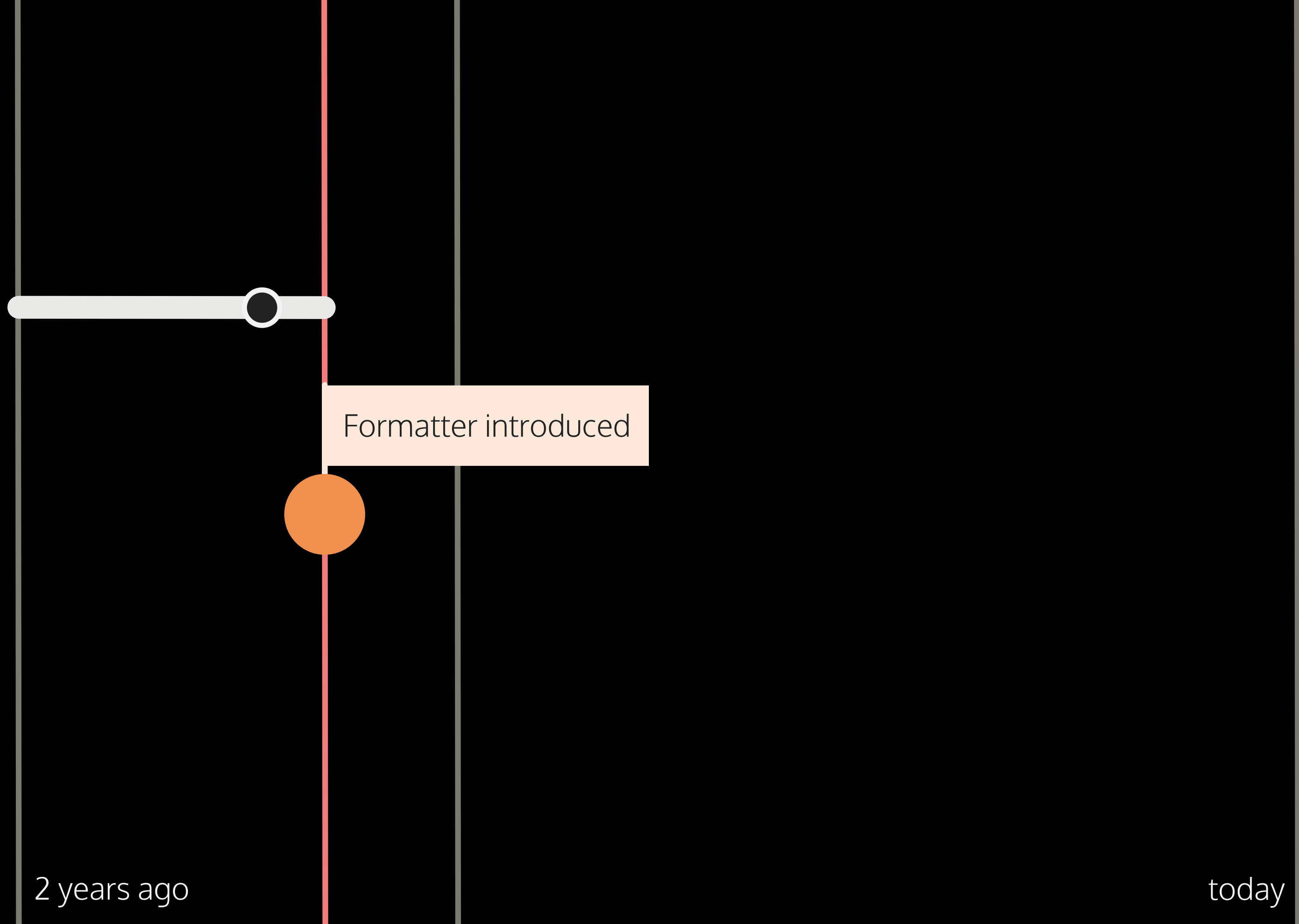
Team culture

Organization culture



2 years ago

today

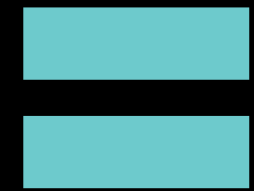


Formatter introduced

2 years ago

today

Formatter



A tool for automatically formatting source code.

```
#{unused_variable} =      Set Variable Hello, world!  
#{another_var} Set Variable      Goodbye, moon!
```

```
#{unused_variable} = Set Variable Hello, world!  
#{another_var} = Set Variable Goodbye, moon!
```

> Formatter for Robot Framework

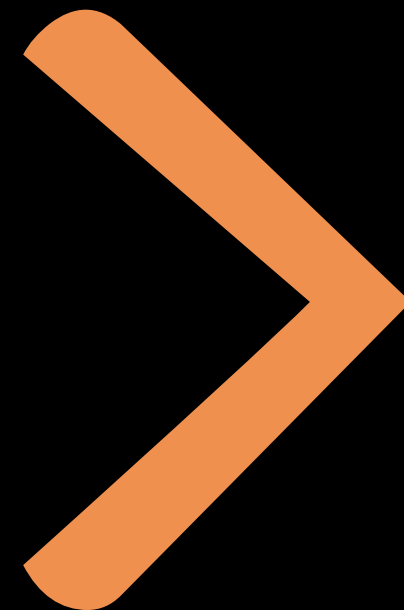
Robotidy

or Robocop >= 6

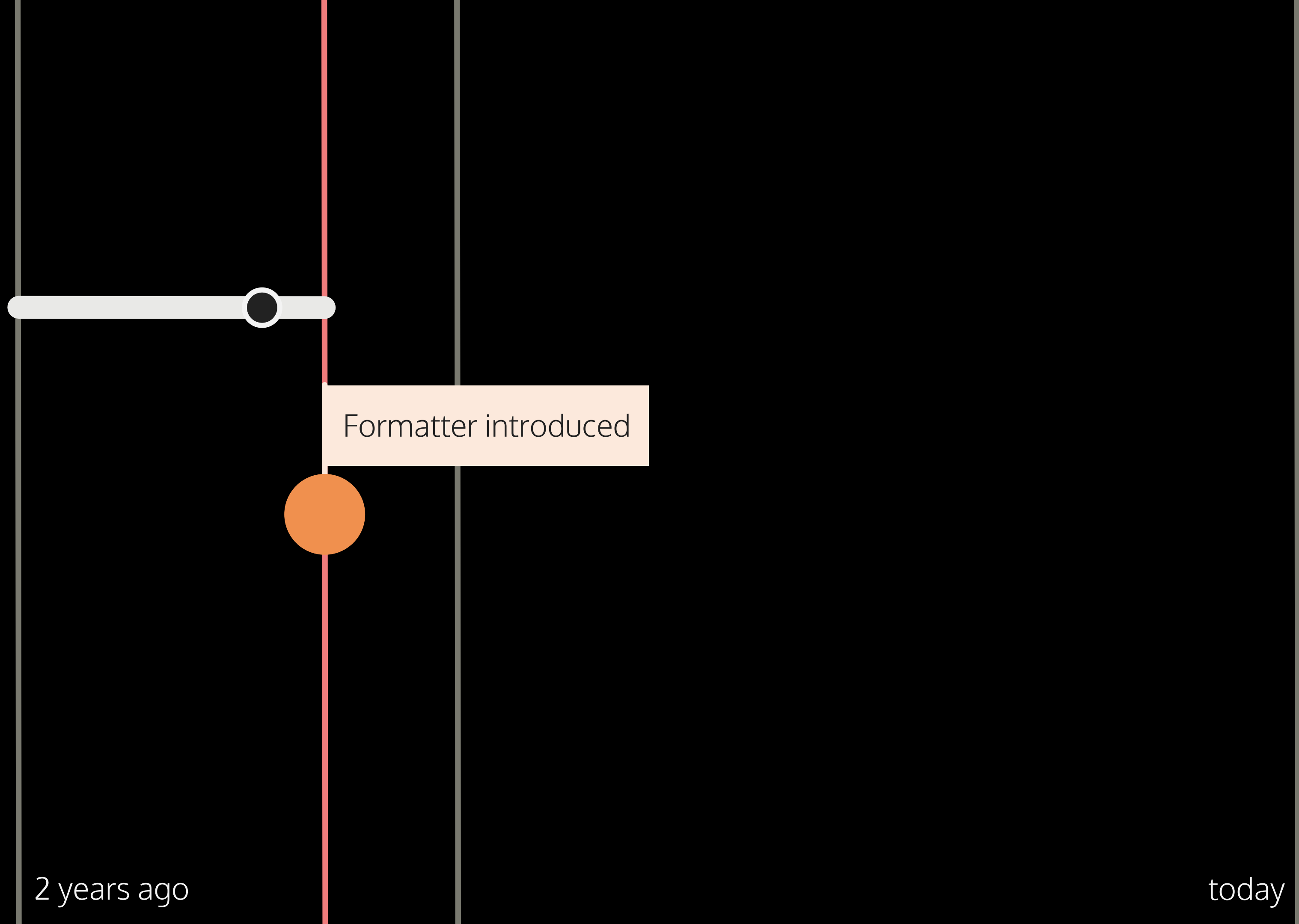
Consistent formatting

“But Sander, my way is prettier!”

Consistent code



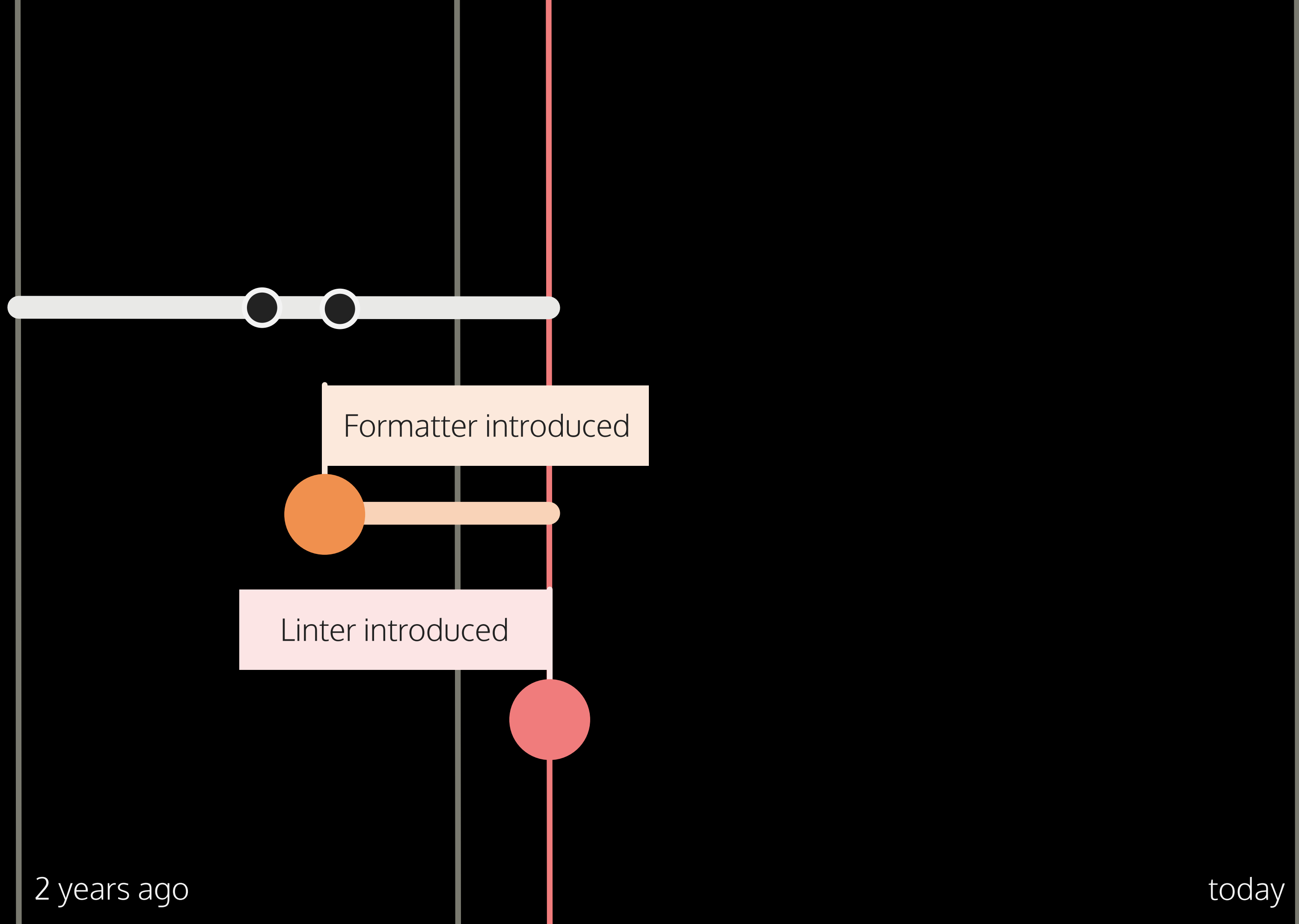
Pretty code



2 years ago

today

Formatter introduced



Linters



A [...] tool that analyzes source code for errors, vulnerabilities, and stylistic issues to improve code quality.

Linting

=

Static code
analysis

Variable `'${unused_variable}'` is assigned but not used robocop([0920](#))

Variable (local assign): **unused_variable**

Value: `${unused_variable} = Set Variable Hello, world!`

[View Problem \(Alt+F8\)](#) No quick fixes available

`${unused_variable}` = Set Variable Hello, world!

Found 133 issues: 96 WARNINGS, 37 INFOs.

Issues by ID:

W10001 (sleep-keyword-used)	: 33
INL0-L12 (locator-outside-variable)	: 30
W0931 (no-test-variable)	: 15
WNL0-L06 (locator-variable-name-missing-parent-locator)	: 12
WNL0-L09 (locator-variable-with-meaningless-html-tag)	: 11
W0929 (no-global-variable)	: 11
WNL0-L09 (locator-variable-with-meaningless-html-tag)	: 11
WNL0-L09 (locator-variable-with-meaningless-html-tag)	: 11
W0929 (no-global-variable)	: 11
W0920 (unused-variable)	: 8
I0914 (if-can-be-merged)	: 7
W0919 (unused-argument)	: 6

Processed 34 files from which 14 files contained issues.

Scan finished in 1.873s.

> Linter for Robot Framework

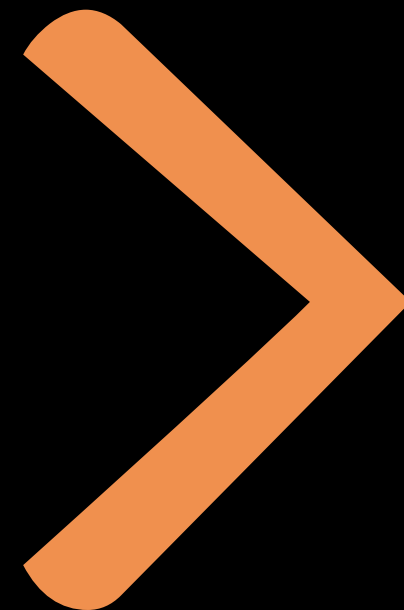
Robocop

Formatting + Linting = Consistency

Code consistency

- Style
- Approach*
- Documentation*
- Prevent unstable situations
- Prevent common pitfalls

Consistent code

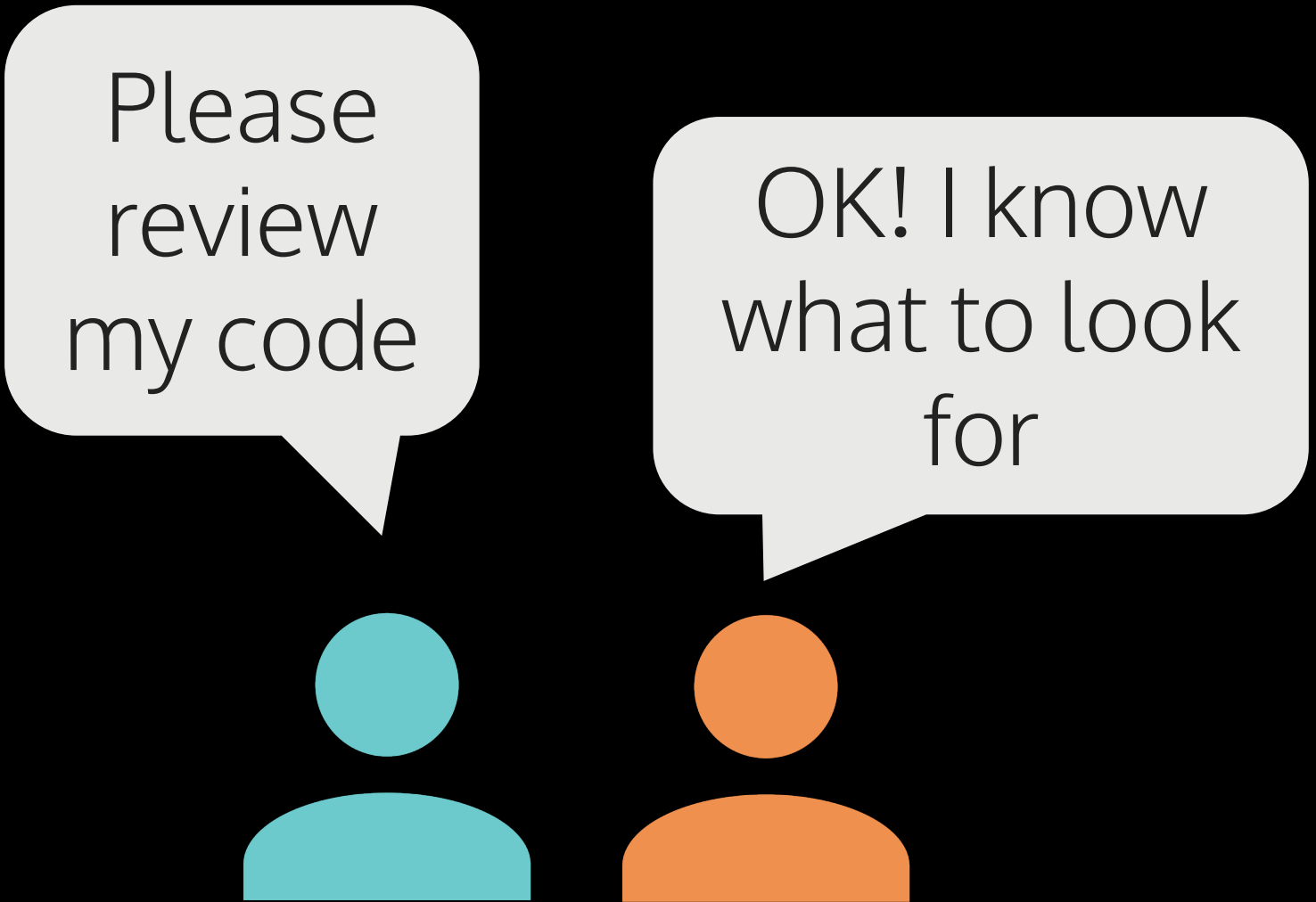


Pretty code

Consistent `code` is
easier to `read`

Consistent `code` is
easier to `review`

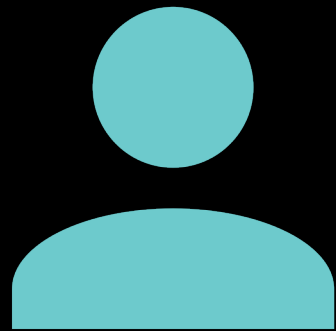
Consistent **code** is
easier to **maintain**



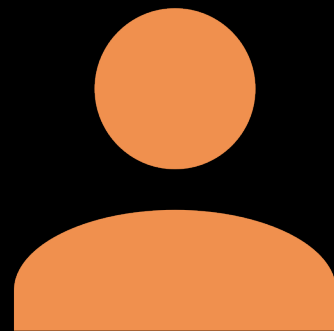
Please
review
my code

OK! I know
what to look
for

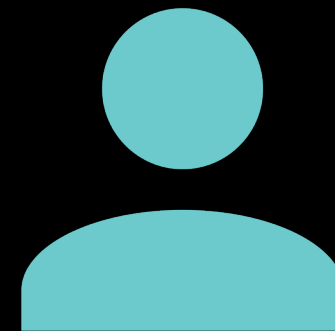
Please review my code



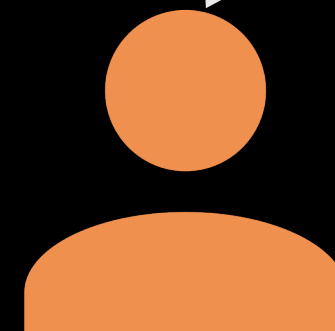
OK! I know what to look for



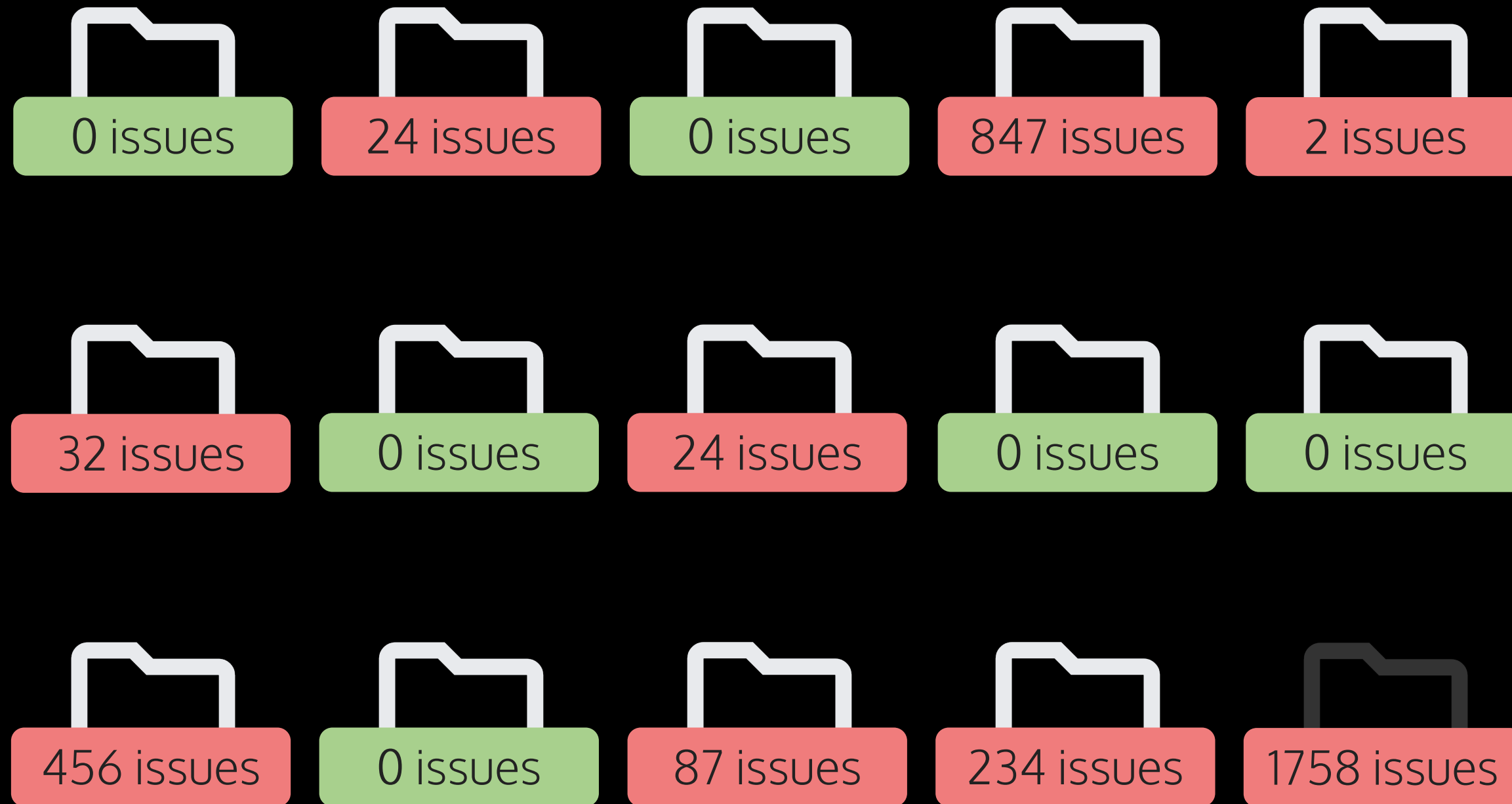
I'm going on holiday can you help out?

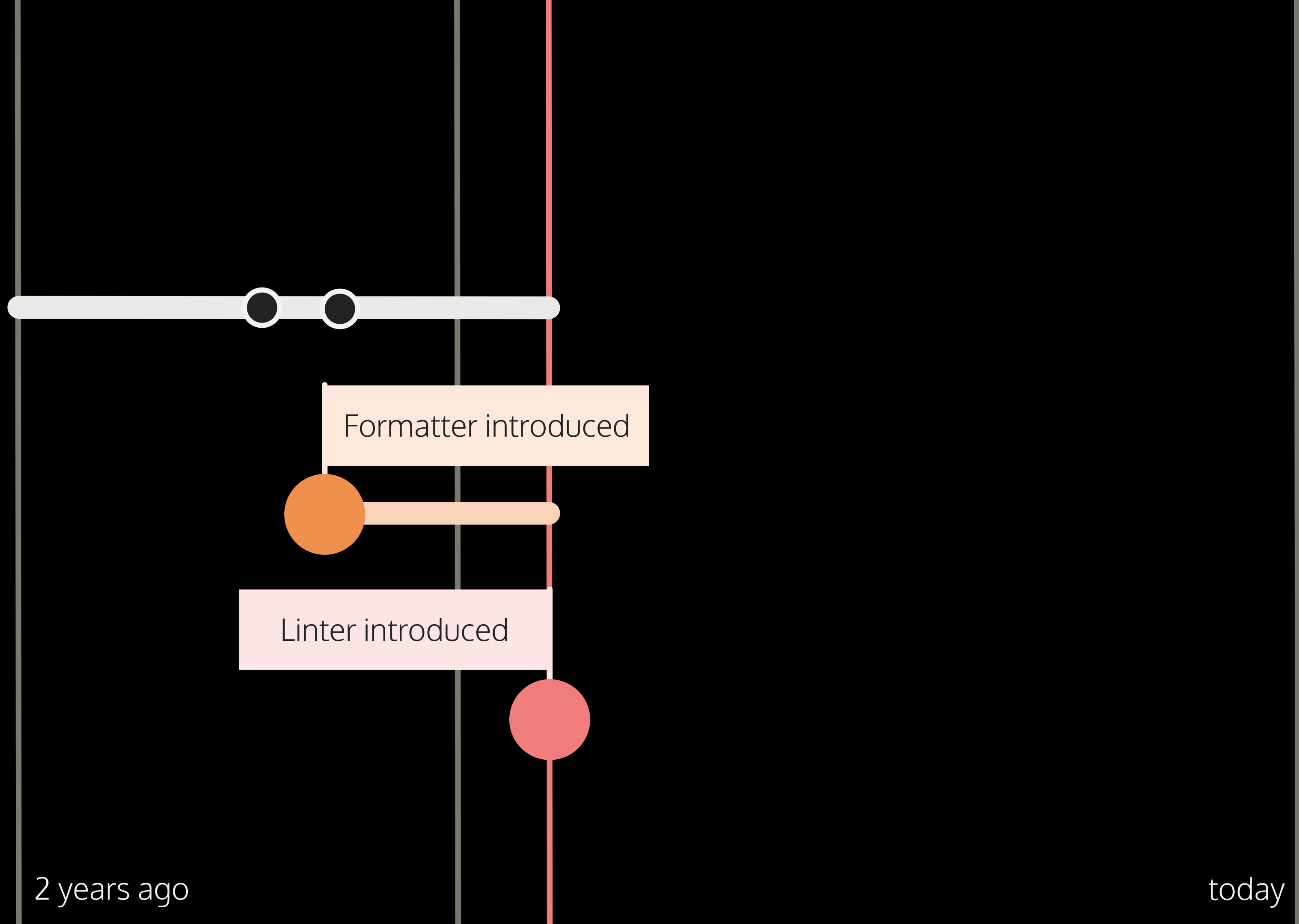


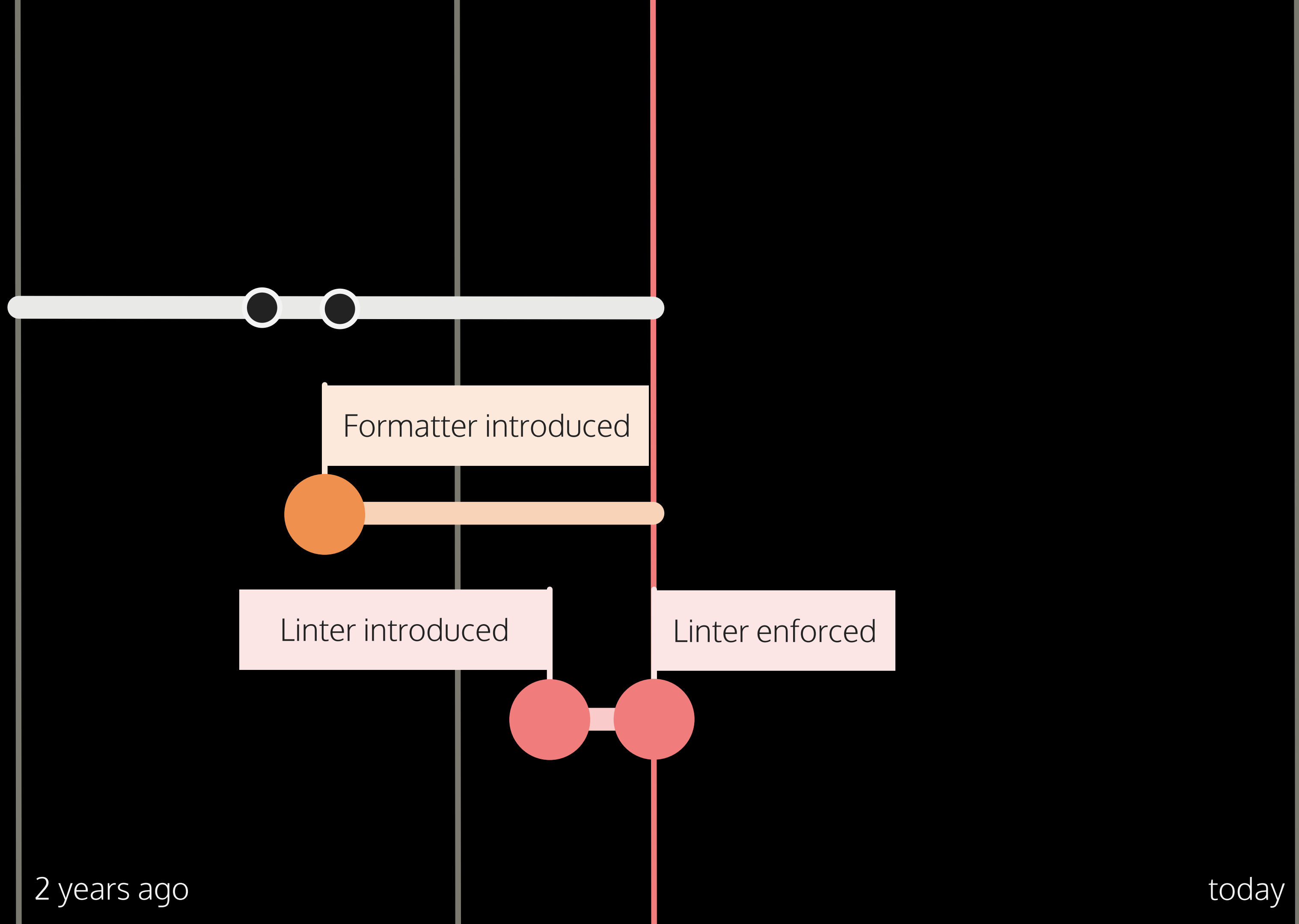
OK! I know how to keep things running



> Lint issues

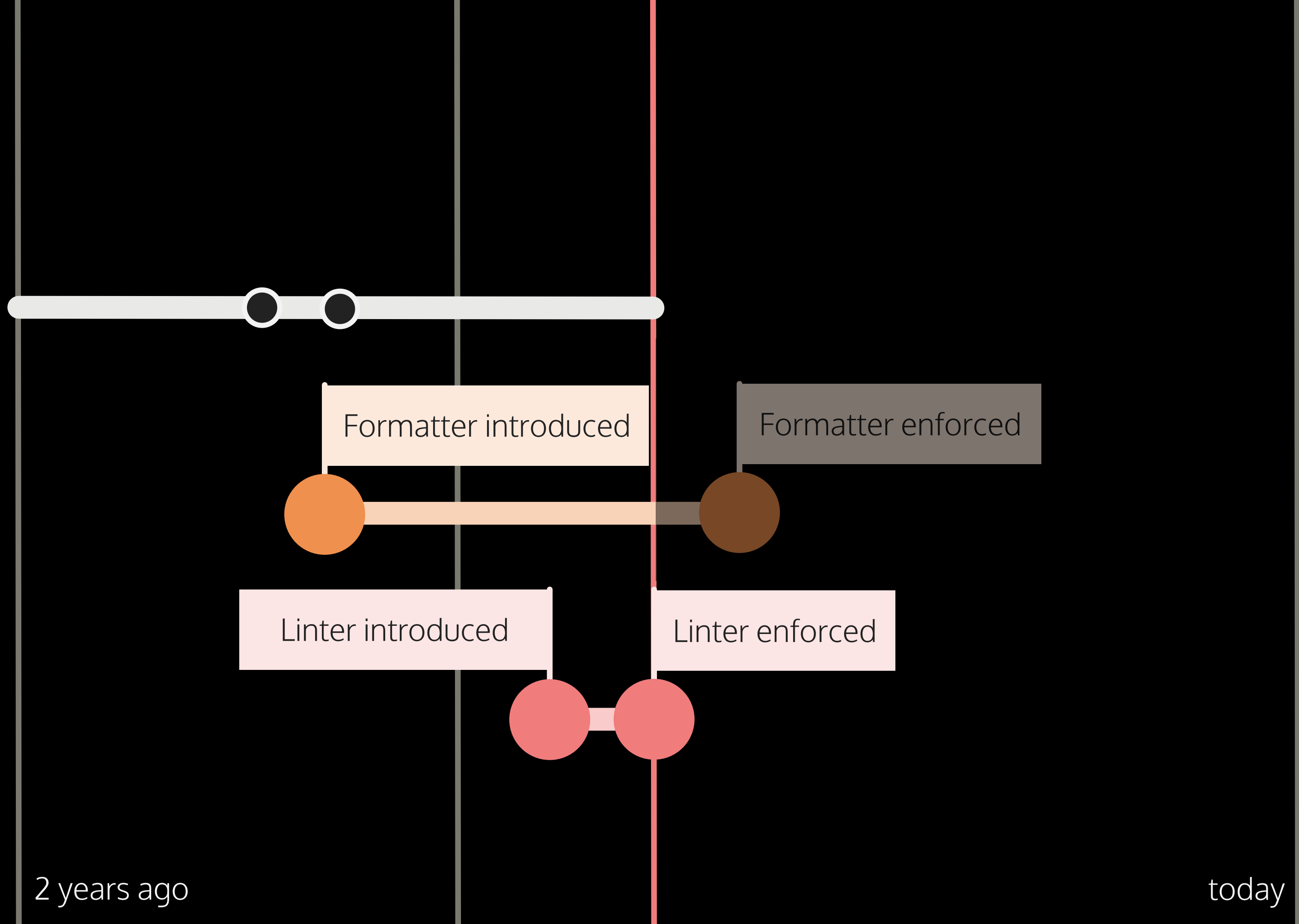






2 years ago

today



2 years ago

today



Teach

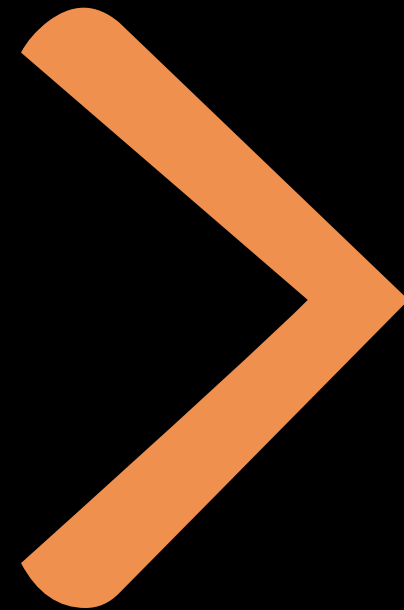


Enforce



Do

Automated
enforcement




Manual
enforcement

← **Jobs in run #2025050...**
POR Regression


POR Regression Sand

>  Robot Framework sand... 27s

POR Regression Lotteries

∨  Robot Framework lotte... 26s


 Initialize job 1s

 Checkout nlo-nl/NLO.... 2s

 Install locales 1s

 Install Python <1s


 Install dependencies 15s

 Code formatting 4s

 Code lint <1s

 Pre-test: API Gatewa... <1s

 Run tests <1s

 Run additional tests <1s



Jobs in run #2025050...

POR Regression

POR Regression Sand

> Robot Framework sand... 27s

POR Regression Lotteries

∨ Robot Framework lotte... 26s

Initialize job 1s

Checkout nlo-nl/NLO.... 2s

Install locales 1s

Install Python <1s

Install dependencies 15s

Code formatting 4s

Code lint <1s

Pre-test: API Gatewa... <1s

Run tests <1s

Run additional tests <1s

Code formatting

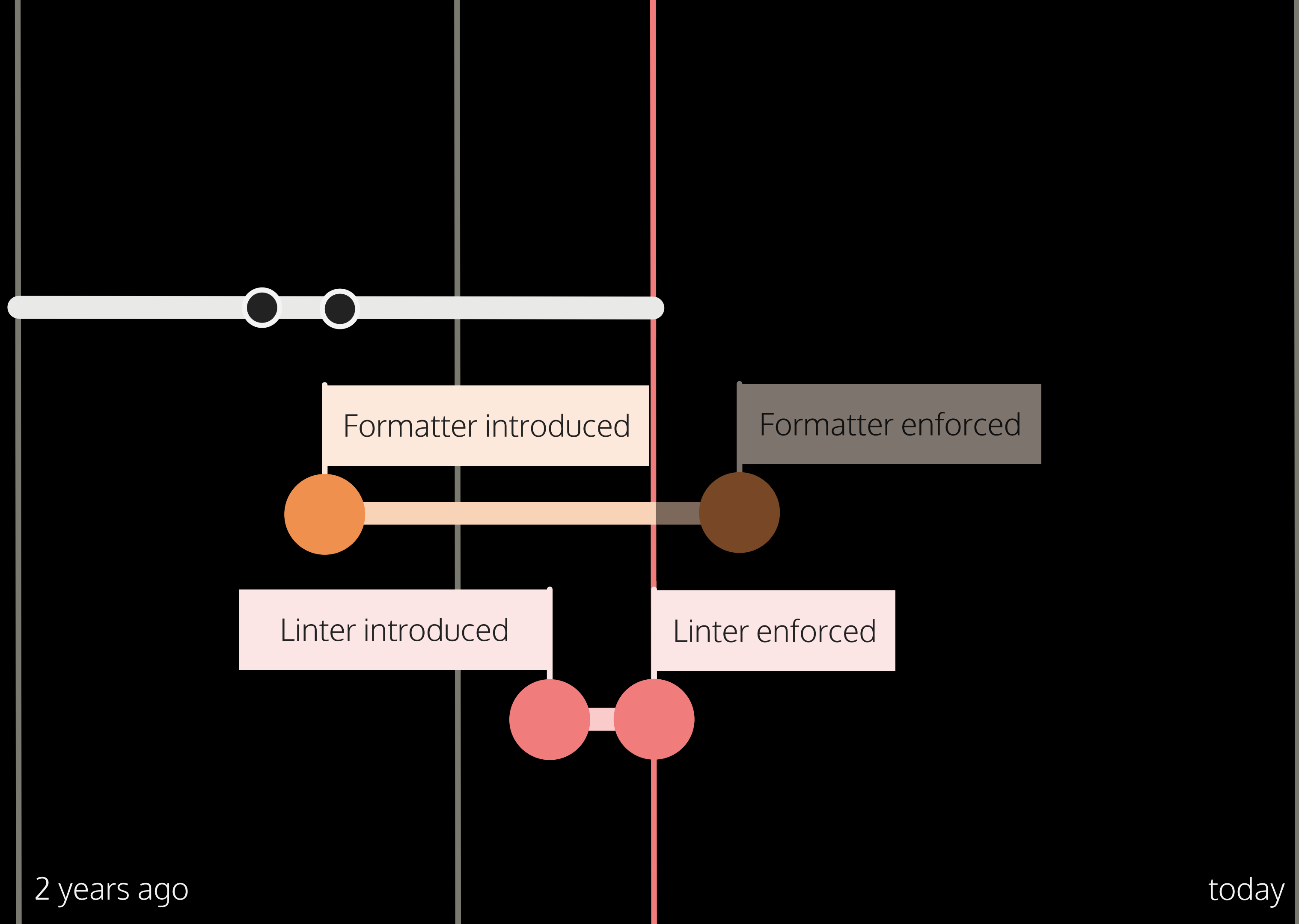


View raw log

```
1 Starting: Code formatting
2 =====
3 Task      : PowerShell
4 Description : Run a PowerShell script on Linux, macOS, or Windows
5 Version   : 2.247.1
6 Author    : Microsoft Corporation
7 Help      : https://docs.microsoft.com/azure/devops/pipelines/tasks/utility/powershell
8 =====
9 Generating script.
10 ===== Starting Command Output =====
11 /usr/bin/pwsh -NoLogo -NoProfile -NonInteractive -Command . '/agent/_work/_temp/d9f1831e-e03d-417f-a119-24f7
12 Checking code formatting of all '*.robot' and '*.resource' files @ './4_test_suite/lottery_portal'
13 Would reformat /agent/_work/1/s/4_test_suite/lottery_portal/test/01_login.robot
14
15 1 file would be reformatted, 93 files would be left unchanged.
16 ##[error]Found unexpected code formatting. Use the auto formatter to fix this issue.
17
18 Finishing: Code formatting
```



Formatting + Linting = Consistency



2 years ago

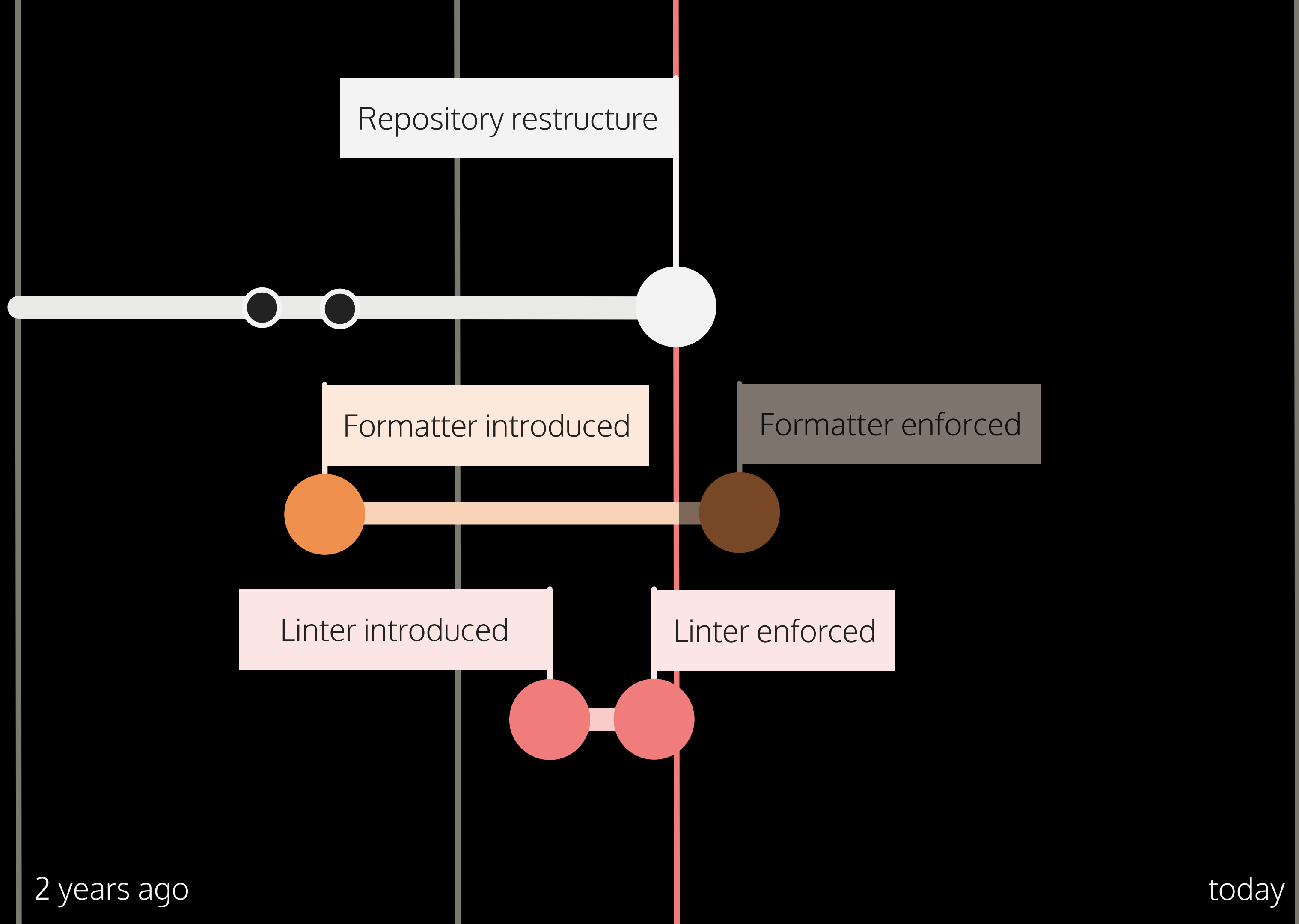
today

Formatter introduced

Formatter enforced

Linter introduced

Linter enforced



Repository restructure

Formatter introduced

Formatter enforced

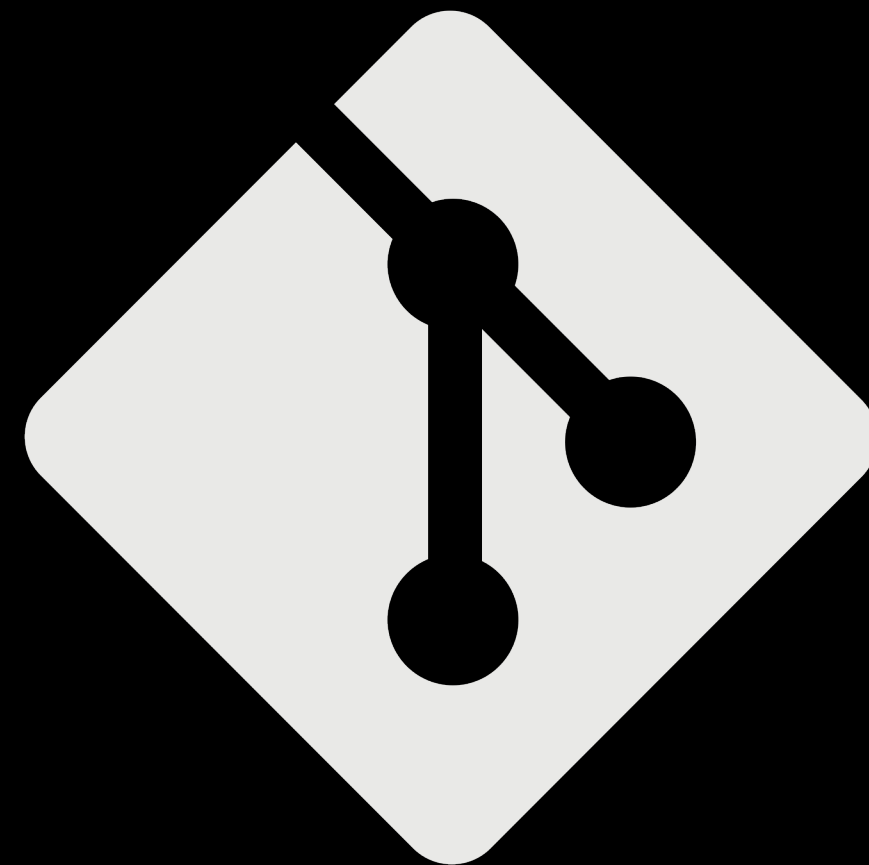
Linter introduced

Linter enforced

2 years ago

today

Git repository restructure



Spaghetti → Lasagna

1

Generic

2

Lotteries

iGaming

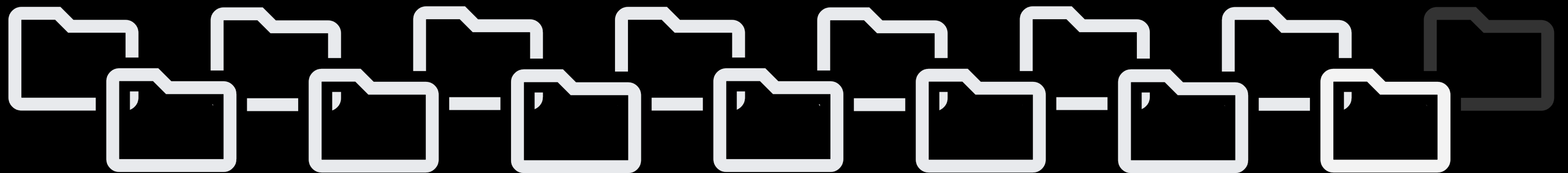
3

A

B

...

4



1

```
*** Settings ***  
Resource    2_domain/Lotteries  
Resource    3_component/Foo  
Resource    4_testSuite/EJP
```

2

```
*** Settings ***  
Resource    1_generic  
Resource    2_domain/Lotteries
```



```
*** Settings ***  
Resource    3_component/Foo  
Resource    4_testSuite/EJP
```

3

```
*** Settings ***  
Resource    1_generic  
Resource    2_domain/Lotteries  
Resource    3_component/Foo
```























































```
*** Settings ***  
Resource    4_testSuite/EJP
```
















4

```
*** Settings ***  
Resource    1_generic  
Resource    2_domain/Lotteries  
Resource    3_component/Foo  
Resource    4_testSuite/EJP
```



- >  .vscode
- >  1_generic
- ∨  2_domain
 - >  igaming
 - >  lottery
- ∨  3_component
 - >  draw_based_games
 - >  lottery_cms
- ∨  4_test_suite
 - >  archive
 - >  braze_emails
 - >  casino
 - >  control_center
 - >  eurojackpot
 - >  krasloten
 - >  lottery_portal
 - >  lotto
 - >  lucky_day
 - >  miljoenenspel
 - >  sportsbook
 - >  sportsbook_beta
 - >  staatsloterij
 - >  toto
 - >  toto_backoffice
 - >  toto_winkel
- \  docs

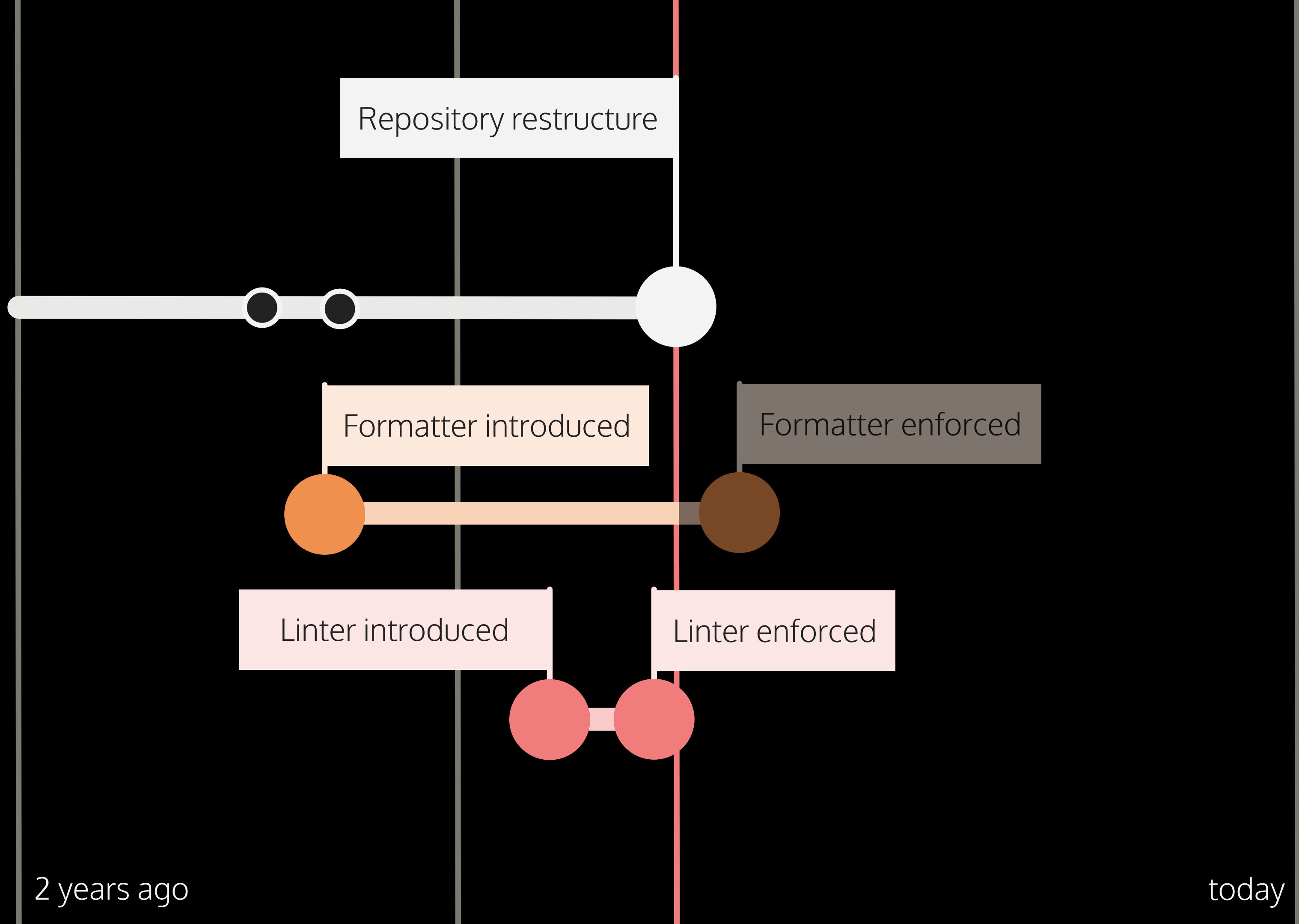
- >  .vscode
- >  1_generic
- ▼  2_domain
 - >  igaming
 - >  lottery
- ▼  3_component
 - >  draw_based_games
 - >  lottery_cms
- ▼  4_test_suite
 - >  archive
 - >  braze_emails
 - >  casino
 - >  control_center
 - >  eurojackpot
 - >  krasloten
 - >  lottery_portal
 - >  lotto
 - >  lucky_day
 - >  miljoenenspel
 - >  sportsbook
 - >  sportsbook_beta
 - >  staatsloterij
 - >  toto
 - >  toto_backoffice
 - >  toto_winkel
- >  docs

- >  .vscode
- ▼  1_generic
 - >  config
 - >  data
 - >  infrastructure
 - >  keywords
 - >  pre_test
 - >  reporting
 - >  robocop_rules
 - >  test
 -  framework_data_cleanup.yaml
 -  framework_data_management.yaml
 -  framework_regression.yaml
 -  README.md
- >  2_domain

- > .vscode
- > 1_generic
- ▼ 2_domain
 - > igaming
 - > lottery
- ▼ 3_component
 - > draw_based_games
 - > lottery_cms
- ▼ 4_test_suite
 - > archive
 - > braze_emails
 - > casino
 - > control_center
 - > eurojackpot
 - > krasloten
 - > lottery_portal
 - > lotto
 - > lucky_day
 - > miljoenenspel
 - > sportsbook
 - > sportsbook_beta
 - > staatsloterij
 - > toto
 - > toto_backoffice
 - > toto_winkel
- > docs

- > .vscode
- ▼ 1_generic
 - > config
 - > data
 - > infrastructure
 - > keywords
 - > pre_test
 - > reporting
 - > robocop_rules
 - > test
 - framework_data_cleanup.yaml
 - framework_data_management.yaml
 - framework_regression.yaml
 - README.md
- > 2_domain

- ▼ eurojackpot
 - ▼ keywords
 - api_eurojackpot.resource
 - api_subscription_eurojackpot.resource
 - eurojackpot_cms_keywords.resource
 - eurojackpot_cms_locators.resource
 - eurojackpot_cms_texts.resource
 - eurojackpot_context.resource
 - eurojackpot_data_promotionids.resource
 - eurojackpot_keywords.resource
 - eurojackpot_locators.resource
 - eurojackpot_orderflow.resource
 - eurojackpot.resource
 - ▼ test
 - > pre_condition
 - ▼ regression
 - 01_ejp_singleticket_orderflow.robot
 - 02_ejp_orderflow_step1.robot
 - 03_ejp_orderflow_step2.robot



Repository restructure

Formatter introduced

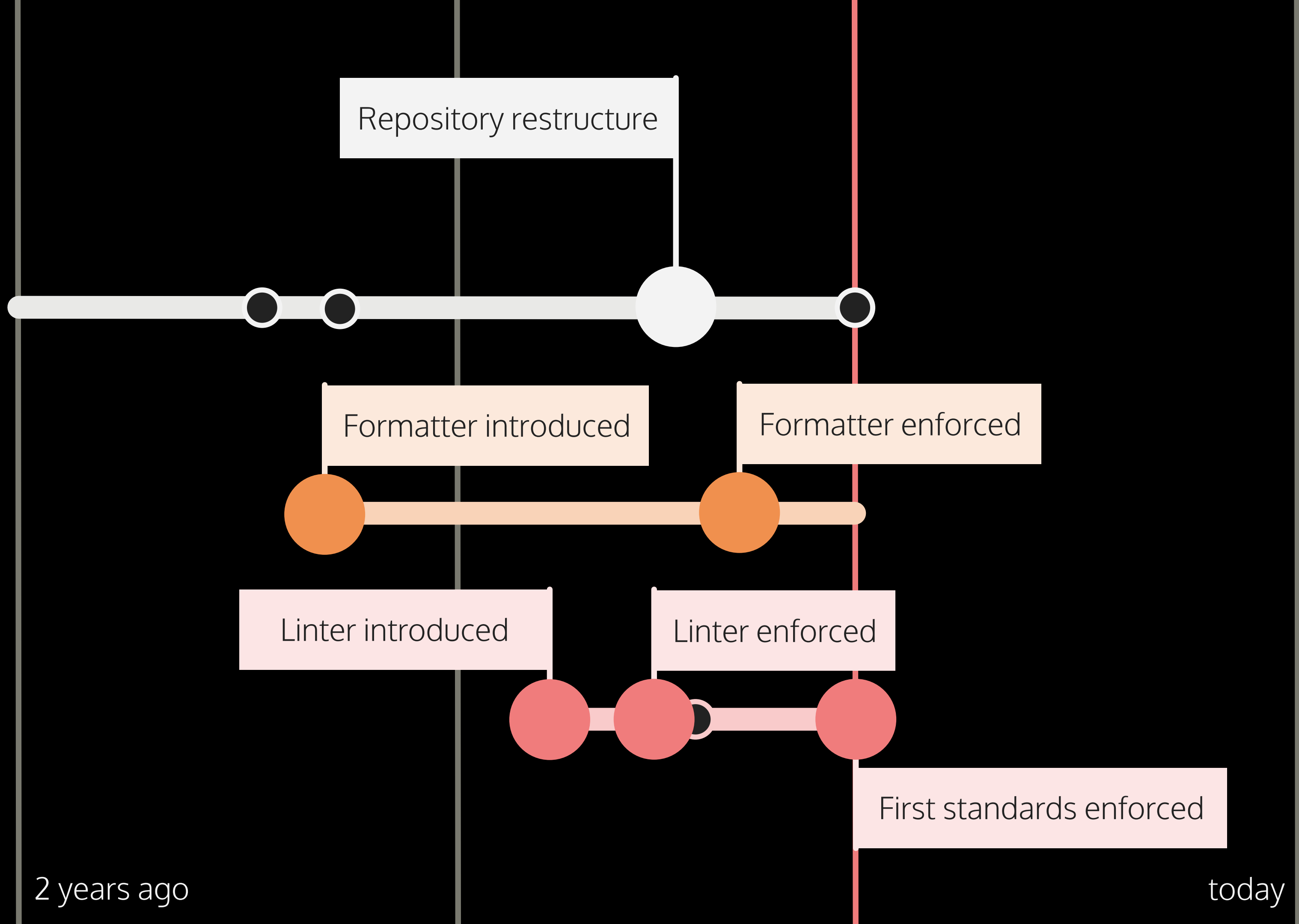
Formatter enforced

Linter introduced

Linter enforced

2 years ago

today



Repository restructure

Formatter introduced

Formatter enforced

Linter introduced

Linter enforced

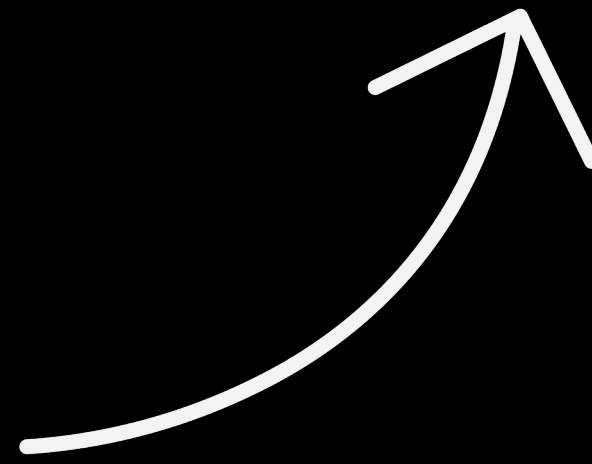
First standards enforced

2 years ago

today

Linters work with rules

You can add your own



```
Rule(  
    rule_id="NLO-I01",  
    name="import-from-lower-abstraction-layer",  
    msg="Abstraction layer '{{ from_layer }}' is not allowed to import from lower  
layer '{{ to_layer }}'",  
    severity=RuleSeverity.ERROR,  
),
```

```
class FileImportChecker(VisitorChecker):
    reports = ("import-from-lower-abstraction-layer",)

    abstraction_layer_finder = AbstractionLayerFinder()
    file_abstraction_layer = None

    def visit_File(self, node: File):
        file_path = Path(self.source)
        self.file_abstraction_layer = self.abstraction_layer_finder.find(file_path)

    def visit_VariablesImport(self, node: VariablesImport):
        self._check_import_path(node)

    def visit_ResourceImport(self, node: ResourceImport):
        self._check_import_path(node)

    def _check_import_path(self, self, node: ResourceImport | VariablesImport):
        ...
```

```
class FileImportChecker(VisitorChecker):
    ...

    def _check_import_path(self, node: ResourceImport | VariablesImport):
        if self.file_abstraction_layer.level is None:
            # This file is not part of the abstraction setup. Let's bail.
            return

        import_str = str(node.get_token("NAME"))
        import_path = Path(self.source).parent.joinpath(import_str).resolve()
        import_abstraction_layer = self.abstraction_layer_finder.find(import_path)

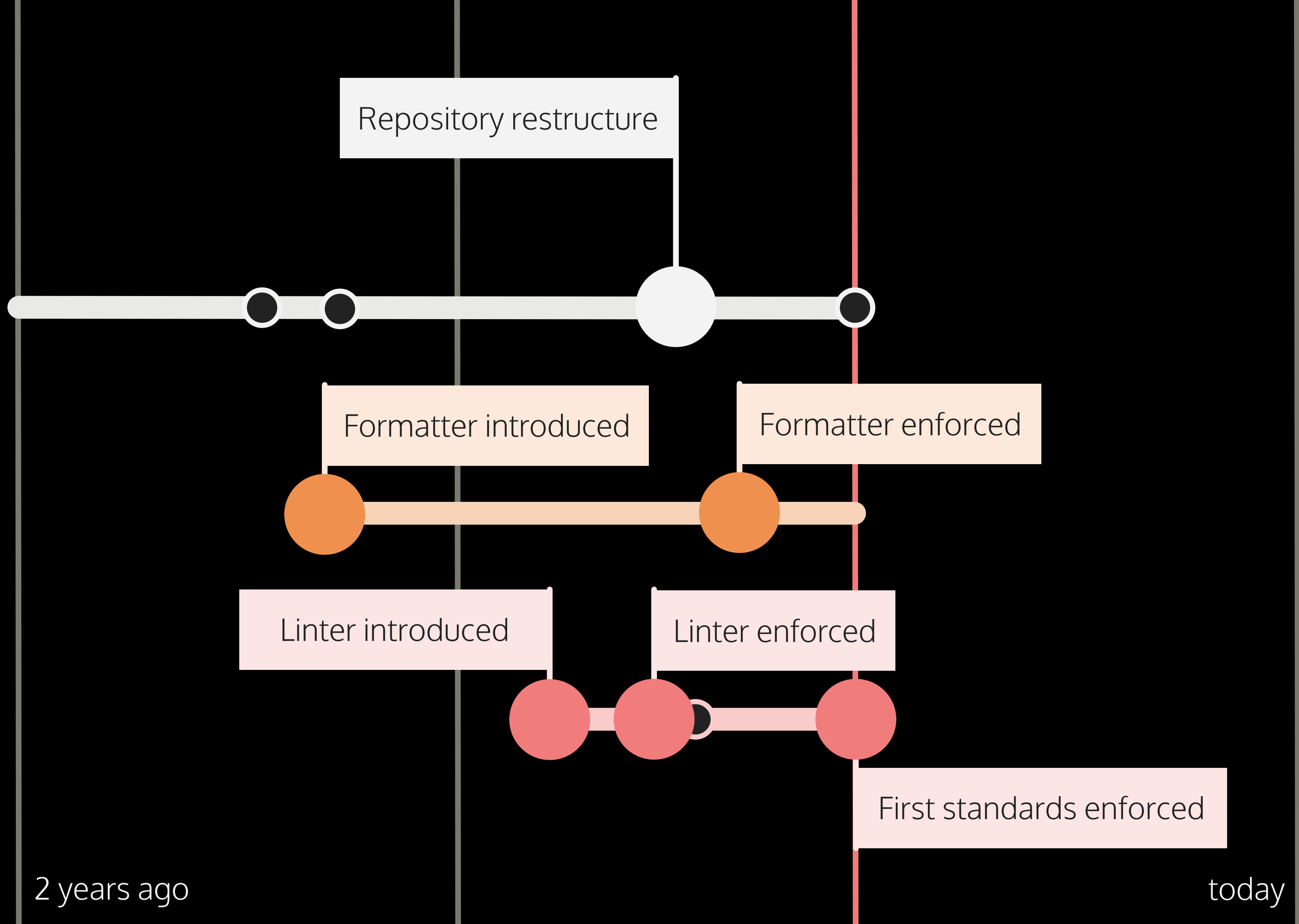
        if self.file_abstraction_layer.level < import_abstraction_layer.level:
            self.report(
                "import-from-lower-abstraction-layer",
                node=node,
                lineno=node.lineno,
                end_lineno=node.lineno,
                end_col=node.end_col_offset,
                from_layer=self.file_abstraction_layer.name,
                to_layer=import_abstraction_layer.name,
            )
```

Abstraction layer '1_generic' is not allowed to import from lower layer '2_domain' robocop([NLO-I01](#))

[View Problem \(Alt+F8\)](#) No quick fixes available

Resource [../.. /2_domain/lottery/keywords/api_player_lottery.resource](#)

NLO-I01	import-from-lower-abstraction-layer
NLO-I02	import-from-outside-abstraction-layer-setup
NLO-F01	folder-name-casing
NLO-F02	file-name-casing
NLO-K01	missing-module-code-in-keyword-name
NLO-K02	inconsistent-keyword-module-code
NLO-K03	missing-interface-descriptor-in-keyword-name
NLO-K04	missing-action-verb-in-keyword-name
NLO-K05	undocumented-abbreviation-in-keyword-name
NLO-K06	no-verb-conjunction-in-keyword-name
NLO-L01	locator-variable-outside-locator-file
NLO-L02	locator-file-too-big
NLO-L03	locator-variable-name-prefix
NLO-L04	locator-variable-name-missing-module-code
NLO-L05	locator-variable-name-inconsistent-module-code
NLO-L06	locator-variable-name-missing-parent-locator
NLO-L07	locator-variable-name-camelcase
NLO-L08	locator-variable-type
NLO-L09	locator-variable-with-meaningless-html-tag
NLO-L10	locator-variable-with-text
NLO-L11	locator-comment-on-same-line
NLO-L12	locator-outside-variable
NLO-T01	missing-code-in-test-name
NLO-T02	inconsistent-test-code-prefix
NLO-T03	duplicate-test-code



Repository restructure

Formatter introduced

Formatter enforced

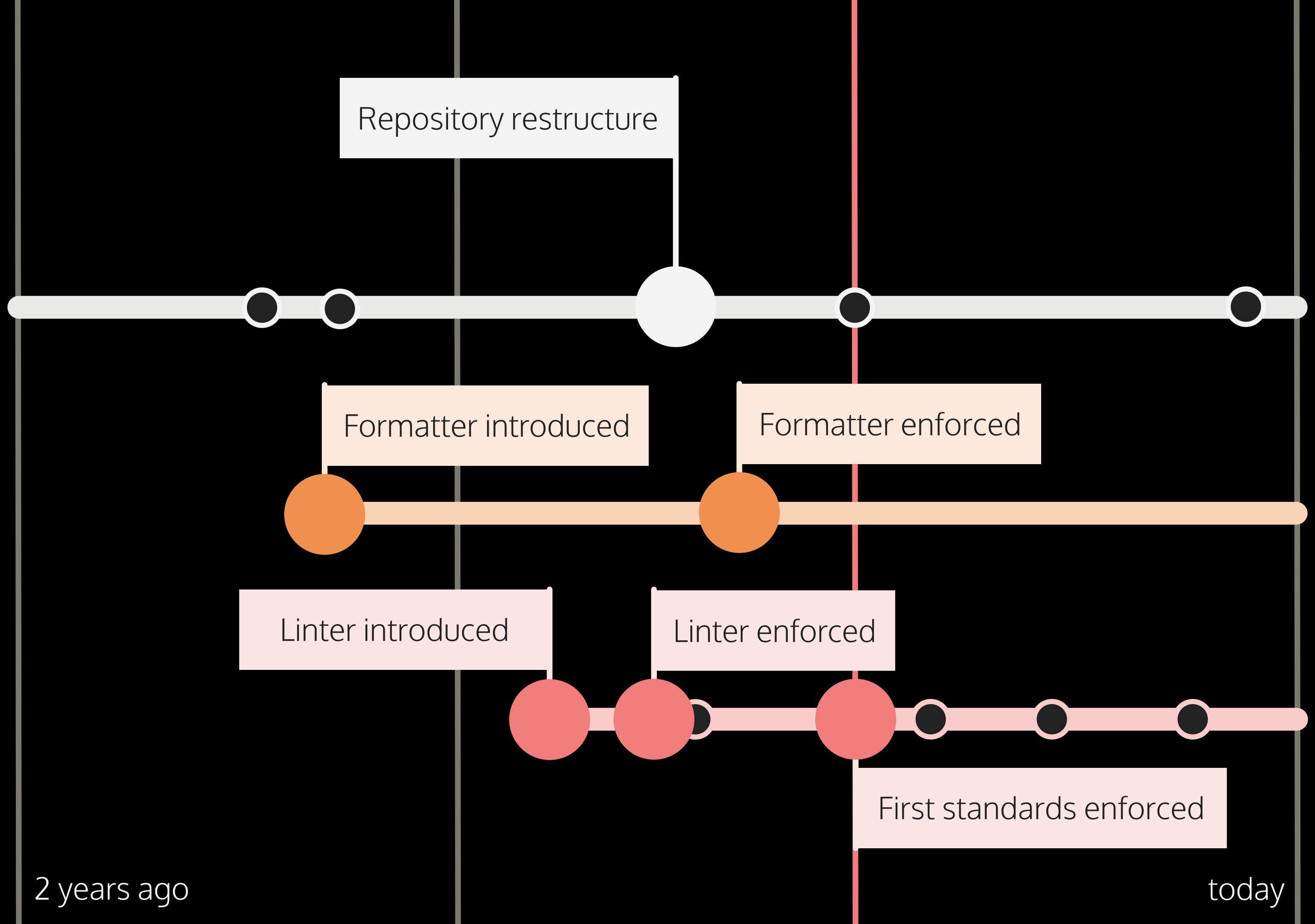
Linter introduced

Linter enforced

First standards enforced

2 years ago

today



Repository restructure

Formatter introduced

Formatter enforced

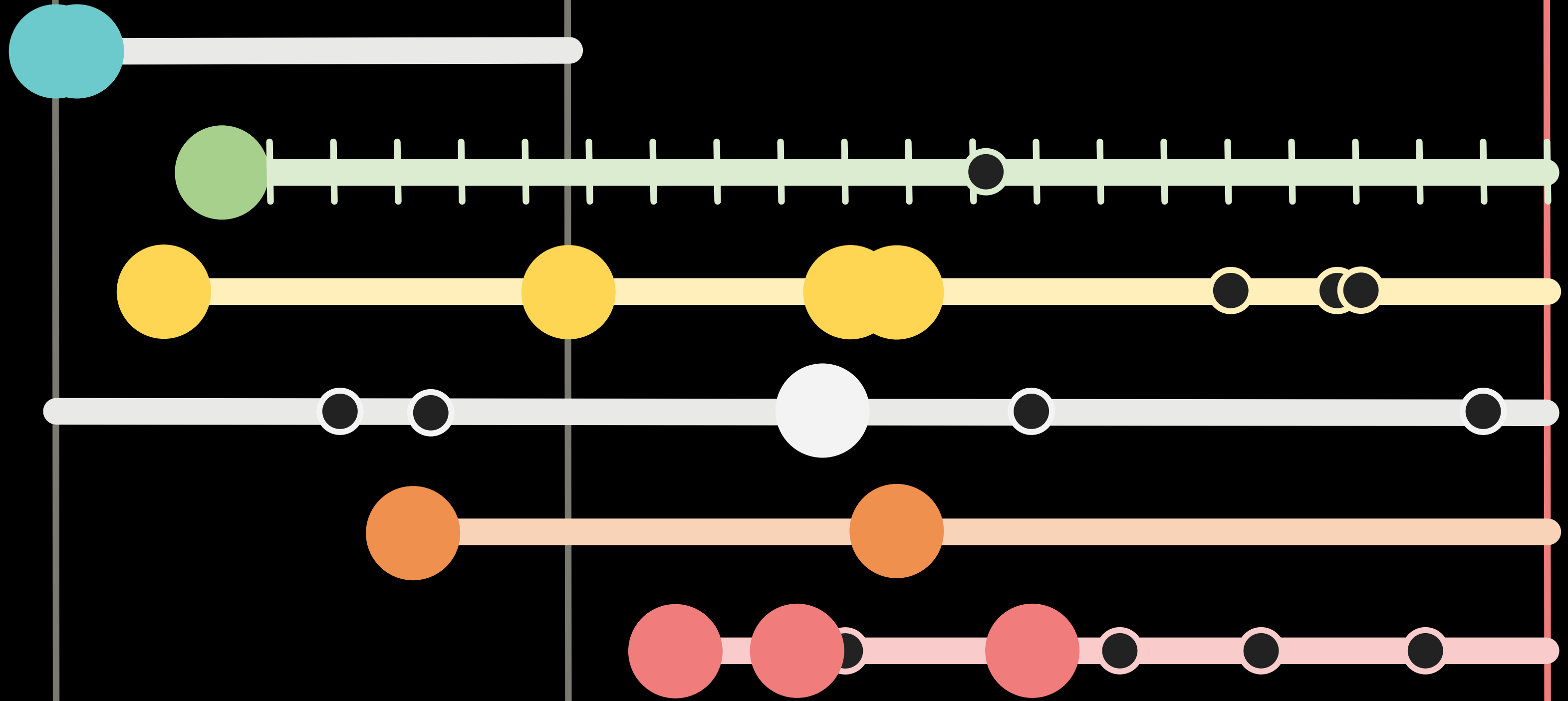
Linter introduced

Linter enforced

First standards enforced

2 years ago

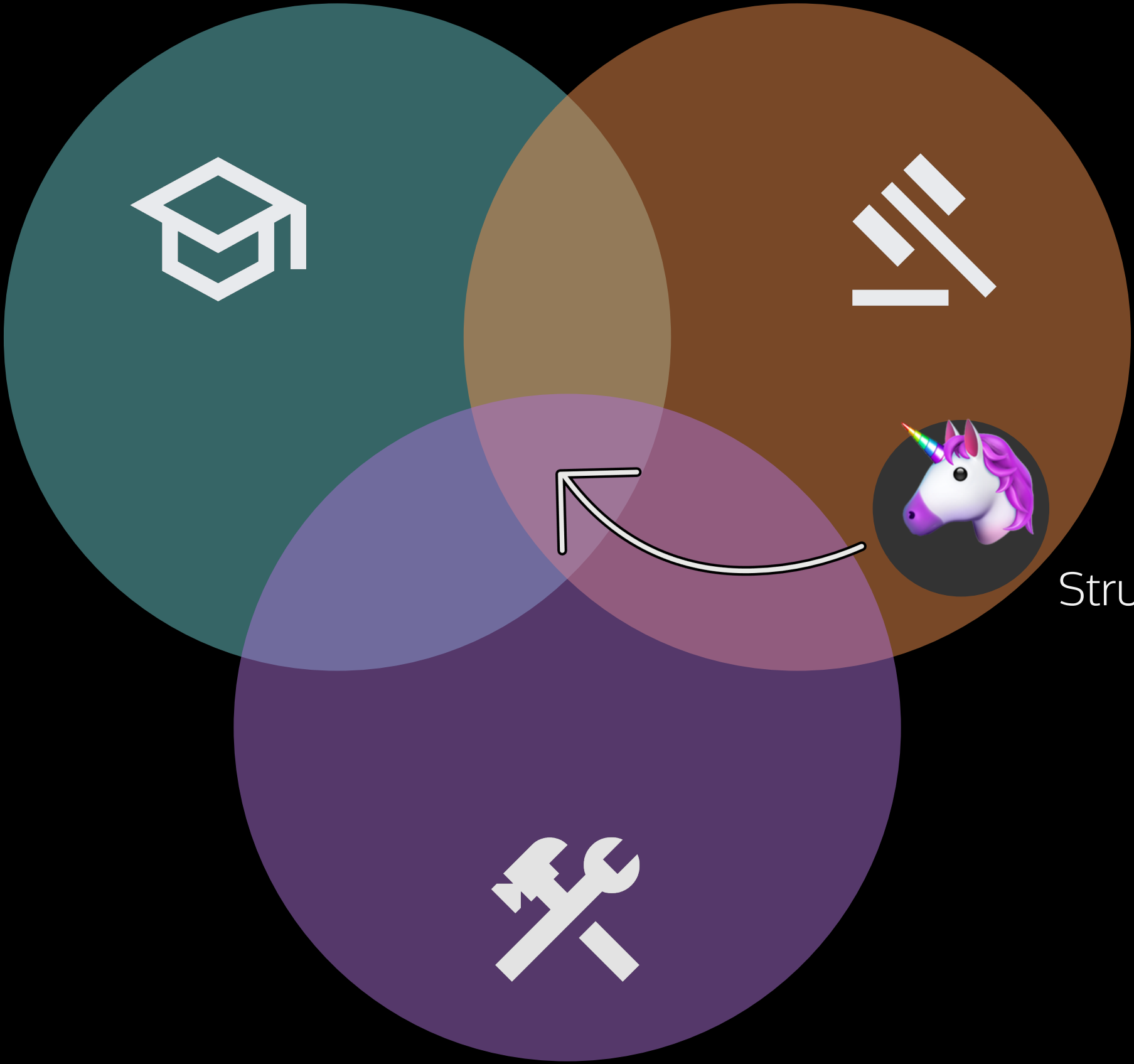
today



2 years ago

today

Anything
is *way* harder at scale



Structural change

Questions?

What about *your* unicorn?



<https://lakitna.nl/talks/2025/expoqa>

- Slides
- List of dependencies & tools
- List of custom lint rules
- List of standards



bartosz

expo:QA

expo IQA 25

MADRID
May 20th,
21st & 22nd
2025

Thank you for attending

expoqqa.eu