Cypress Testing Masterclass

Let the Bots 🤖 Test While You Rest 😴

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17th April 2024

Appsilon

ShinyConf 2024
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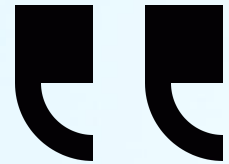
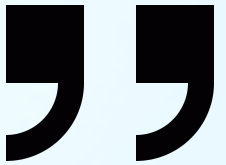
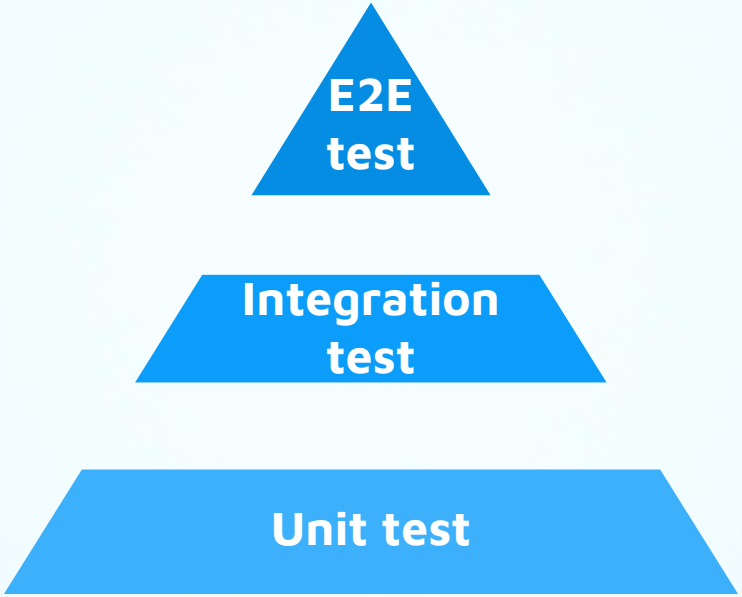


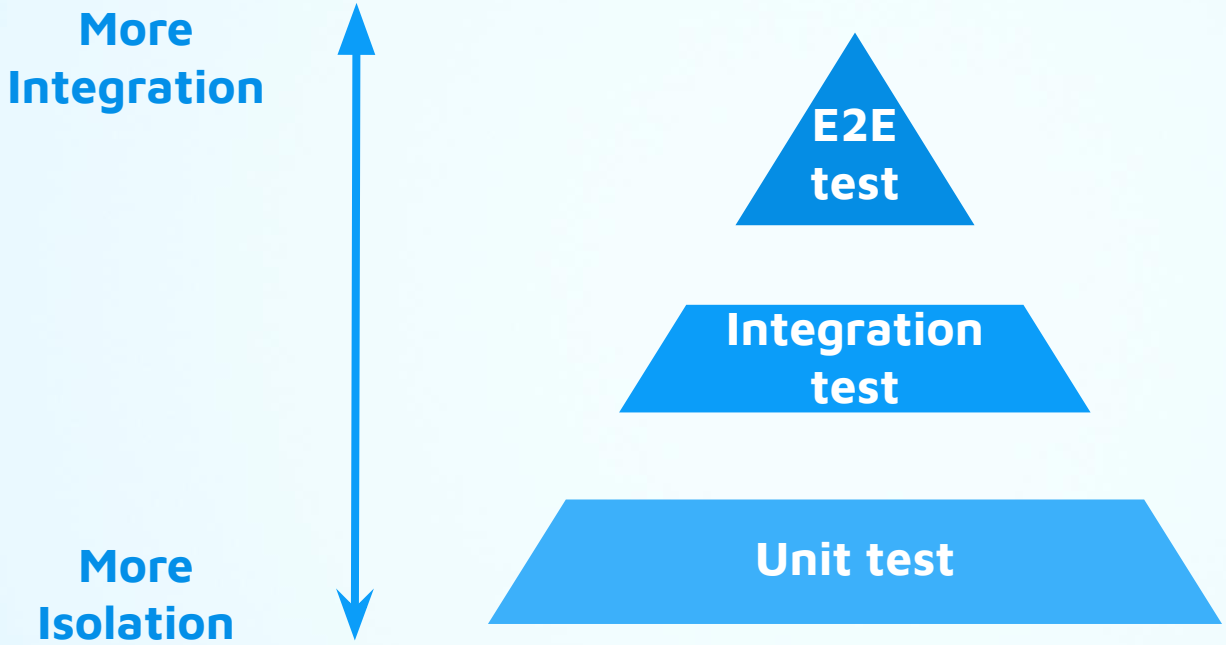
If you do not have automated tests, the users are the test.



Testing Pyramid



Testing Pyramid



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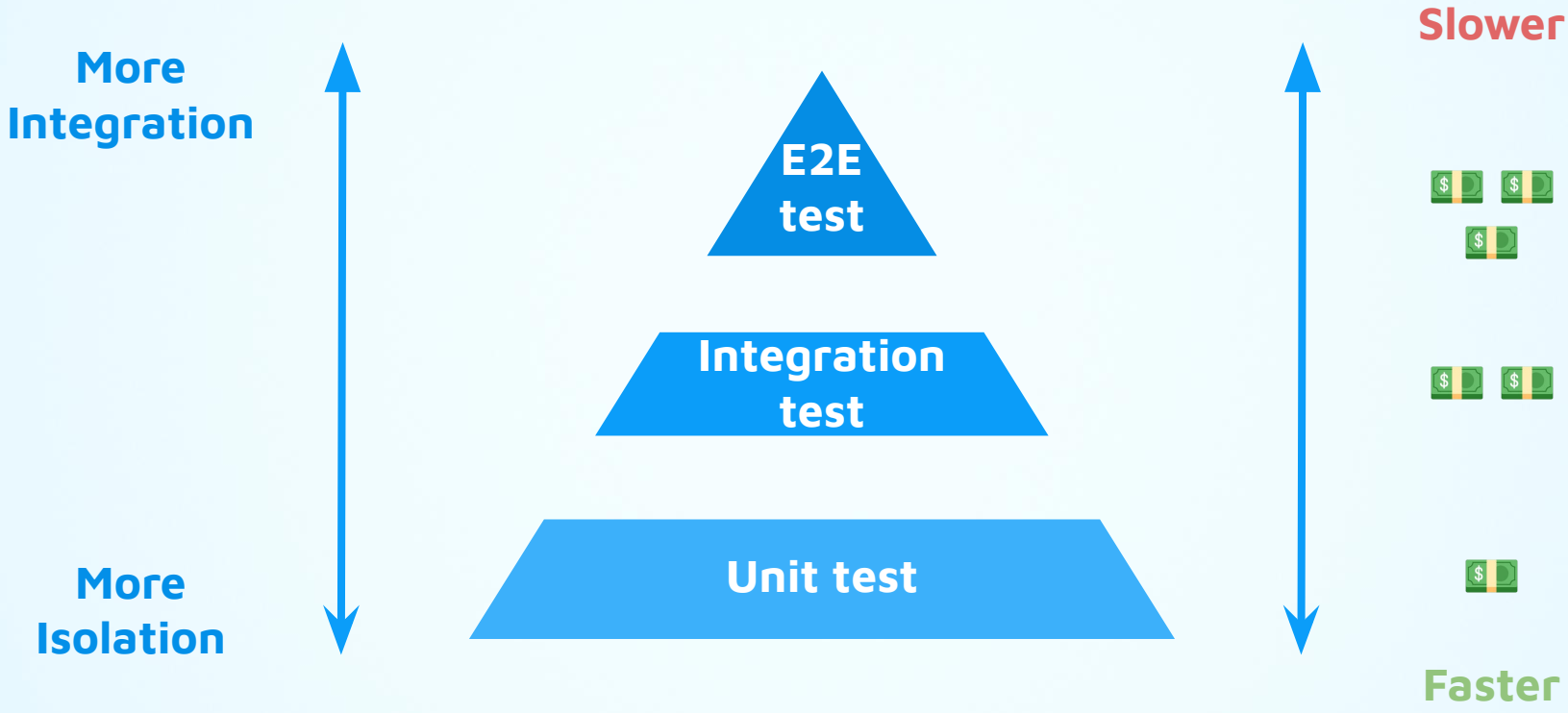
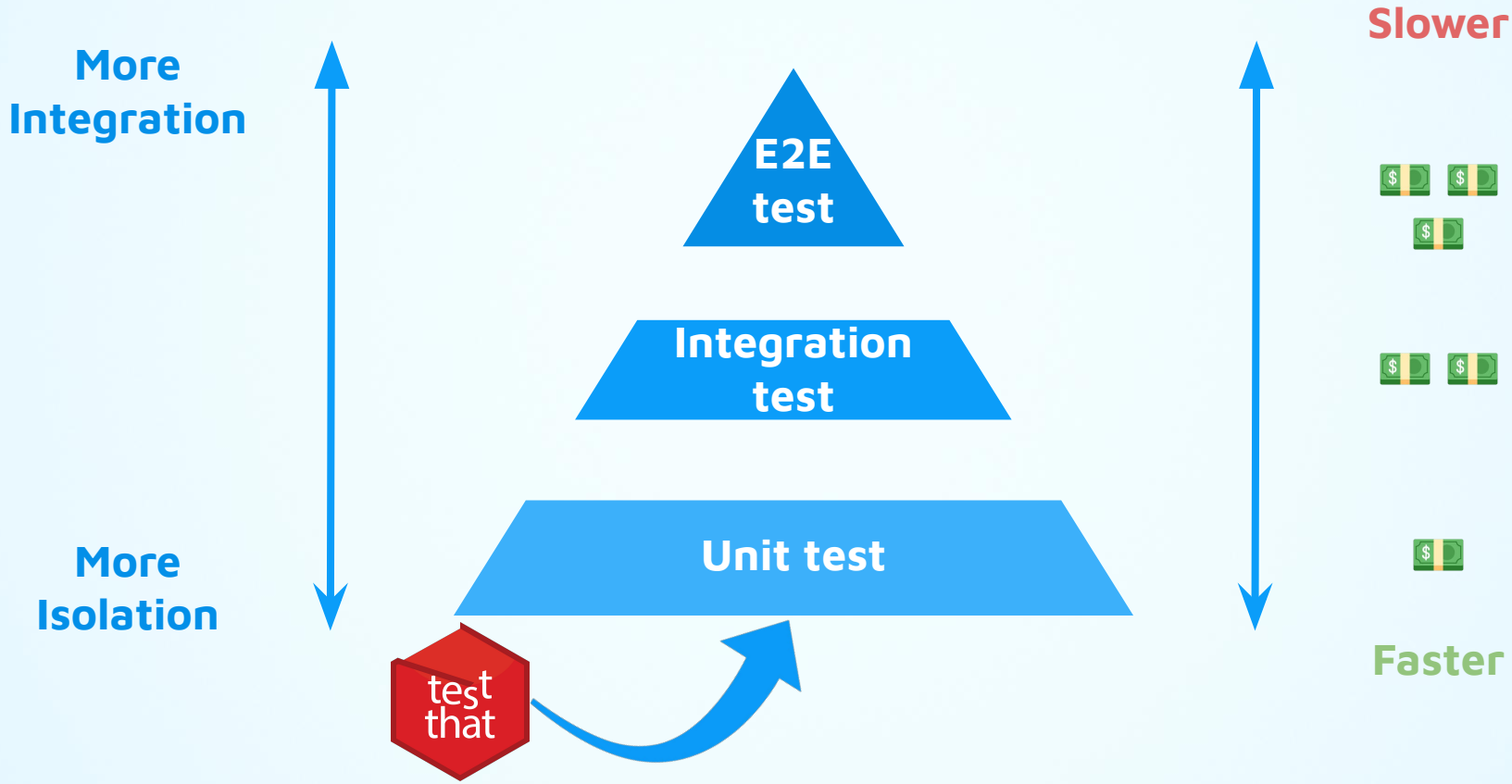


Testing Pyramid



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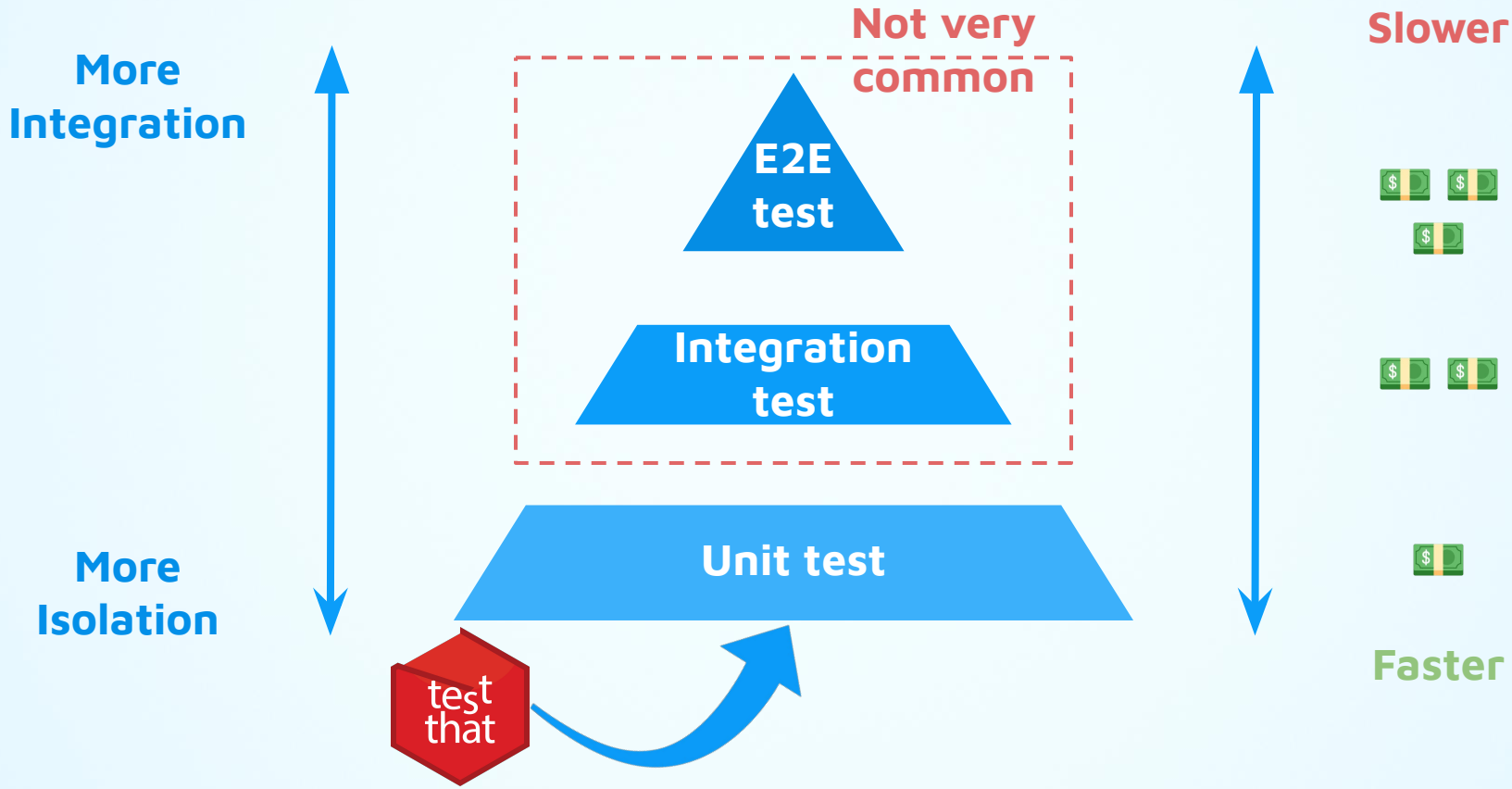

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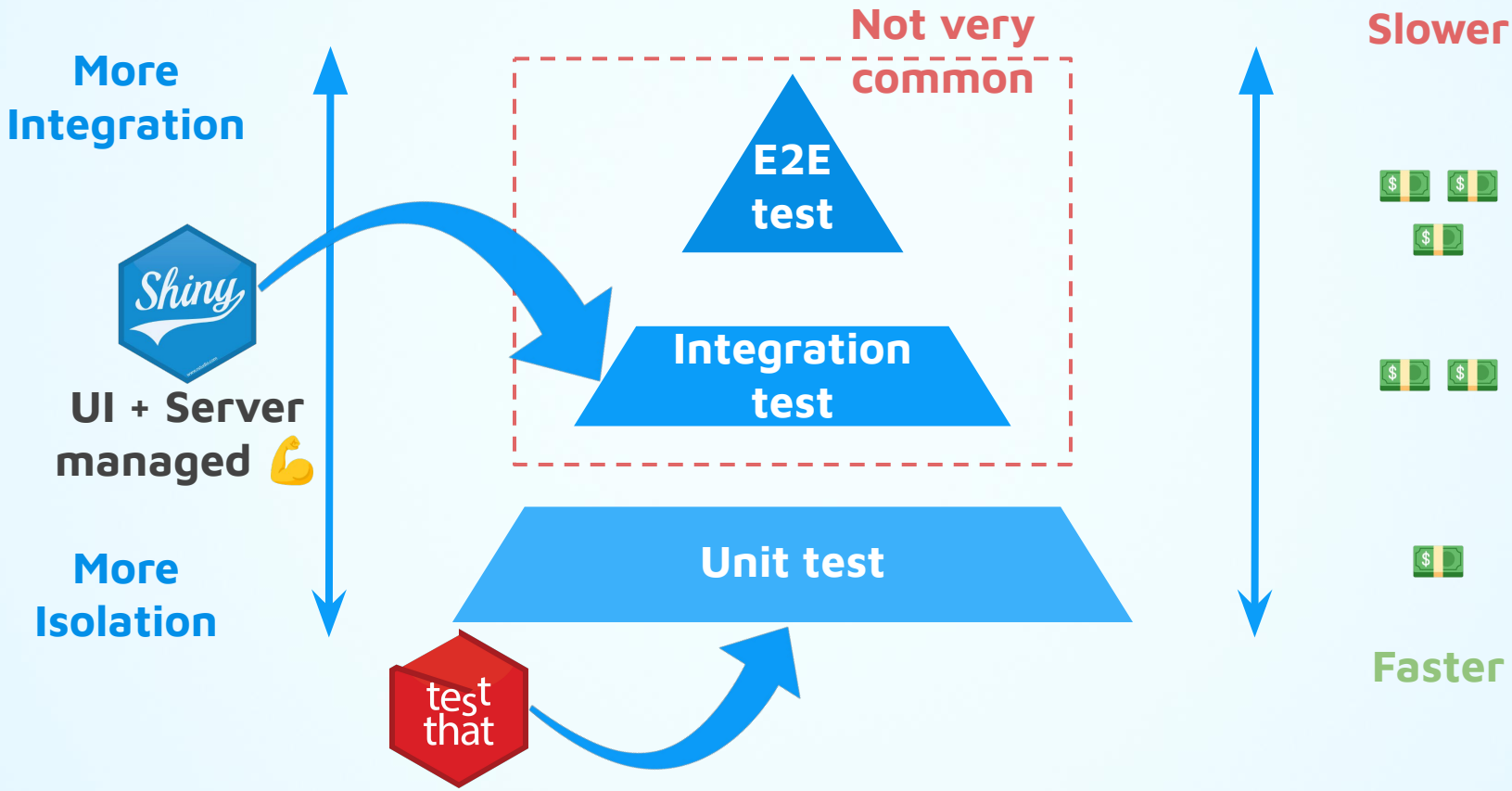

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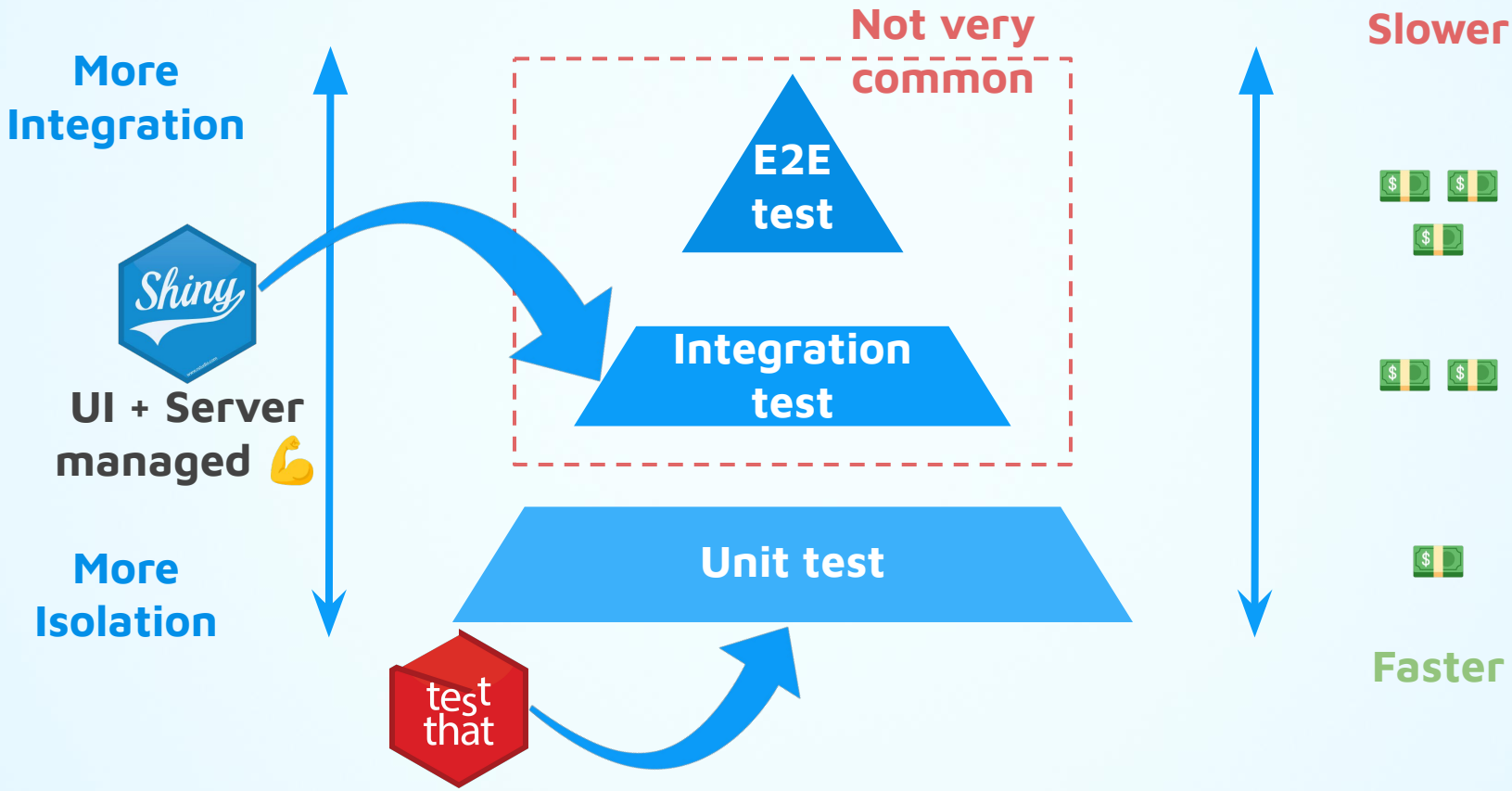

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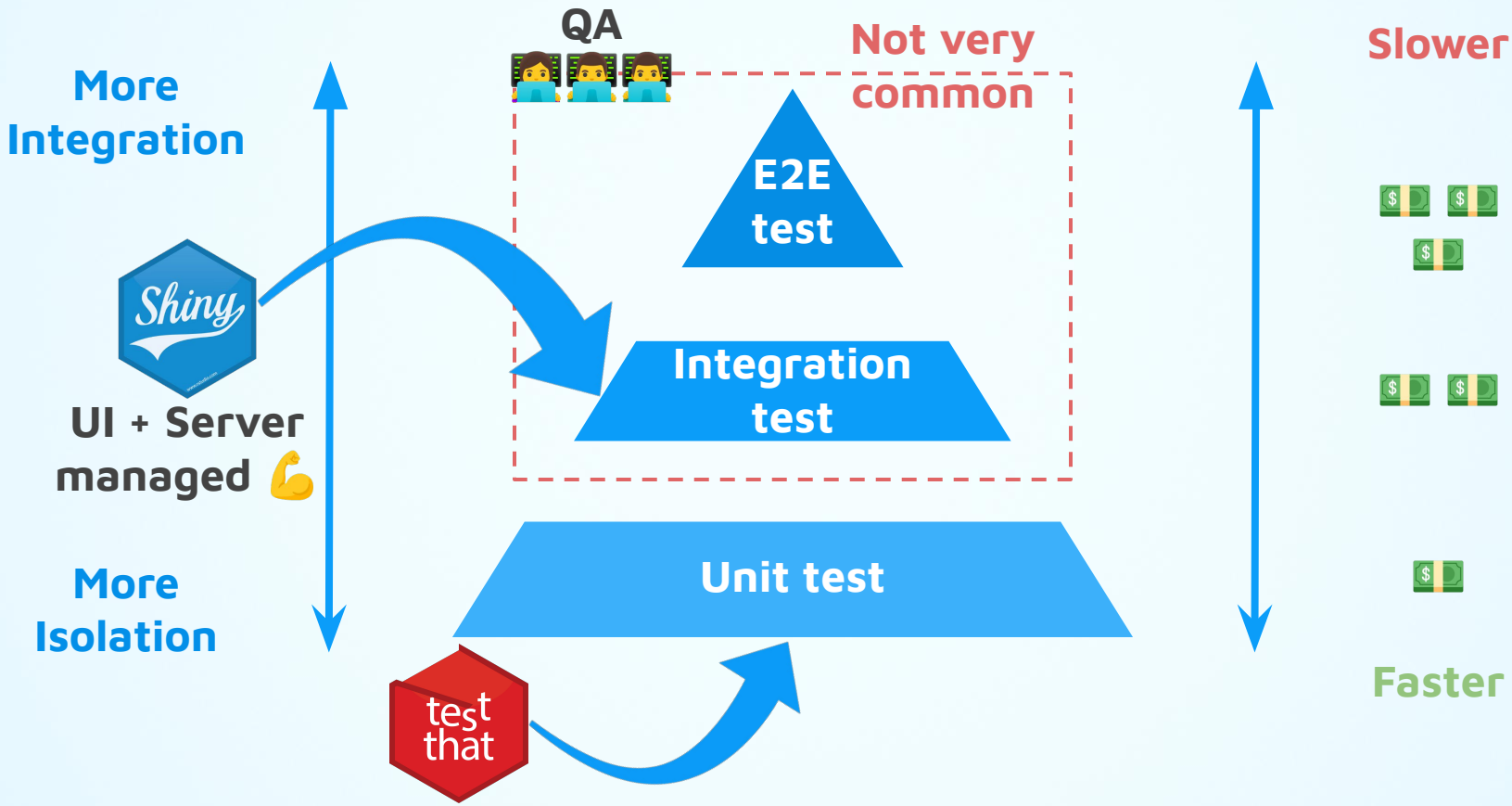
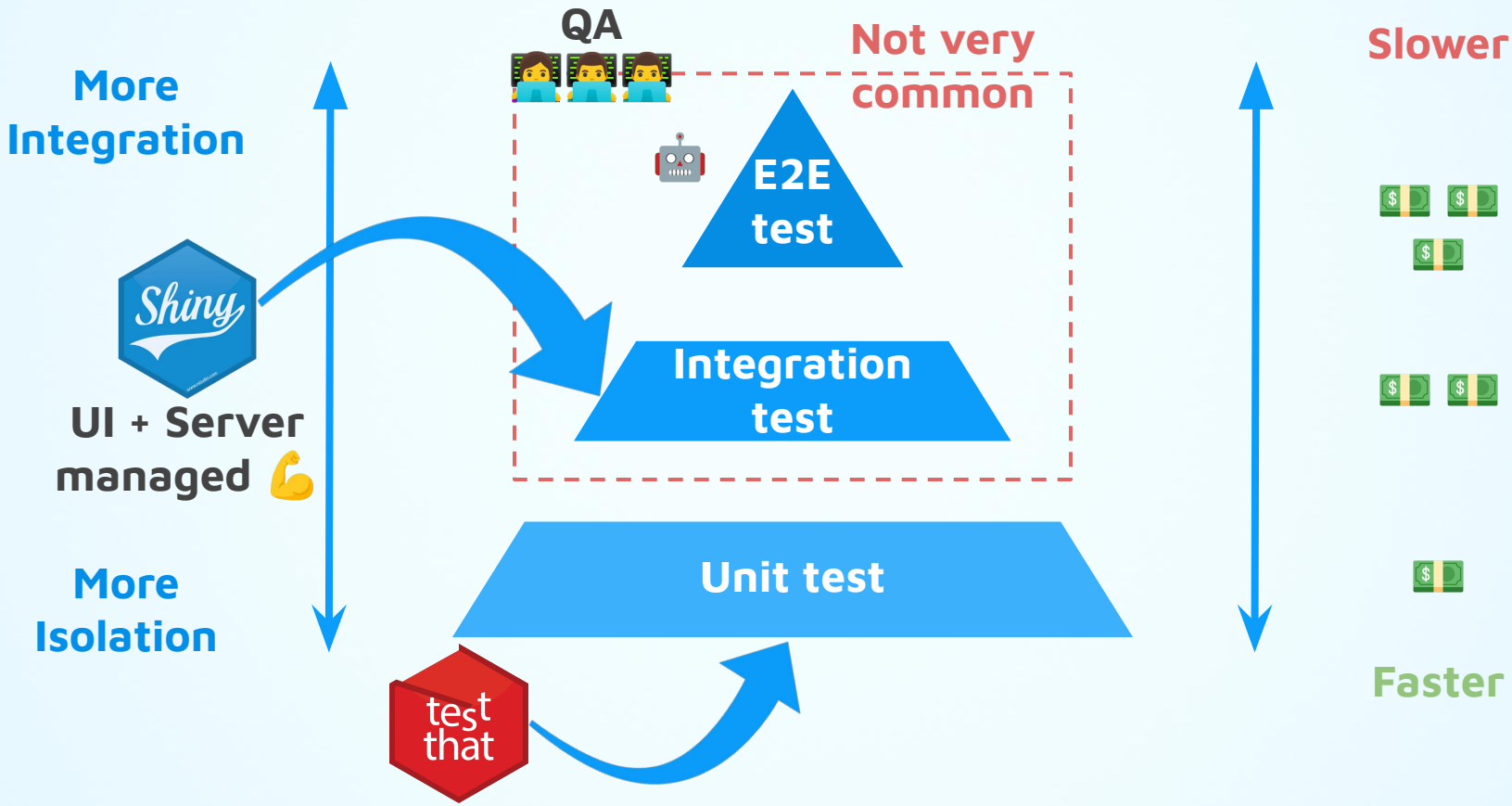
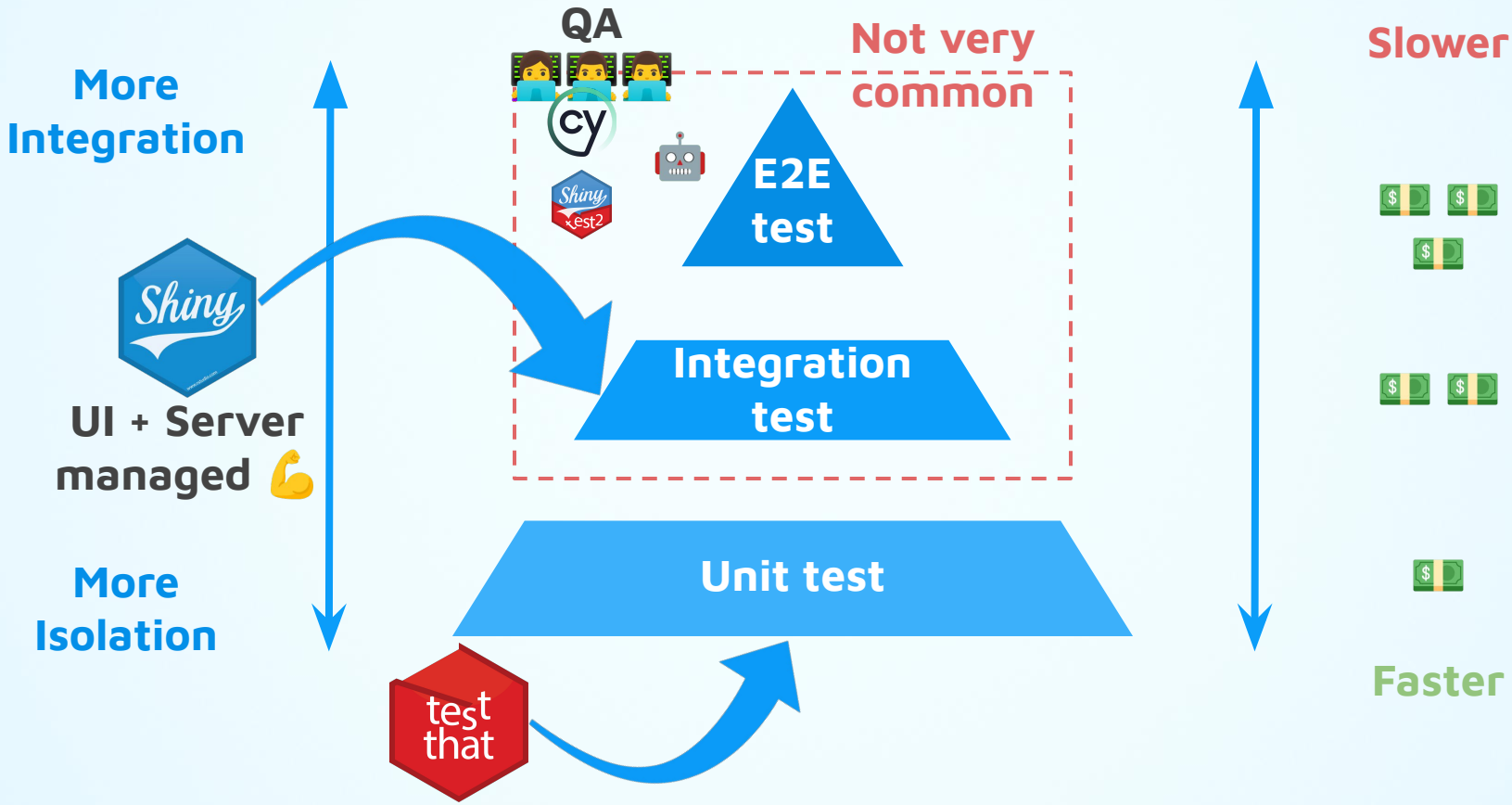


Testing Pyramid



Testing Pyramid



vs

- Works on any web app
- Performs real interaction
- Relatively higher learning curve
- Rich API for app interaction to simulate real usage
- Can test actual deployments

- It taps deep into shiny and testthat
- Bypasses real interaction
- Easy to setup and record tests
- Limited options for finding elements (CSS selectors only)
- Perfect for regression testing

A pinch of JS is enough to use cypress

- Node JS to run JS locally
- Package manager. Here we will use
- Basic JS syntax

Installation and setup

Step 1

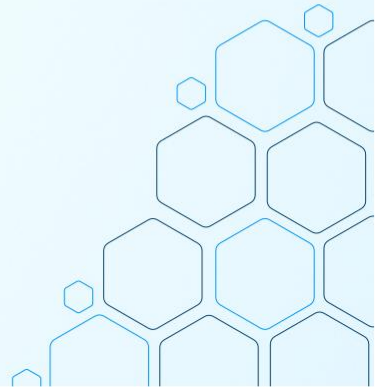
Download and install Node.js for your OS from: https://nodejs.org/en/download

Step 2

Verify that you can access node and npm using the commands:

node -v

npm -v



Installation and setup

Step 3

Create a new npm project using the command in a new working directory:

npm init -y

package.json

Installation and setup

Step 4

Install cypress using the following command:

npm install cypress

node_modules

package.json

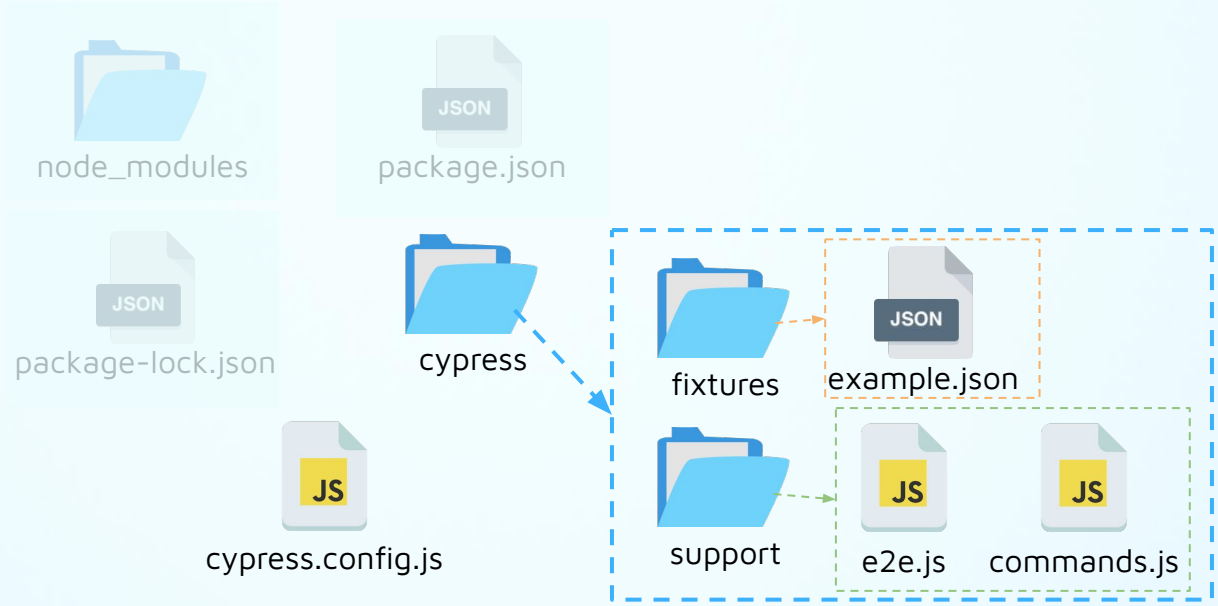
package-lock.json

Installation and setup

Step 5

Open cypress using the following command:

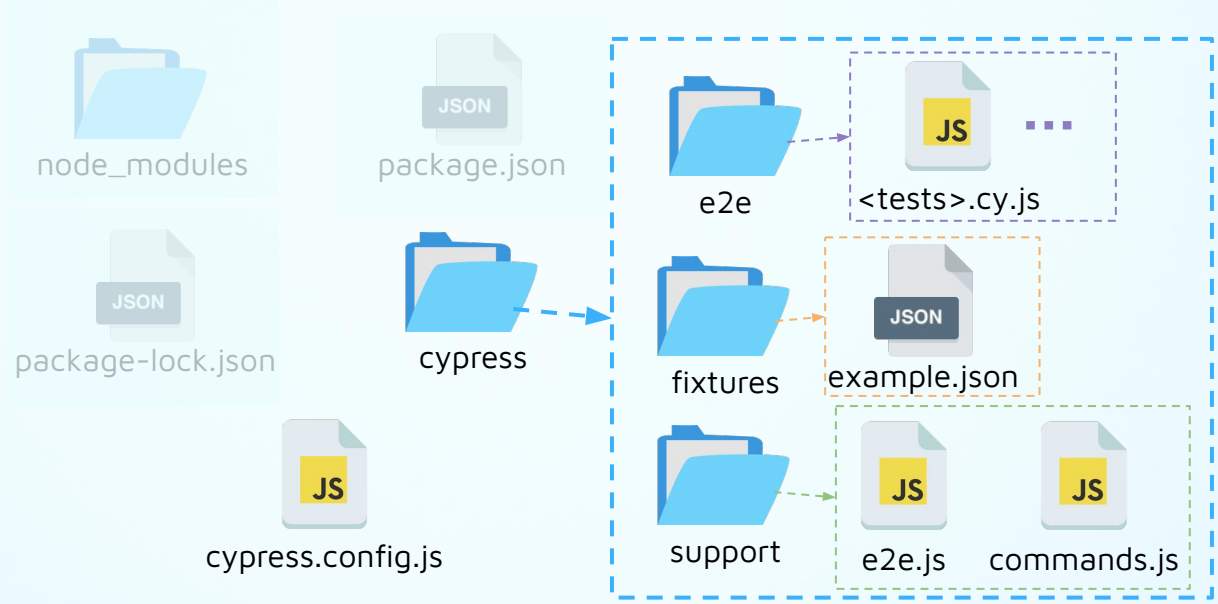
npx cypress open



Installation and setup

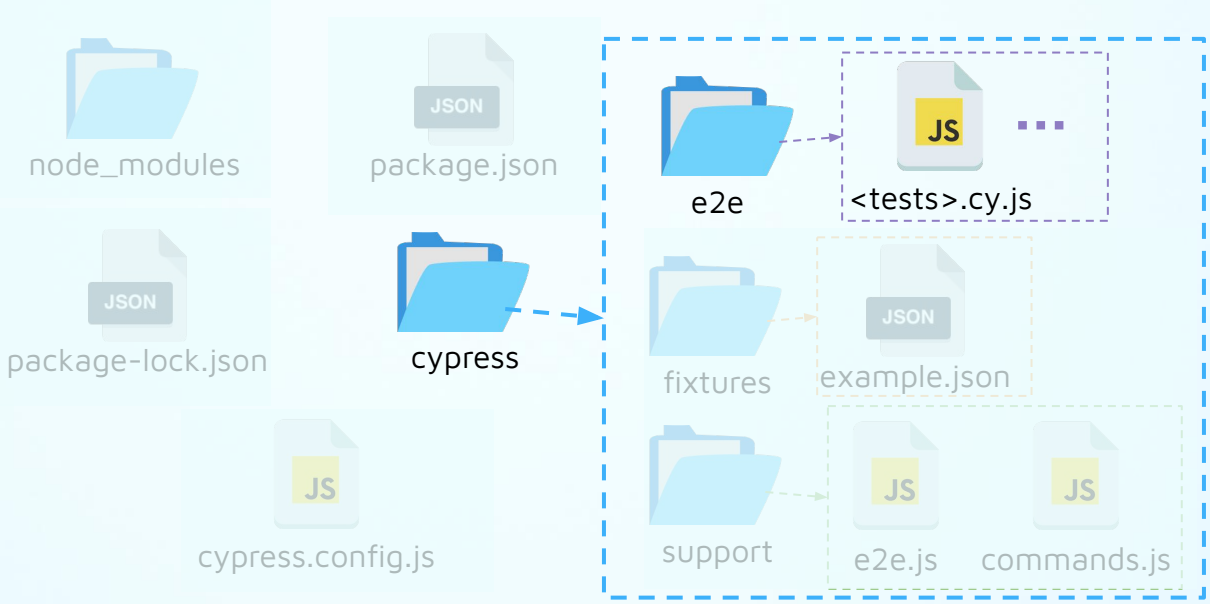
Step 6

Choose e2e and click "Scaffold example specs"



Cypress demo

Let’s see how the use the cypress driver app and look at the sample test specs

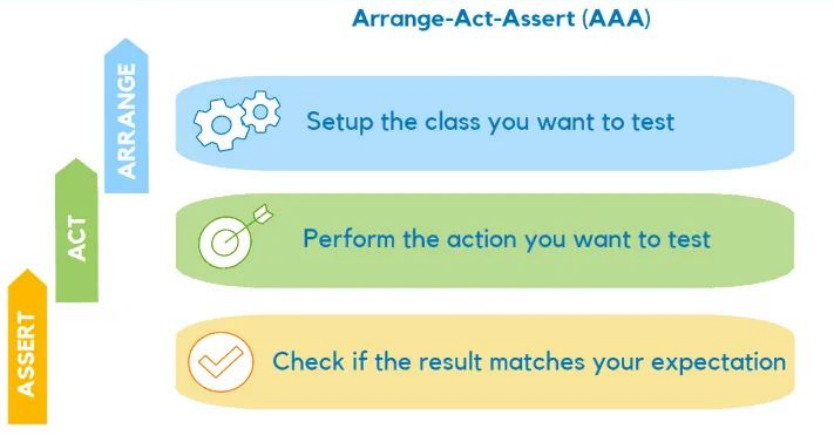


Cypress docs is 💙

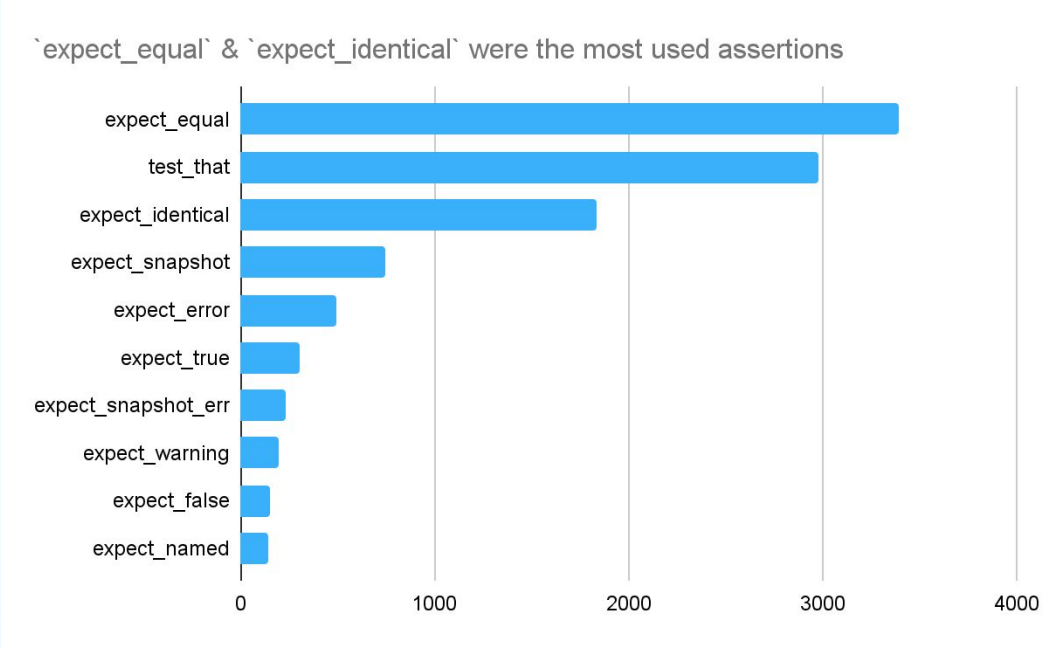
Cypress demo

80-20 cypress methods

- BDD syntax from mocha: describe(), it(), before(), after(), …
- get()
- Actions like click(), dblclick(), type(), check(), …
- should()

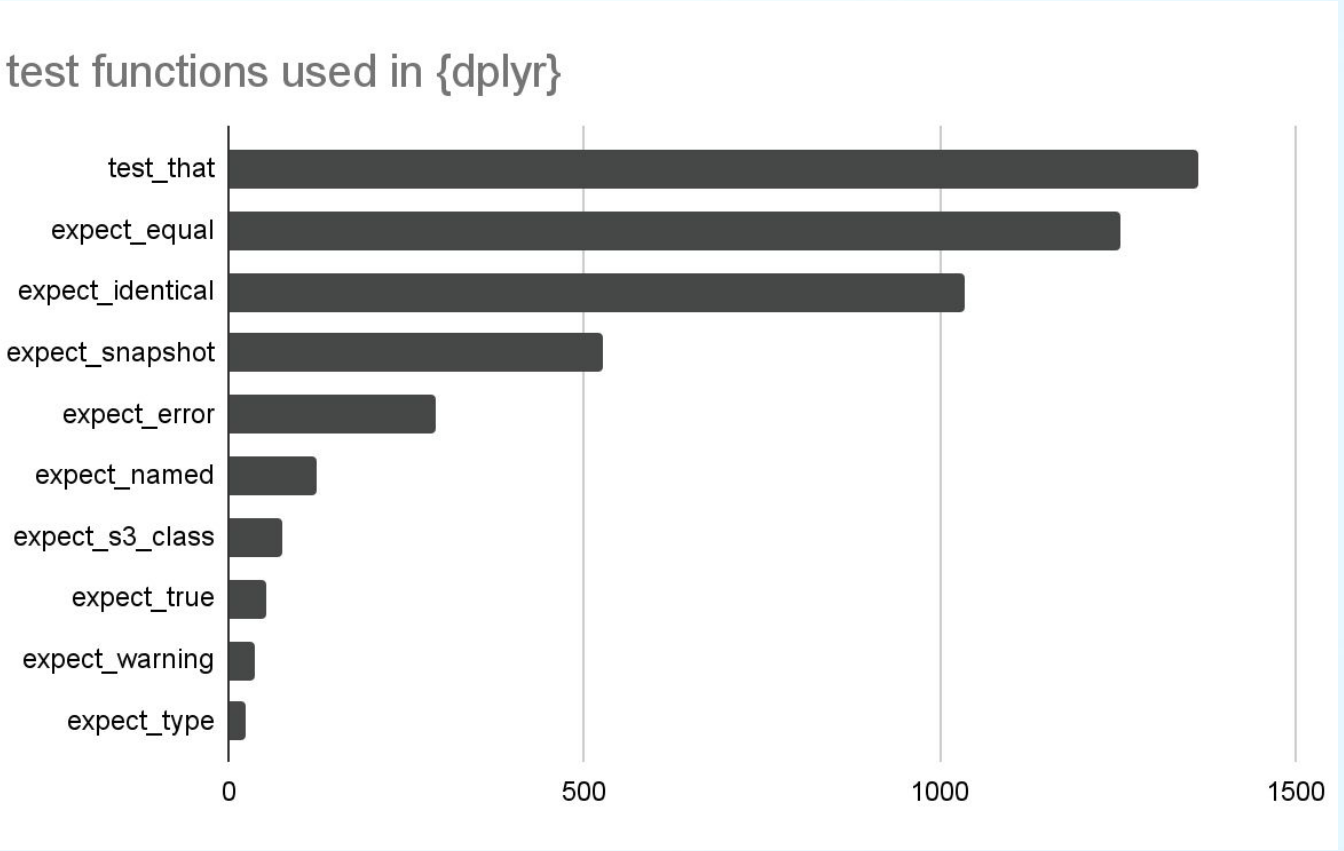


Frequency of testthat functions in these packages*

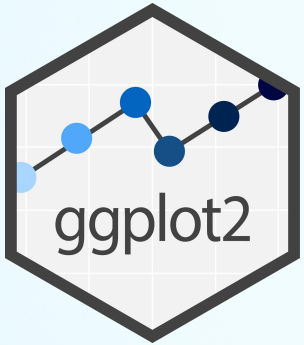


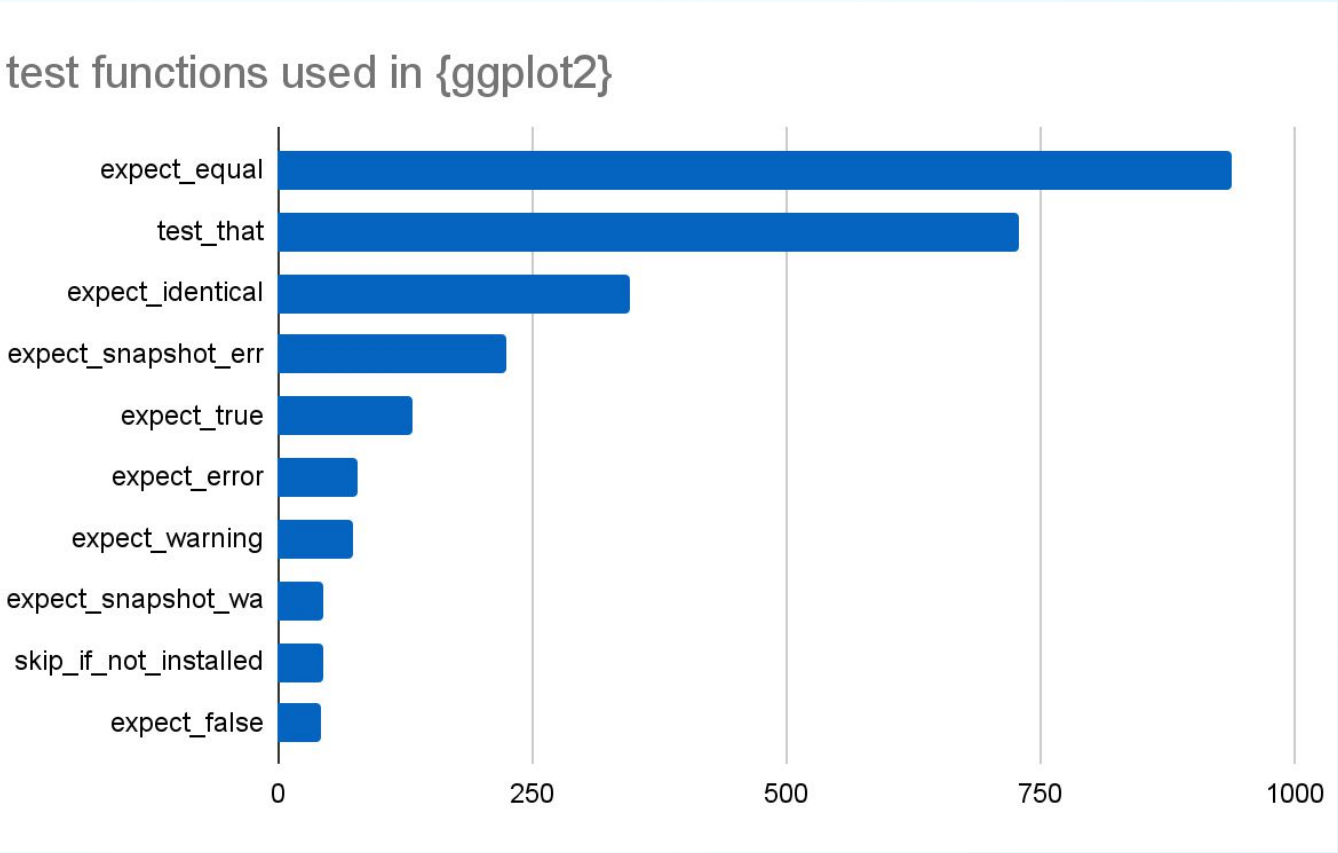
*From the main branch of the repositories as of 17th April 2024

Frequency of testthat functions

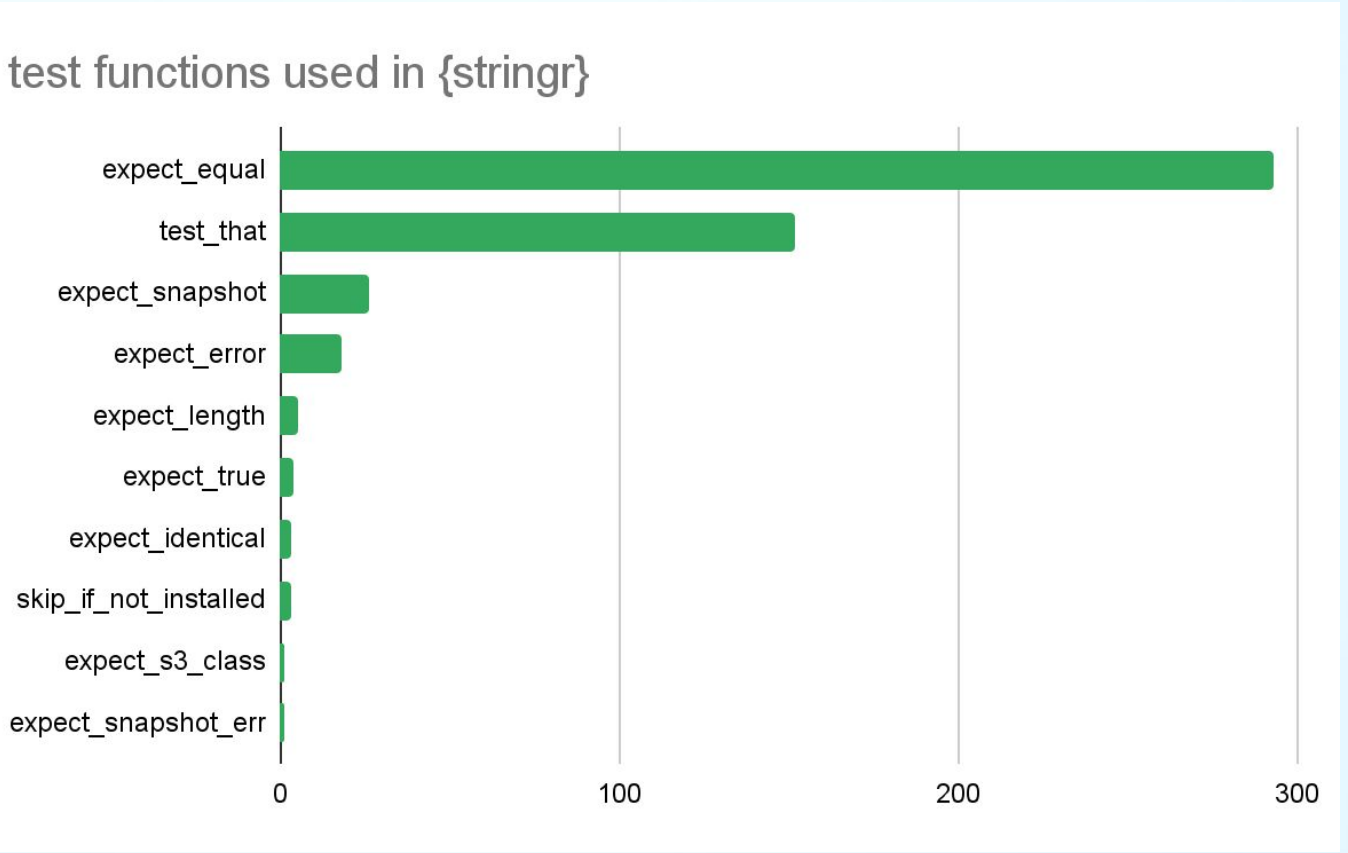


Frequency of testthat functions





Frequency of testthat functions



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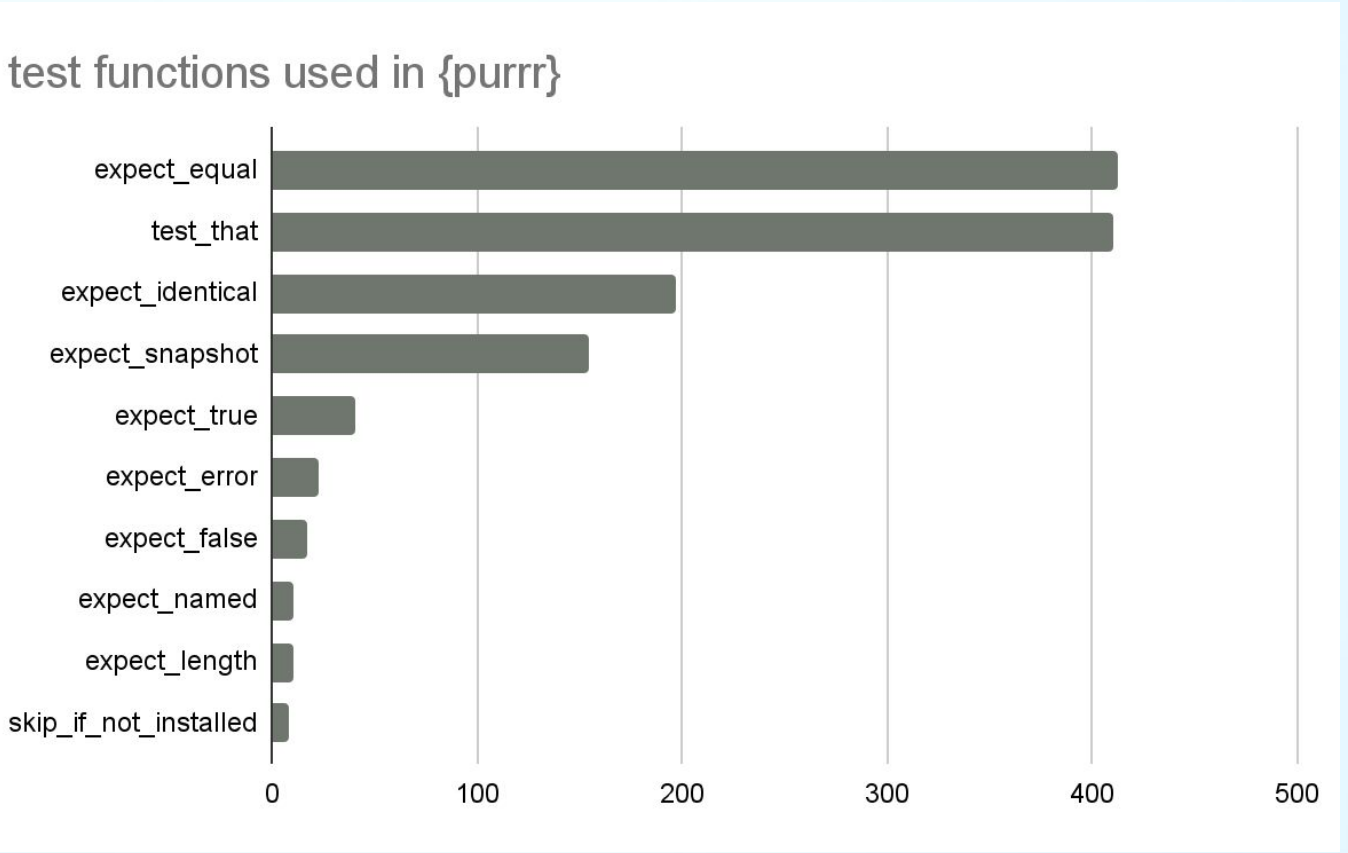
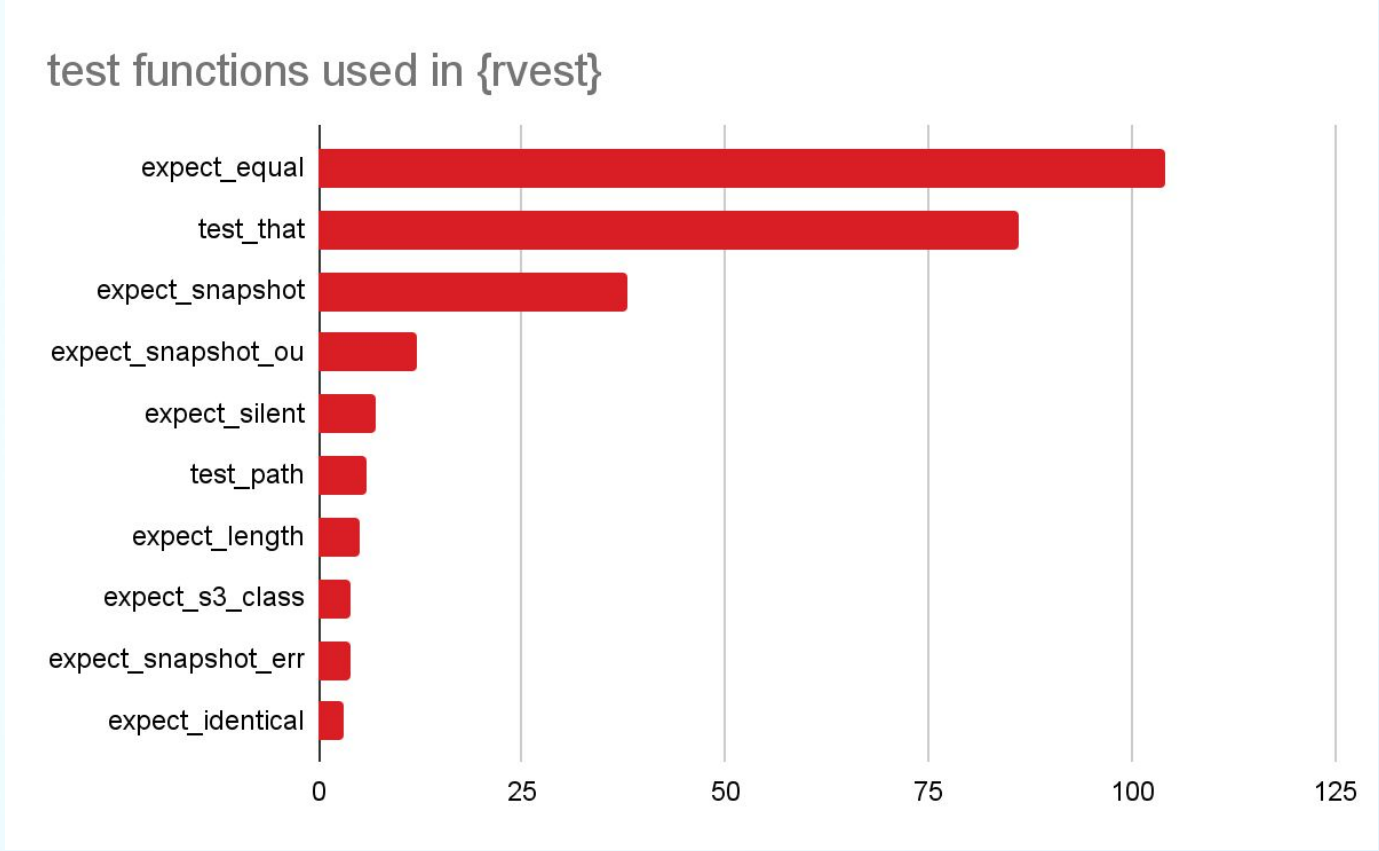


Frequency of testthat functions



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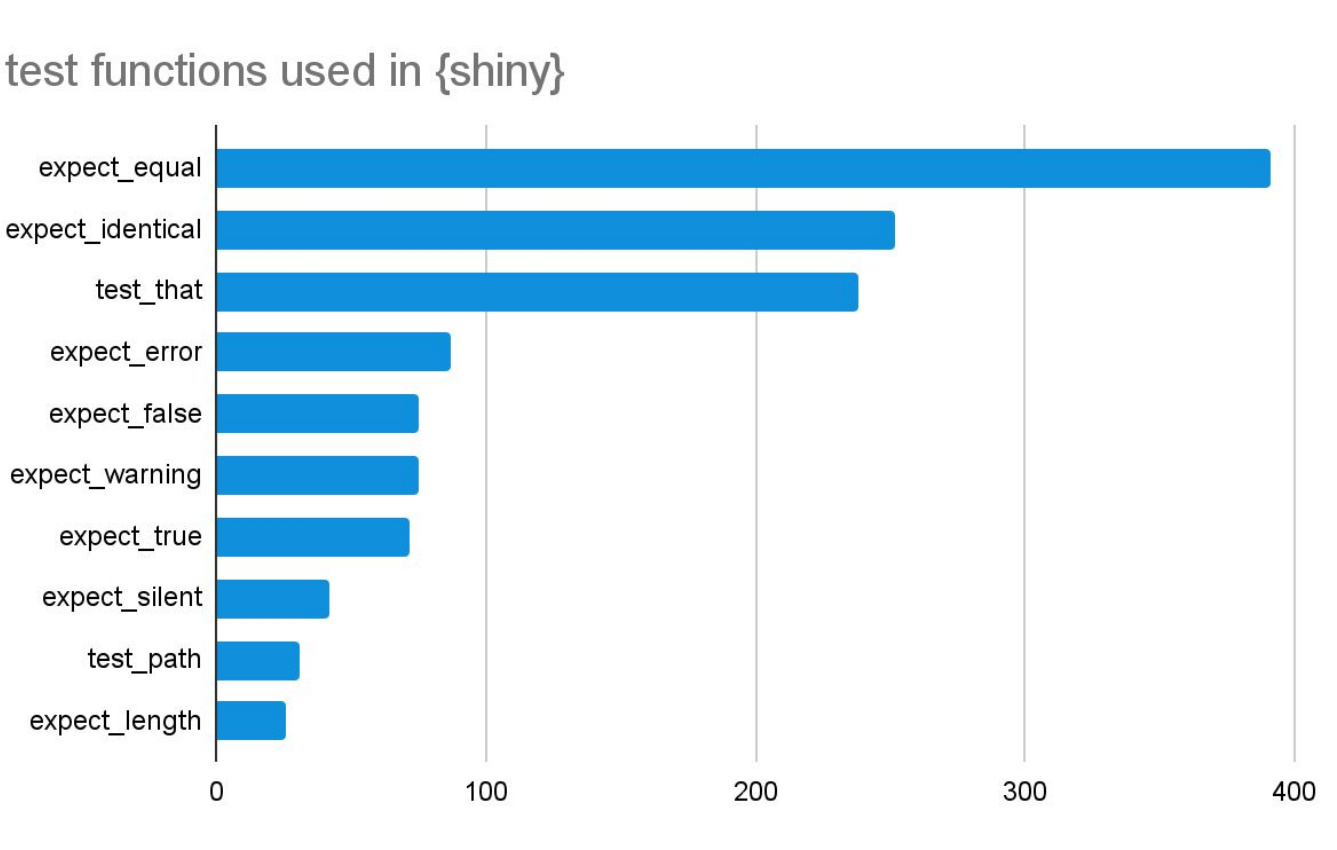


Cypress demo

To run the test specs use the command:
npx cypress run

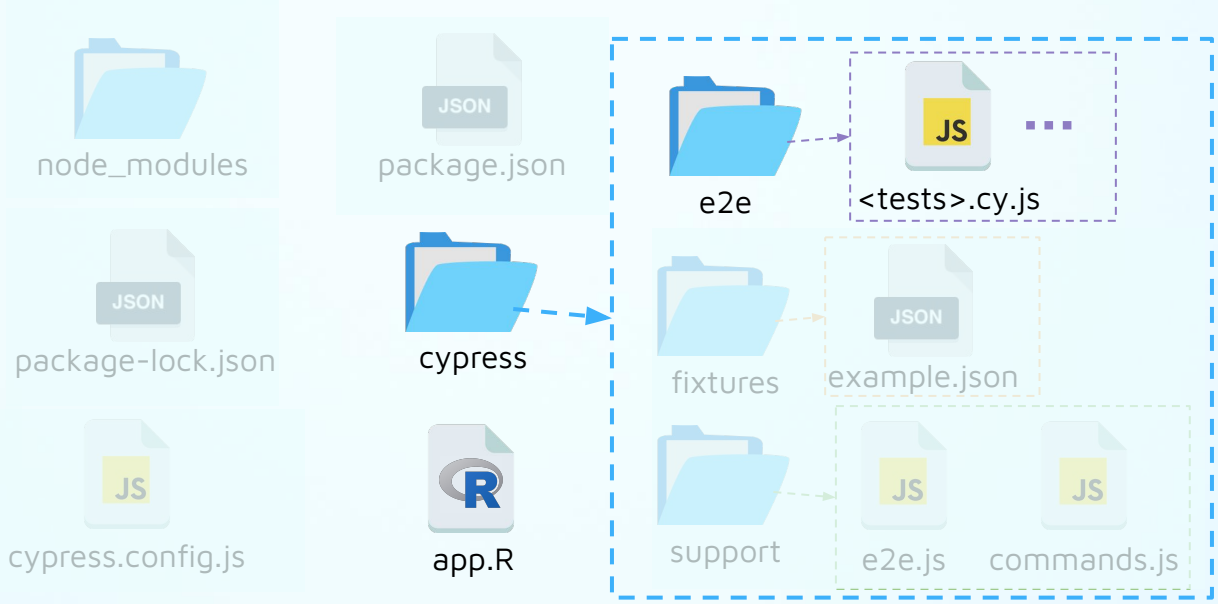
These common commands can be stored as scripts in **package.json**

```
"scripts": {
 "test": "cypress run",
 "open": "cypress open"
}
```

Now the previous command can be executed by running:
npm run test

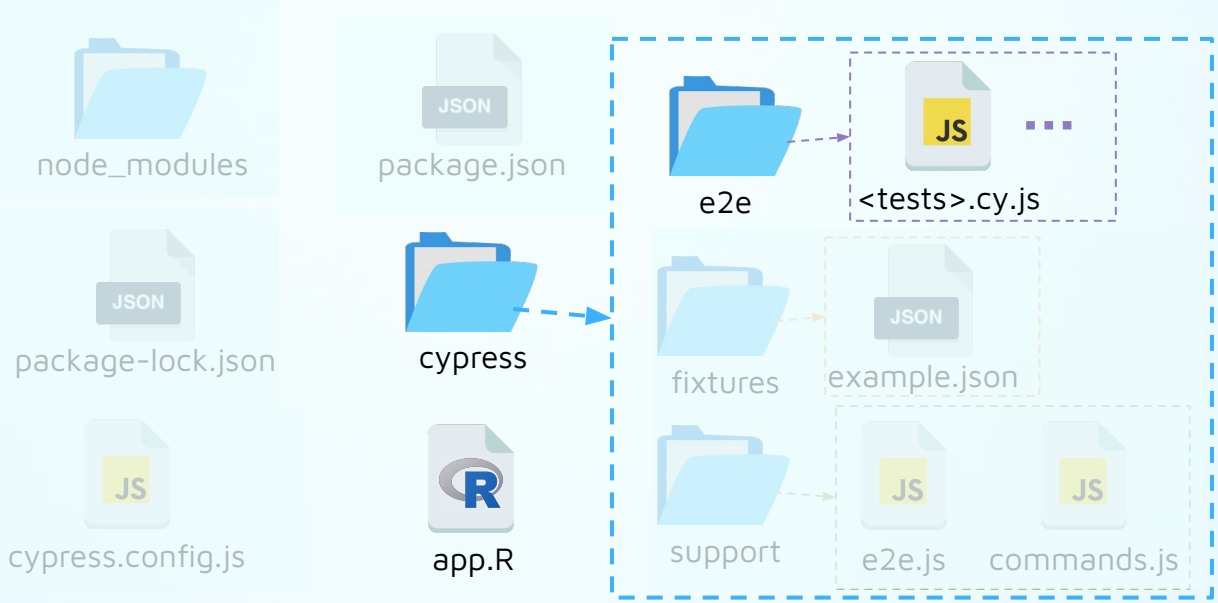
Cypress + Shiny demo

Run the shiny app separately and test using the local app url:
shiny::runApp(); **npx cypress open**



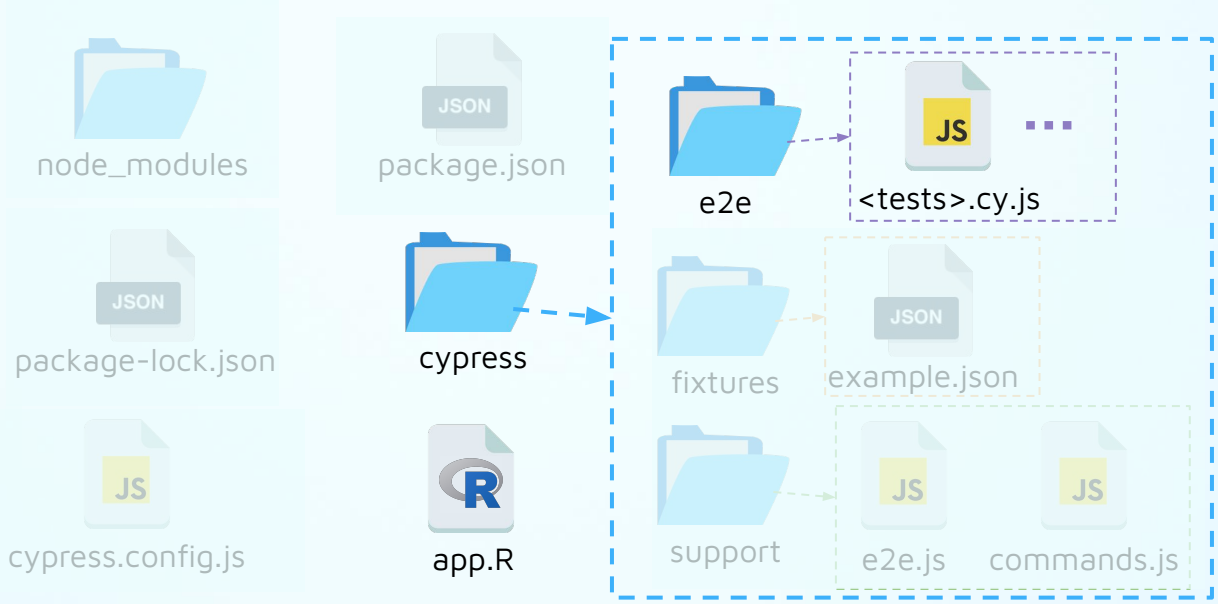
Cypress + Shiny demo

Shiny can be performing some reactive calculations under the hood.
And, cypress might think that the app is ready!
Use timeout.



Cypress + Shiny demo

Shiny errors or Validation errors can be caught by looking for certain css class in the body of the app



Cypress + Shiny demo

To run the run the app and test at the same time we can use a package called `start-server-and-test`. Which can be installed using:
npm install start-server-and-test

These common commands can be stored as scripts in **package.json**

```
"scripts": {
 "run-app": "Rscript -e \"shiny::runApp(port = 5555)\"",
 "run-cypress": "cypress run --project .",
 "open-cypress": "cypress open --project .",
 "test-e2e": "start-server-and-test run-app http://localhost:5555 run-cypress",
 "test-e2e-interactive": "start-server-and-test run-app http://localhost:5555 open-cypress"
}
```

Setting up CI for Cypress tests

https://github.com/cypress-io/github-action

```yaml
name: End-to-end tests
on: push
jobs:
 cypress-run:
   runs-on: ubuntu-22.04
   steps:
     - name: Checkout
       uses: actions/checkout@v4
     - name: Setup Node
       uses: actions/setup-node@v4
       with:
         node-version: 20
     - name: Cypress run
       uses: cypress-io/github-action@v6
```

Setting up CI for Shiny-Cypress tests

```
...
- name: Setup R
  uses: r-lib/actions/setup-r@v2
  with:
    r-version: 4.1.2
- name: Setup system dependencies
  run: >
    sudo apt-get update && sudo apt-get install --yes
    libcurl4-openssl-dev
- name: Install R packages
  run: Rscript -e 'install.packages("shiny")'
...
```

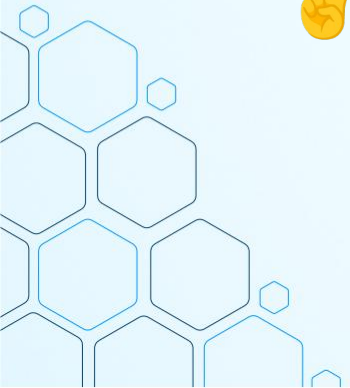
```
...
- name: Cypress run
  uses: cypress-io/github-action@v6
  with:
    build: npm install cypress --save-dev
    start: npm run run-app
    wait-on: "http://localhost:5555"
    wait-on-timeout: 500
```

Alternatively, you can use rhino 😉

Thank you

☝ Check the Cypress Scaffold example specs

✌ Create a simple shiny app with cypress



You can find the materials from this workshop at
https://github.com/Appsilon/cypress-masterclass