

# Visual Testing



Summer Tang



# Summer

Front-End Developer@Trend Micro

Summer。桑莫。夏天 [cythilya.tw](https://cythilya.tw)

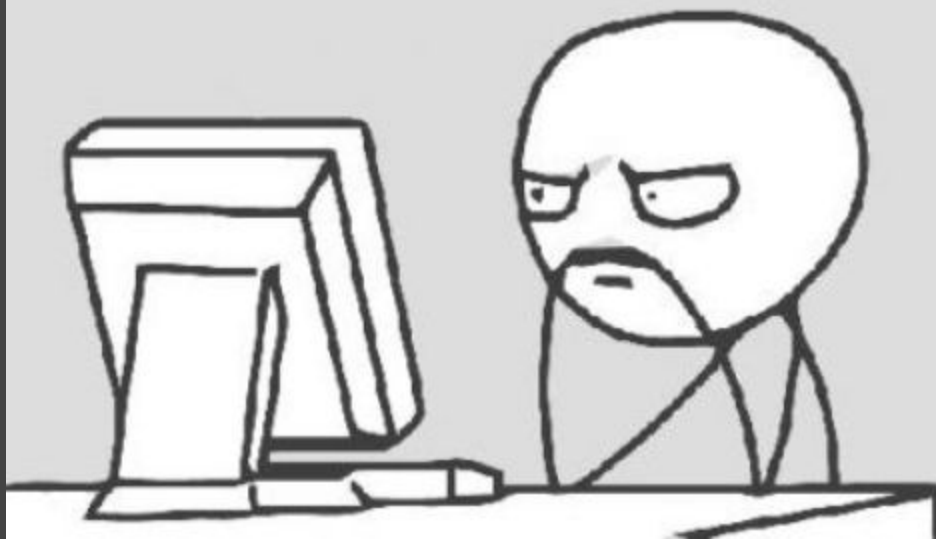


cythilya

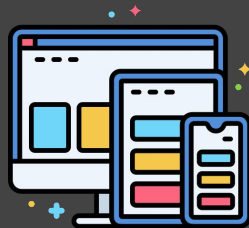


[cythilya@gmail.com](mailto:cythilya@gmail.com)

# UI 測試中





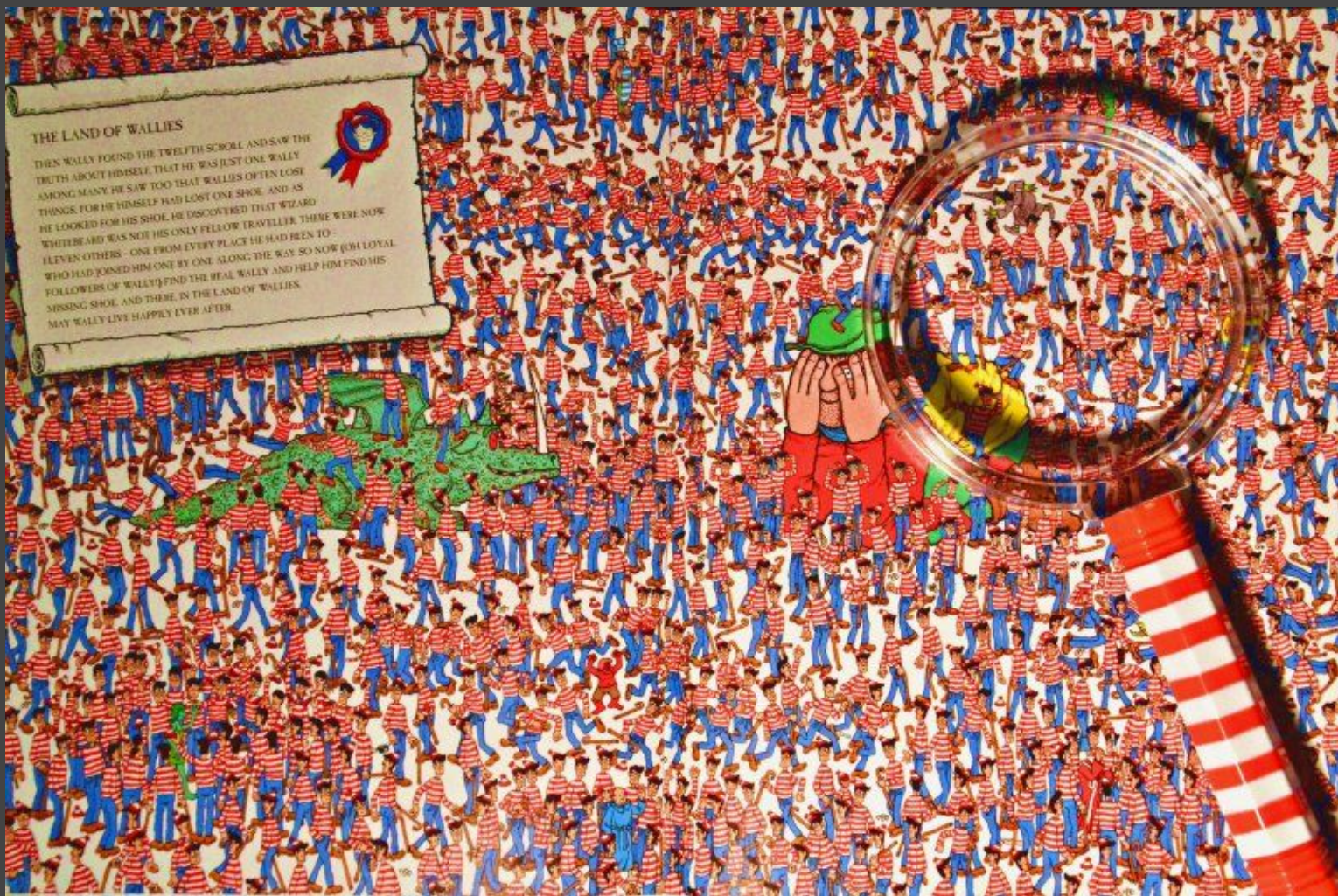


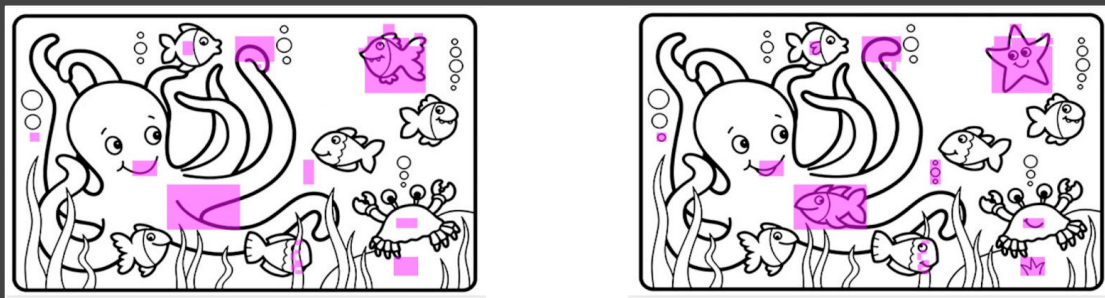
# 變因多

手動測試, 耗時費力

### THE LAND OF WALLIES

THEN WALLY FOUND THE TWELFTH SCROLL AND SAW THE TRUTH ABOUT HIMSELF, THAT HE WAS JUST ONE WALLY. AMONG MANY HE SAW TOO THAT WALLIES OFTEN LOSE THINGS, FOR HE HIMSELF HAD LOST ONE SHOE. AND AS HE LOOKED FOR HIS SHOE, HE DISCOVERED THAT WIZARD WHITEBEARD WAS NOT HIS ONLY FELLOW TRAVELLER. THERE WERE NOW ELEVEN OTHERS - ONE FROM EVERY PLACE HE HAD BEEN TO - WHO HAD JOINED HIM ONE BY ONE ALONG THE WAY. SO NOW FOR LOYAL FOLLOWERS OF WALLY TO FIND THE REAL WALLY AND HELP HIM FIND HIS MISSING SHOE. AND THERE, IN THE LAND OF WALLIES, MAY WALLY LIVE HAPPILY EVER AFTER.



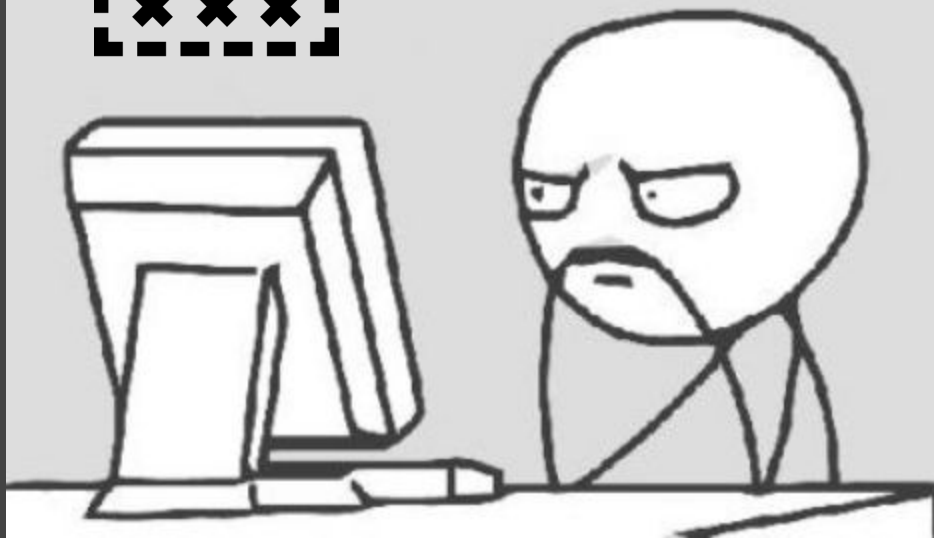


靠眼力 

難以 Pixel Perfect

# UI 測試中

CODE



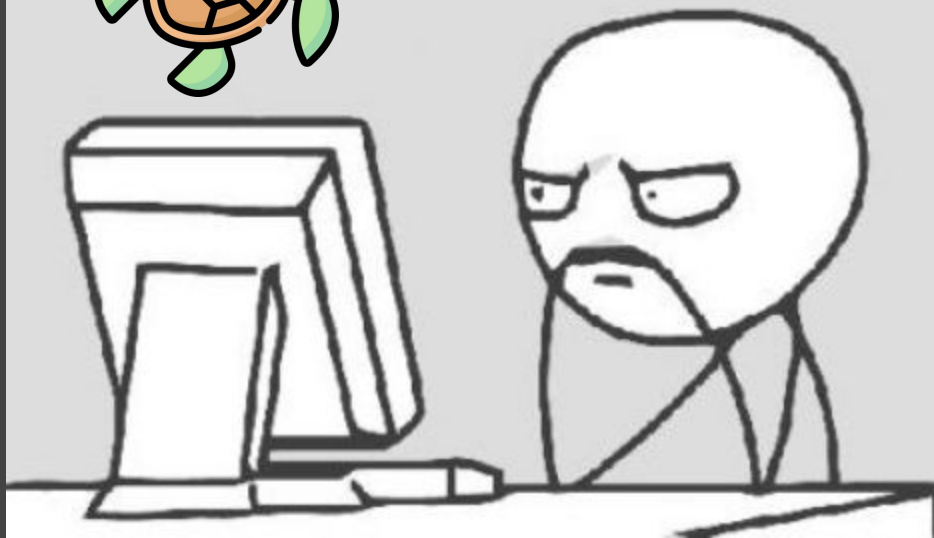
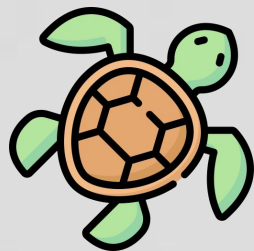




# 快照。不直覺

靠想像力

# UI 測試中





# 大又慢

產生與儲存快照耗費大量時間空間

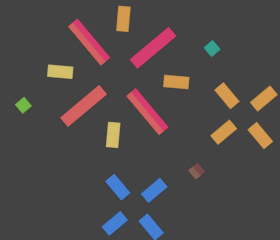
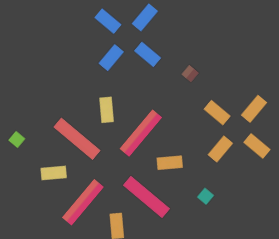
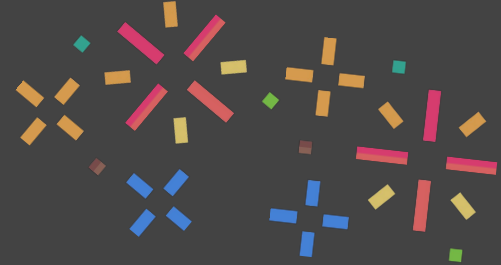
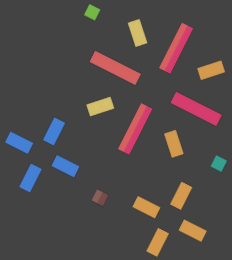


# E2E Testing 包山包海

測試容易跑失敗、Pipeline 不穩定



# Visual Testing





怎麼做？

Visual Testing



# 元件測試



Test at Component Level with Storybook,  
Visual Testing Service & CI/CD





安裝 Storybook  
+ Chromatic / Percy

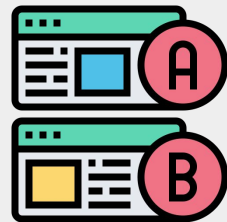
yarn add chromatic  
or  
yarn add @percy/cli



撰寫 story  
測試程式



跑測試 + 快照



檢視快照



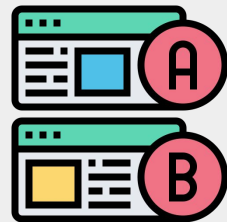
安裝 Storybook  
+ Chromatic / Percy



撰寫 story  
測試程式



跑測試 + 快照



檢視快照

```
const ButtonStory =  
  <Button />;
```



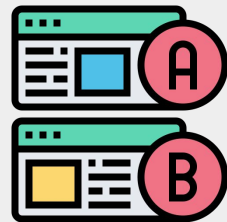
安裝 Storybook  
+ Chromatic / Percy



撰寫 story  
測試程式



跑測試 + 快照



檢視快照

yarn chromatic  
or  
percy snapshot



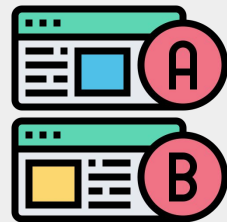
安裝 Storybook  
+ Chromatic / Percy



撰寫 story  
測試程式

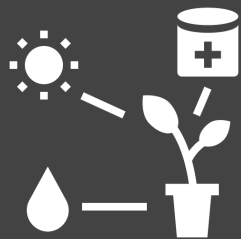


跑測試 + 快照

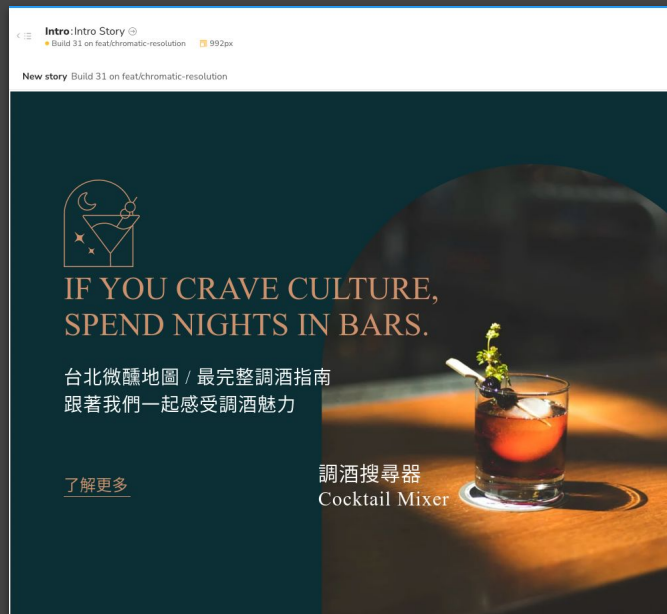


檢視快照





測試變因

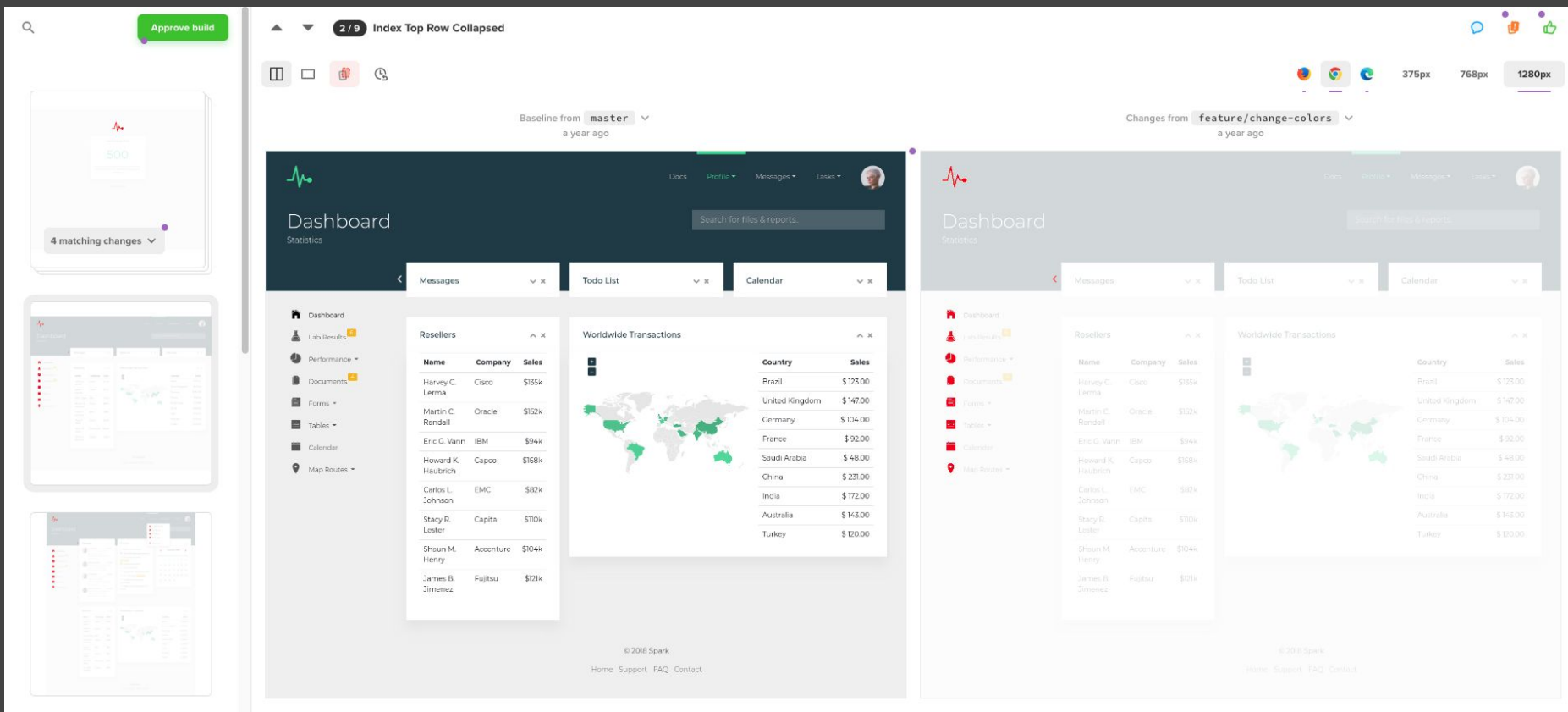


```
// Storybook config, preview.js
const parameters = {
  chromatic: {
    viewports: [320, 576, 768, 992]}
};
```

```
// Story
IntroStory.args = {
  chromatic: {
    viewports: [320, 576, 768, 992]}
};
```

```
//percy.json  
{  
  snapshot: {  
    widths: [320, 576, 768,  
      992]}  
};
```

```
// Story  
cy.percySnapshot('main  
page',{  
  widths: [320, 576, 768,  
    992]  
});
```



Review Snapshots by Percy

Visual Testing



互動

Triggered via JavaScript / CSS



# Cocktail Mixer

今晚想要尋找什麼樣的品飲體驗？

請輸入調酒名稱或材料

搜尋調酒

使用體驗搜尋

可直接輸入一項材料, 如蔓越莓、鳳梨、vodka、威士忌等

其他人也搜尋了

🍸 側車 Sidecar

🍸 長島冰茶 Long Island Iced Tea

🍸 飛行 Aviation

🍸 瑪泰 Mai-tai

🍸 薇絲朋 Vesper

搜尋「愛爾蘭咖啡」



快照搜尋結果

# Cocktail Mixer

今晚想要尋找什麼樣的品飲體驗？

愛爾蘭咖啡

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可直接輸入一項材料, 如蔓越莓、鳳梨、vodka、威士忌等

搜尋結果

🍸 愛爾蘭咖啡 Irish Coffee

Behaviors triggered via JavaScript

# Behaviors triggered via JavaScript

```
SearchService.play = async () => {  
    const canvas = within(canvasElement);  
    const Input = canvas.queryByTestId('input');  
    const Button = canvas.queryByTestId('button');  
    await userEvent.type(Input, '愛爾蘭咖啡');  
    await userEvent.click(Button);  
}
```



願意和我們聊聊嗎?

Feel free to text us. Let's chat.

留下你的 Mail , 我們將與你聯絡

*Submit*

Hover



願意和我們聊聊嗎?

Feel free to text us. Let's chat.

留下你的 Mail , 我們將與你聯絡

*Submit*

Behaviors triggered via CSS :hover state

# Use CSS Class

```
// Button component
// HTML
<Button>
  Submit
</Button>

// CSS
&:hover, &.hover {...}
```

```
// Button story
import Button from './Button';

const Template = () =>
  <Button className='hover' />;

...
```

# Trigger CSS States via Props

```
// Button component
const Button = ({ hover }) => {
  return (
    <Button
      hover={hover}
    >
      Submit
    </Button>
  );
}
```

```
// Button story
import Button from './Button';

const Template = (args) =>
  <Button {...args}/>;

const ButtonStory =
  Template.bind({});

ButtonStory.args = {
  hover: true,
};
```

# Trigger Component-Level Testing by PR

```
name: 'Chromatic'
on: [pull_request]
jobs:
  chromatic-deployment:
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v2
        with:
          fetch-depth: 0
      - name: Install dependencies
        run: yarn
      - name: Publish to Chromatic
        uses: chromaui/action@v1
        with:
          projectToken: ${ secrets.CHROMATIC_TOKEN }
```

Visual Testing



# 頁面測試

Test at Page Level with E2E Testing Tools





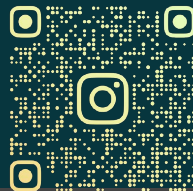
# IF YOU CRAVE CULTURE, SPEND NIGHTS IN BARS.

台北微醺地圖 / 最完整調酒指南  
跟著我們一起感受調酒魅力

[了解更多](#)

調酒搜尋器  
Cocktail Mixer

微醺地圖  
Barsurfing Map



# Cypress + Percy

```
describe('Index page', () => {  
  it('Take snapshot for index page', () => {  
    cy.visit('https://mixtini-co.web.app/');  
    cy.percySnapshot(index);  
  });  
});
```

# Mixtini 首頁的快照比對

The screenshot displays the Mixtini website build approval interface. On the left, a sidebar shows the build status: "Build #170" with "1 visual changes". Below this, a "Build approved" button is highlighted with a red box and labeled "approve 按鈕". The main area shows a comparison between the current build and the "master" branch. The current build is marked "Auto-approved" and shows "Changes from master" as "3 days ago". The master branch is marked "Auto-approved" and shows "Changes from master" as "10 days ago". The comparison shows a difference in the main content area, which is highlighted with a red box and labeled "標記差異". The difference is in the text "IF YOU CRAVE CULTURE, SPEND NIGHTS IN BARS." and the sub-header "台北微醺地圖 / 最完整調酒指南 跟著我們一起感受調酒魅力". The current build shows the text in a lighter color, while the master branch shows it in a darker color. The comparison also shows a difference in the "調酒搜尋器" (Cocktail Mixer) section, which is highlighted with a red box and labeled "解析度". The current build shows the text in a lighter color, while the master branch shows it in a darker color. The comparison also shows a difference in the "了解更多" (Learn More) link, which is highlighted with a red box and labeled "解析度". The current build shows the link in a lighter color, while the master branch shows it in a darker color.

Build #170  
1 visual changes

Auto-approved branch:  
master  
3 days ago

Snapshots  
Changed 1  
Unchanged 0

Status  
☐ Changes requested 0  
☐ Unreviewed 0  
☒ Approved 1

Browsers  
☒ Safari  
☒ Firefox  
☒ Chrome  
☒ Edge

Widths  
☒ 320px  
☒ 576px  
☒ 768px  
☒ 992px

Build approved

approve 按鈕

Auto-approved

Baseline from master 10 days ago

Changes from master 3 days ago

MIXTINI

關於我們 調酒搜尋器 聯絡我們

IF YOU CRAVE CULTURE,  
SPEND NIGHTS IN BARS.

台北微醺地圖 / 最完整調酒指南  
跟著我們一起感受調酒魅力

調酒搜尋器  
Cocktail Mixer

了解更多

瀏覽器 解析度

標記差異

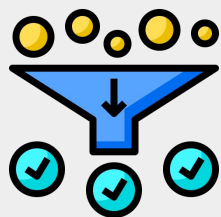
IF YOU CRAVE CULTURE,  
SPEND NIGHTS IN BARS.

台北微醺地圖 / 最完整調酒指南  
跟著我們一起感受調酒魅力

調酒搜尋器  
Cocktail Mixer

# Regular Page-Level Testing

```
name: Regular Visual Testing
on:
  schedule:
    - cron: '0 0 * * 1'
jobs:
  build:
    runs-on: ubuntu-latest
    steps:
      - name: Checkout
        uses: actions/checkout@master
      - name: Install packages
        run: yarn
      - name: Run visual testing
        run: npx percy exec -- yarn cy:percy
    env:
      PERCY_TOKEN: ${ secrets.PERCY_TOKEN }
```



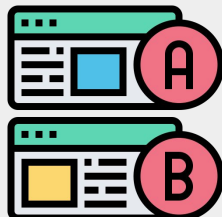
①

跑測試



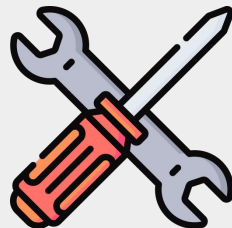
②

快照



③

比對  
快照



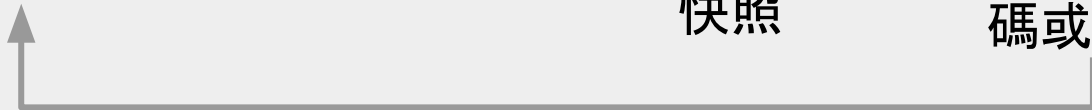
④

更新程式  
碼或快照



⑤

上線



Visual Testing



# 快照的比對原理

✓  
x [main]  
\  
[A]



✓  
x - y - z [main]  
\  
p - q [A] ✓

x - y - z [main]

\



p - q [A]



x - y - z - p - q [main]



x - y - z [main] ✓  
\  
p - q - r [A] ✗



x - y - z - p - q [main] ✓



Percy

VS



Chromatic

VS



Jest-Image-Snapshot

哪個工具好？

# Generate Snapshots

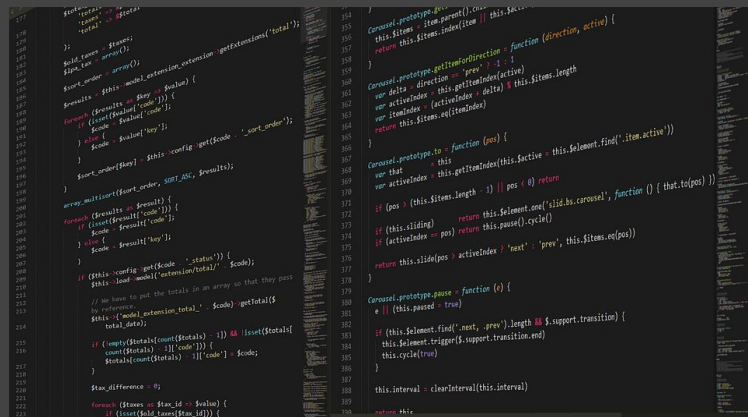
Screenshots



DOM in Text Format

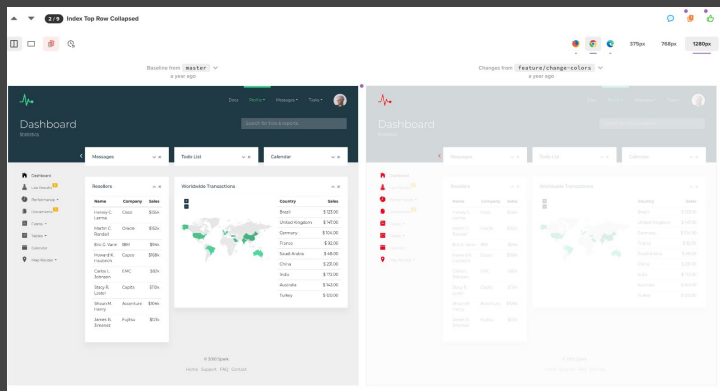


VS



# Diff Snapshots

On Its Service



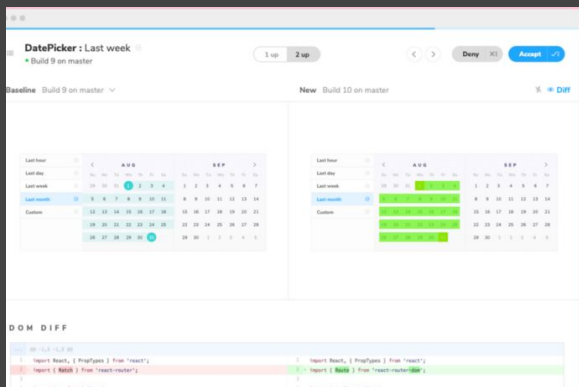
By Version Control Tools



VS

# Diff DOM

On Its Service



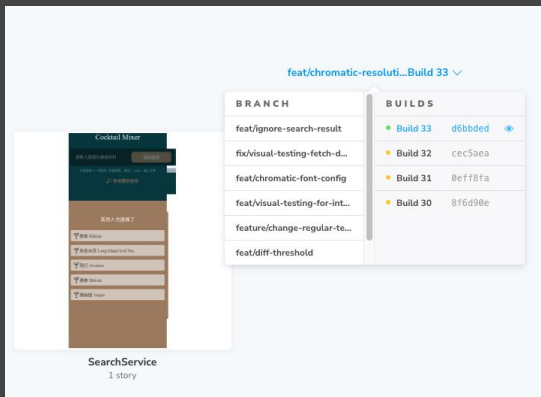
By Version Control Tools



VS

# View Snapshots by PR / Branch

On Its Service 



By Version Control Tools

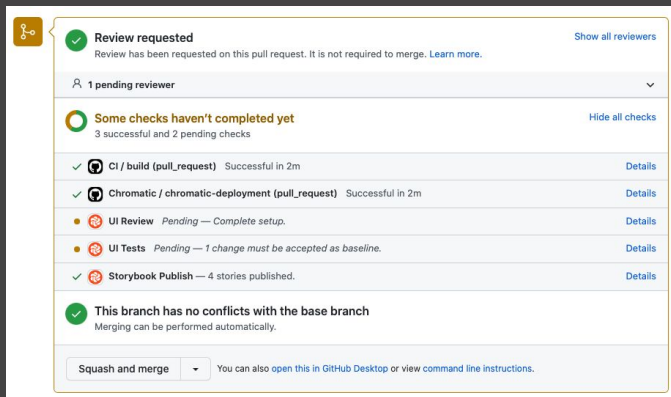


VS



# Show as PR Criteria

Integrate with GitHub Actions



VS

By Version Control Tools



 **Some checks haven't completed yet**  
3 successful and 1 pending checks

[Hide all checks](#)

|                                                                                                                                                             |                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| ✓  <b>CI / build (pull_request)</b> Successful in 1m                       | <a href="#">Details</a> |
| ✓  <b>Chromatic / chromatic-deployment (pull_request)</b> Successful in 1m | <a href="#">Details</a> |
| ●  <b>UI Tests</b> Pending — 1 change must be accepted as baseline.        | <a href="#">Details</a> |
| ✓  <b>Storybook Publish</b> — 1 story published.                           | <a href="#">Details</a> |

✓ **This branch has no conflicts with the base branch**  
Merging can be performed automatically.

Squash and merge ▾ You can also [open this in GitHub Desktop](#) or view [command line instructions](#).

Verify  
Changes

App: Story-Card-01

Baseline: Build 1 on main

愛看書的貓！

愛看書的貓！

Baseline History

- Build 3 - 07/10/2024  
Completed! This was merged into the main branch.
- Build 2 - 06/10/2024  
Completed! This was merged into the main branch.

Diff

```

diff --git a/src/components/BookCard.tsx b/src/components/BookCard.tsx
index 1234567..8901234
--- a/src/components/BookCard.tsx
+++ b/src/components/BookCard.tsx
@@ -1,5 +1,5 @@
import React from 'react';
import { Card } from '@mui/material';
import { BookCardProps } from './types';
import { useTheme } from '@emotion/react';
import { useMediaQuery } from '@emotion/react';
import { useLocalStorage } from '@emotion/use-stable-local-storage';
import { useTheme } from '@emotion/react';
import { useMediaQuery } from '@emotion/react';
import { useLocalStorage } from '@emotion/use-stable-local-storage';

```

Approved!

✓ **All checks have passed**  
4 successful checks

|                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ✓  <b>CI / build (pull_request)</b> Successful in 1m                       |
| ✓  <b>Chromatic / chromatic-deployment (pull_request)</b> Successful in 1m |
| ✓  <b>Storybook Publish</b> — 1 story published.                           |
| ✓  <b>UI Tests</b> — 1 change accepted as baseline.                        |

# Component-Level Testing

Integrate with Storybook 



VS



Implement Its Test Codes

```
DEBUG CONSOLE  PROBLEMS  OUTPUT  TERMINAL

PASS src/components/Items.test.js
  ✓ renders correctly when there are no items (8ms)

  > 1 snapshot written.
Snapshot Summary
  > 1 snapshot written from 1 test suite.

Test Suites: 1 passed, 1 total
Tests:       1 passed, 1 total
Snapshots:  1 written, 1 total
Time:        0.889s, estimated 1s
Ran all test suites related to changed files.
```



⑦

# Integrate with E2E testing

Only Component-Level  
Testing



VS

Page-Level Testing 🏆





- UI 簡單好用
- 專注在元件測試

VS



- 包山包海
- 免費測 Chrome、Firefox、Edge
- 團隊態度積極 ~~愛錢~~

# Recommended Solution

Component-Level Testing



vs

Page-Level Testing



興趣 



 工作





VS





VS





成效

# 自動化測試

滿足各種需求、省時省力

QA 表示開心

# 精準比對

Pixel Perfect

改什麼，一目了然

# 時間

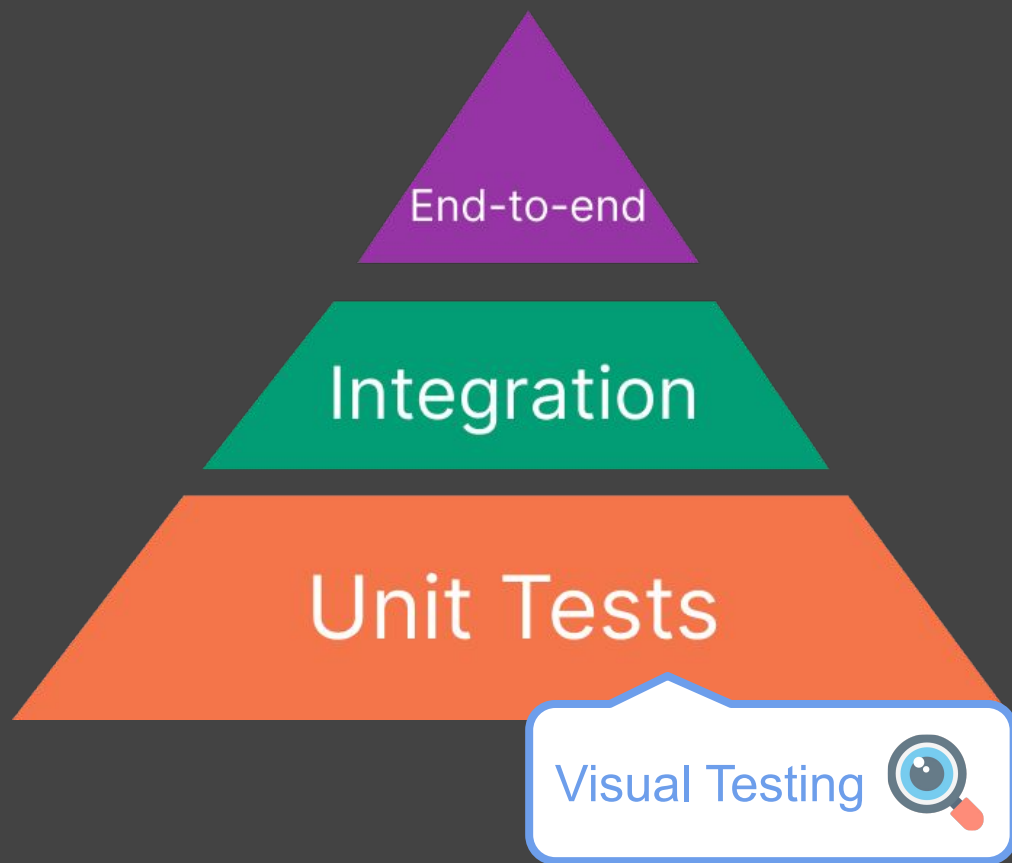
產生快照

↓ 98%

# 空間

儲存快照

↓ 100%

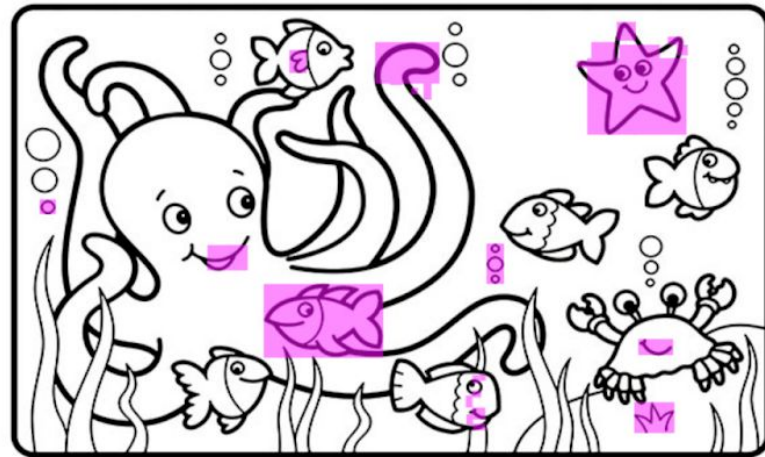
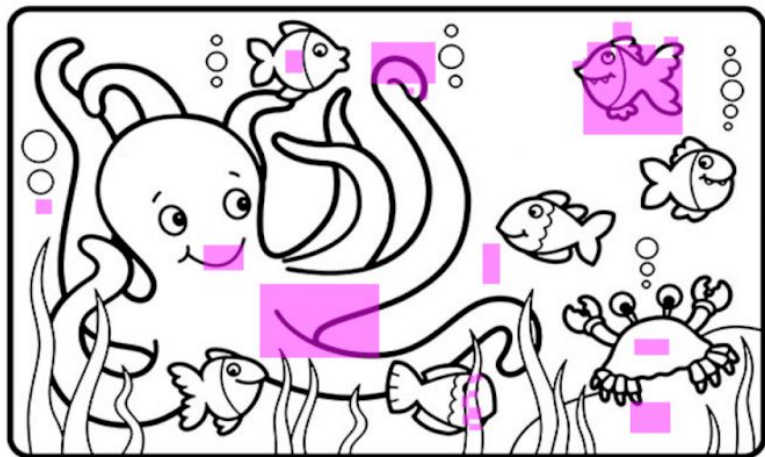


成本 & 時間 ↓

```
it('Check elements status', () => {  
  cy.visit('https://sample.com');  
  cy  
    .get('.element-title')  
    .should('exist');  
  cy  
    .get('.sidebar-nav-item.active')  
    .should('have.text', 'Hello  
World')  
});
```

```
it('Take snapshot', () => {  
  cy.visit('https://sample.com');  
  cy.percySnapshot('sample');  
});
```

覆蓋率 ↑



閃開讓專業的來

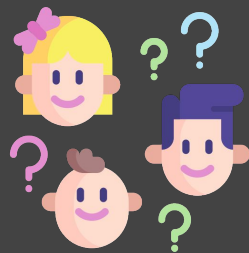




# 畫面比對與 E2E Testing 脫鉤

# DX++

- ✓ 忽略快照 ➡ 自動比對
- ✓ 寫測試的時間 ↓
- ✓ 要維護的程式碼 ↓



# 疑難雜症

不難寫測試的系統  
也適用

# 很難寫測試

靠畫面比對來初步偵錯

# 動態內容

# 餵假資料

內容維持一致

# Cocktail Mixer

今晚想要尋找什麼樣的品飲體驗？

請輸入調酒名稱或材料

搜尋調酒

● 使用體驗搜尋

可直接輸入一項材料, 如蔓越莓、鳳梨、vodka、威士忌等

其他人也搜尋了

🍸 側車 Sidecar

🍸 長島冰茶 Long Island Iced Tea

🍸 飛行 Aviation

🍸 邁泰 Mai-tai

🍸 薇絲朋 Vesper

搜尋「愛爾蘭咖啡」



利用假資料  
得到搜尋結果

# Cocktail Mixer

今晚想要尋找什麼樣的品飲體驗？

愛爾蘭咖啡

搜尋調酒

● 使用體驗搜尋

可直接輸入一項材料, 如蔓越莓、鳳梨、vodka、威士忌等

搜尋結果

🍸 愛爾蘭咖啡 Irish Coffee

忽略特定元件



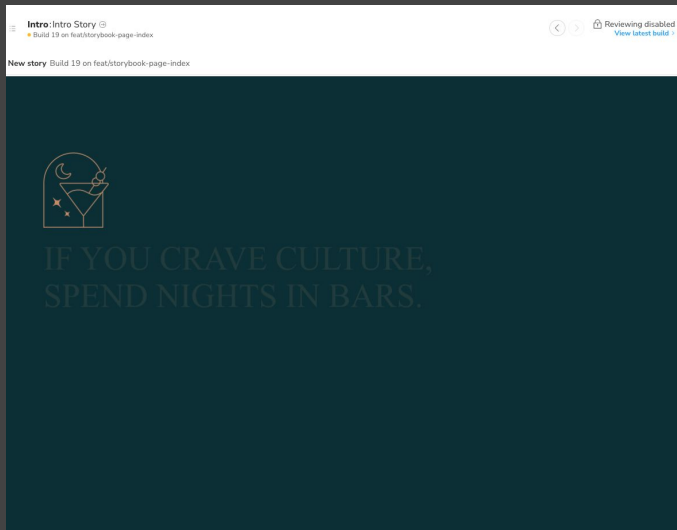
搜尋「愛爾蘭咖啡」



加上 chromatic-ignore  
不做比對



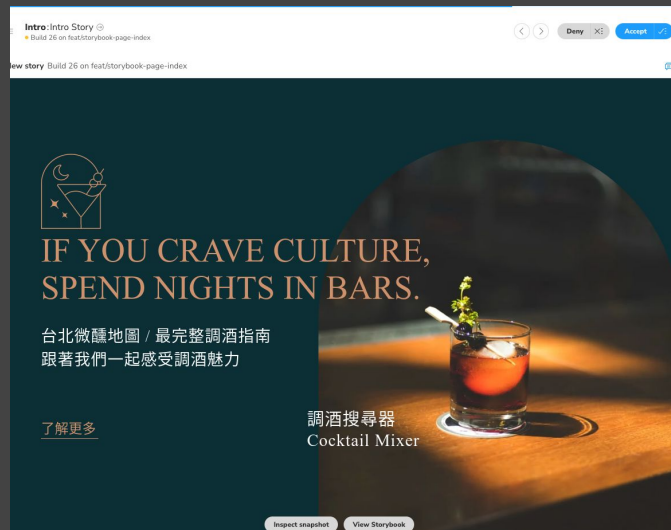
# 動畫



等待動畫結束



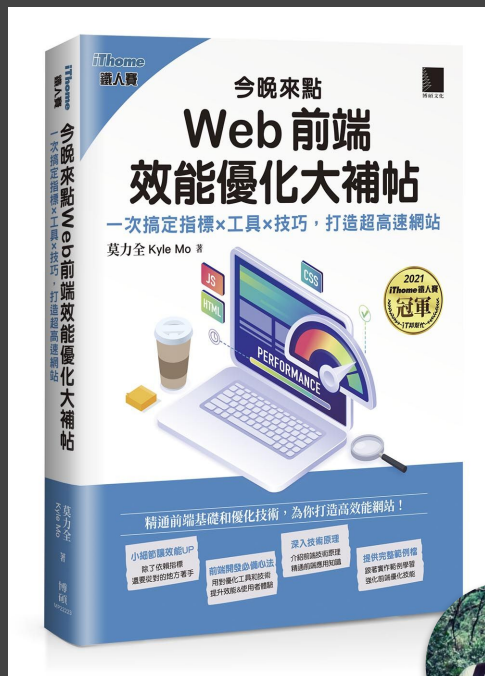
延遲 300 ms 後快照



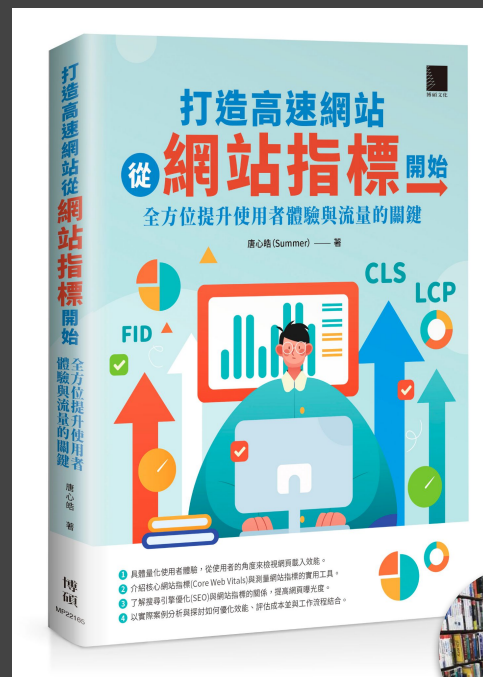
```
TestStory.parameters = {  
  chromatic: { delay: 300 }  
};
```

# 提升效能

字型檔 / 第三方資源 / 大圖



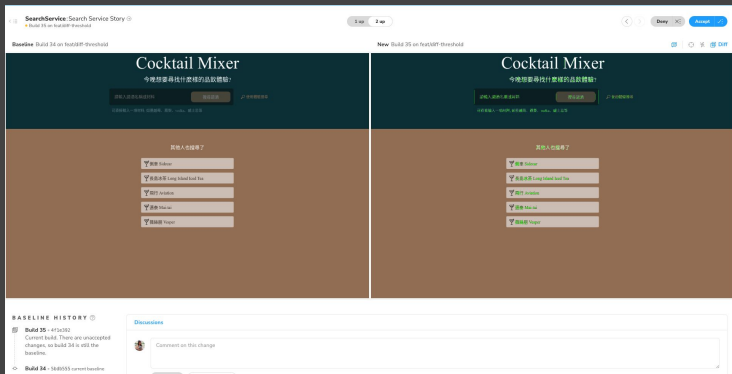
<https://bit.ly/3es0ezG>



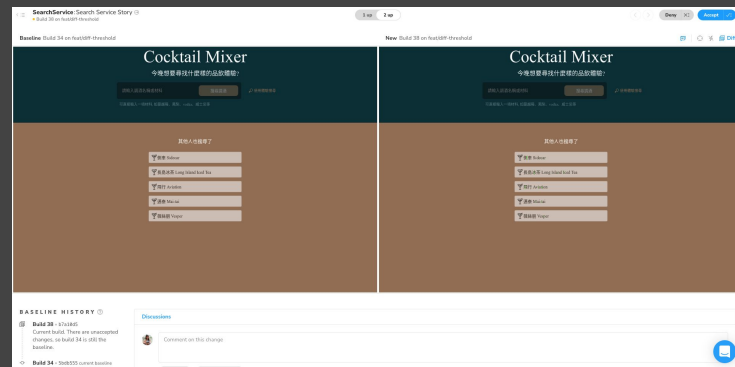
<https://bit.ly/3Ec1P4U>

# 雜訊

設定 Threshold 略過 Visual Noise



threshold = 0.05



```
chromatic: {
  diffThreshold: 0.05
}
```

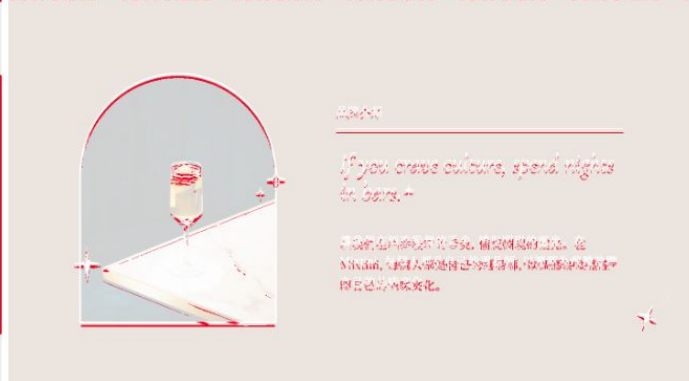
# 統一測試環境

(O) 在我的電腦

(X) 在別人的電腦

Changes from **test-1** 

SUBSCRIBE + SUBSCRIBE + SUBSCRIBE + SUBSCRIBE + SUBSCRIBE + SUBSCRIBE + SUBSCRIBE



# Duplicated Snapshots Review

fetch-depth: 0



# 總結

誰適合。事前準備。好處

Visual Testing



## 誰適合

有 ~~精緻~~ 畫面

✓ 有版控

✓ 穩定

Visual Testing



# 事前準備？

Storybook / E2E Testing Tool / Visual Testing Service

Visual Testing



## 好處？

- ✓ 省時省力省空間
- ✓ 精確比對
- ✓ 覆蓋率 ↑
- ✓ Pipeline 穩定
- ✓ DX ↑

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|                                                                   |                                                   |                |
|-------------------------------------------------------------------|---------------------------------------------------|----------------|
| <b>cythilya</b> feat: integrate GitHub actions for visual testing | 9f279e9 5 minutes ago                             | 🕒 4 commits    |
| .github/workflows                                                 | feat: integrate GitHub actions for visual testing | 5 minutes ago  |
| .storybook                                                        | feat: add basic app files                         | 37 minutes ago |
| cypress                                                           | feat: integrate GitHub actions for visual testing | 5 minutes ago  |
| public                                                            | feat: add basic app files                         | 37 minutes ago |
| src                                                               | feat: add basic app files                         | 37 minutes ago |
| .gitignore                                                        | Initial commit                                    | 1 hour ago     |
| .percy.json                                                       | feat: add cypress                                 | 19 minutes ago |
| LICENSE                                                           | Initial commit                                    | 1 hour ago     |
| README.md                                                         | feat: integrate GitHub actions for visual testing | 5 minutes ago  |
| cypress.json                                                      | feat: add cypress                                 | 19 minutes ago |
| package.json                                                      | feat: integrate GitHub actions for visual testing | 5 minutes ago  |
| yarn.lock                                                         | <a href="#">feat: add cypress</a>                 | 19 minutes ago |

[README.md](#)

## Visual Testing Demo with Chromatic & Percy

No description, website, or topics provided.

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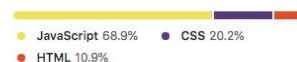
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以前的我：



现在的我：





# 特別感謝

Mixitini ❤️ Sean Chou ❤️ **Yvonne Huang** ❤️ Shawn Lin

Alvin Wu ❤️ Gordon Lin 🍷 Trend Micro

# Thank you!



QnA

最難的是相遇

# Cypress Image Snapshot

# 團隊合作

最推薦的點

更多問題？