Web Fundamentals

Session-03

Agenda – Browser & Intro to Git

Agenda – Browser and Intro to Git

01 How browser works

02 Chrome dev tools

03 Why Git? What is Git? Set up

04 Create, Add , Commit to repo

05 Branching Merging

06 Best Practices, Resources

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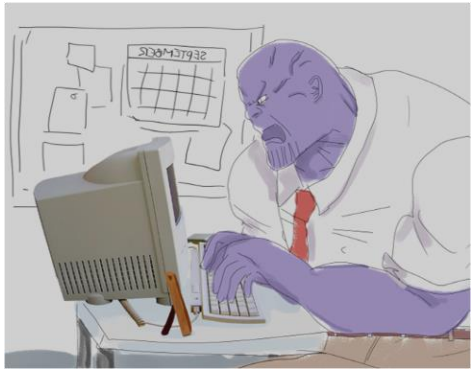
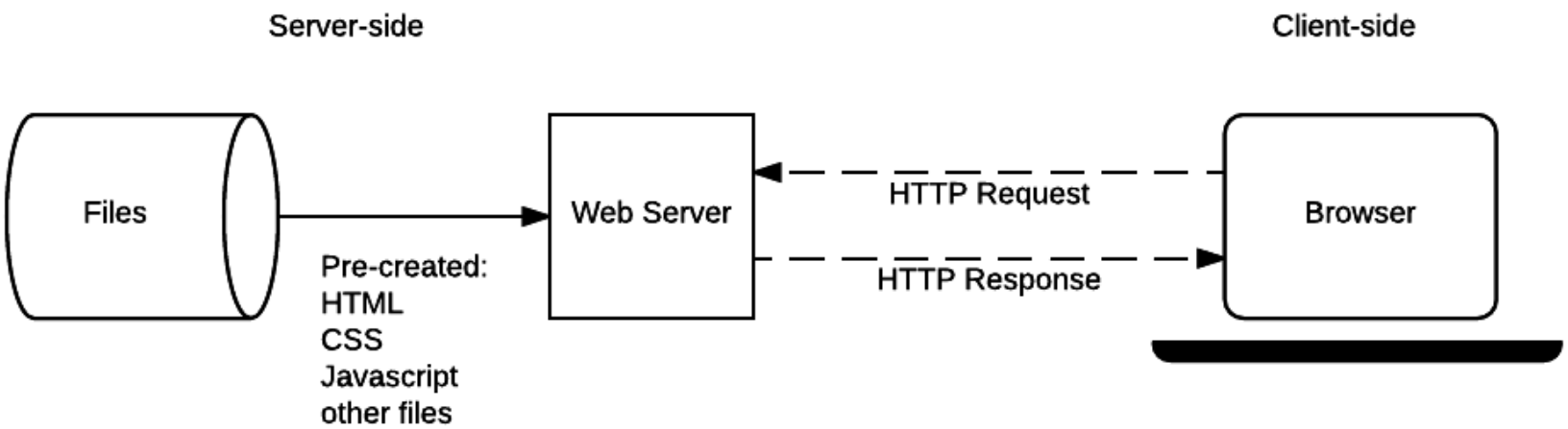
Why we need to know How Browser Works?

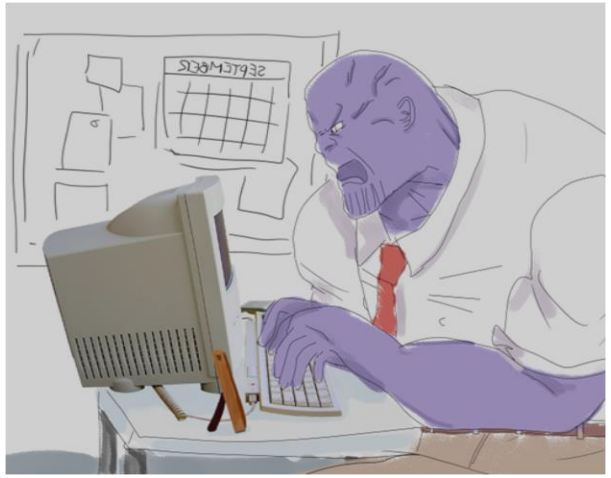
Intent: We need to understand how broswer works in order to debug, performance & security



How Browser Works?

How browser renders when response is received?

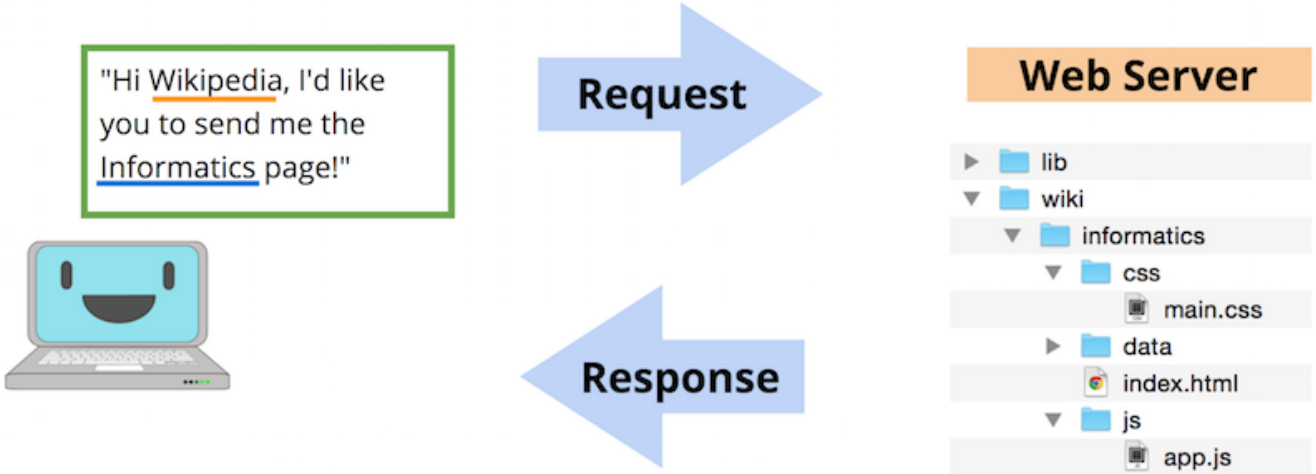




Pesto Web Server

Thanos Enters pesto.tech url

Response files overview



Pesto Web Server

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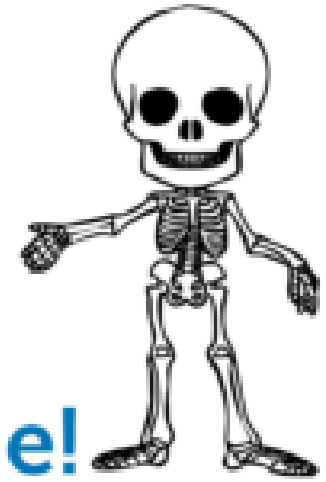
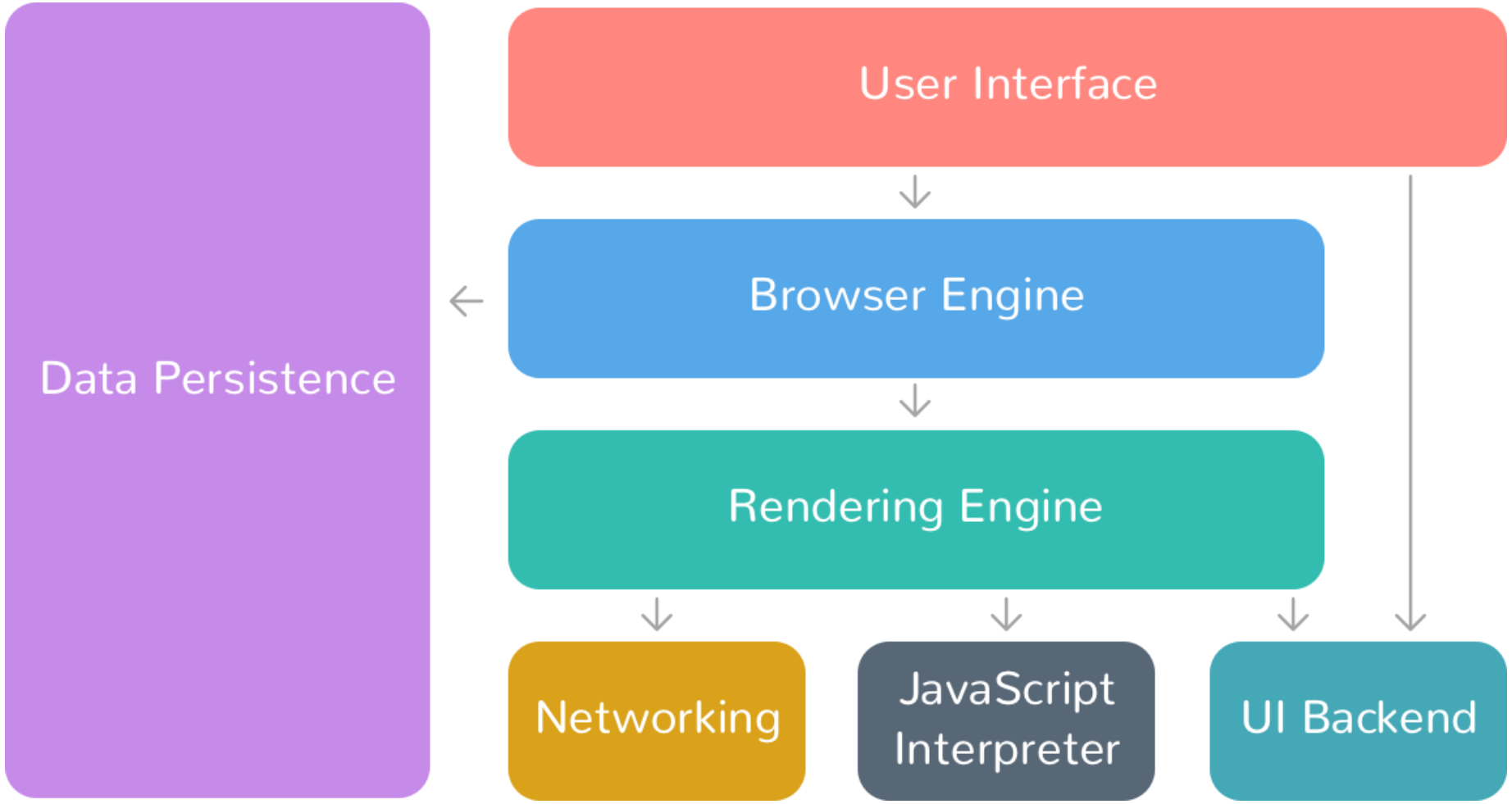
What Languages/Frameworks Browser Can Understand?



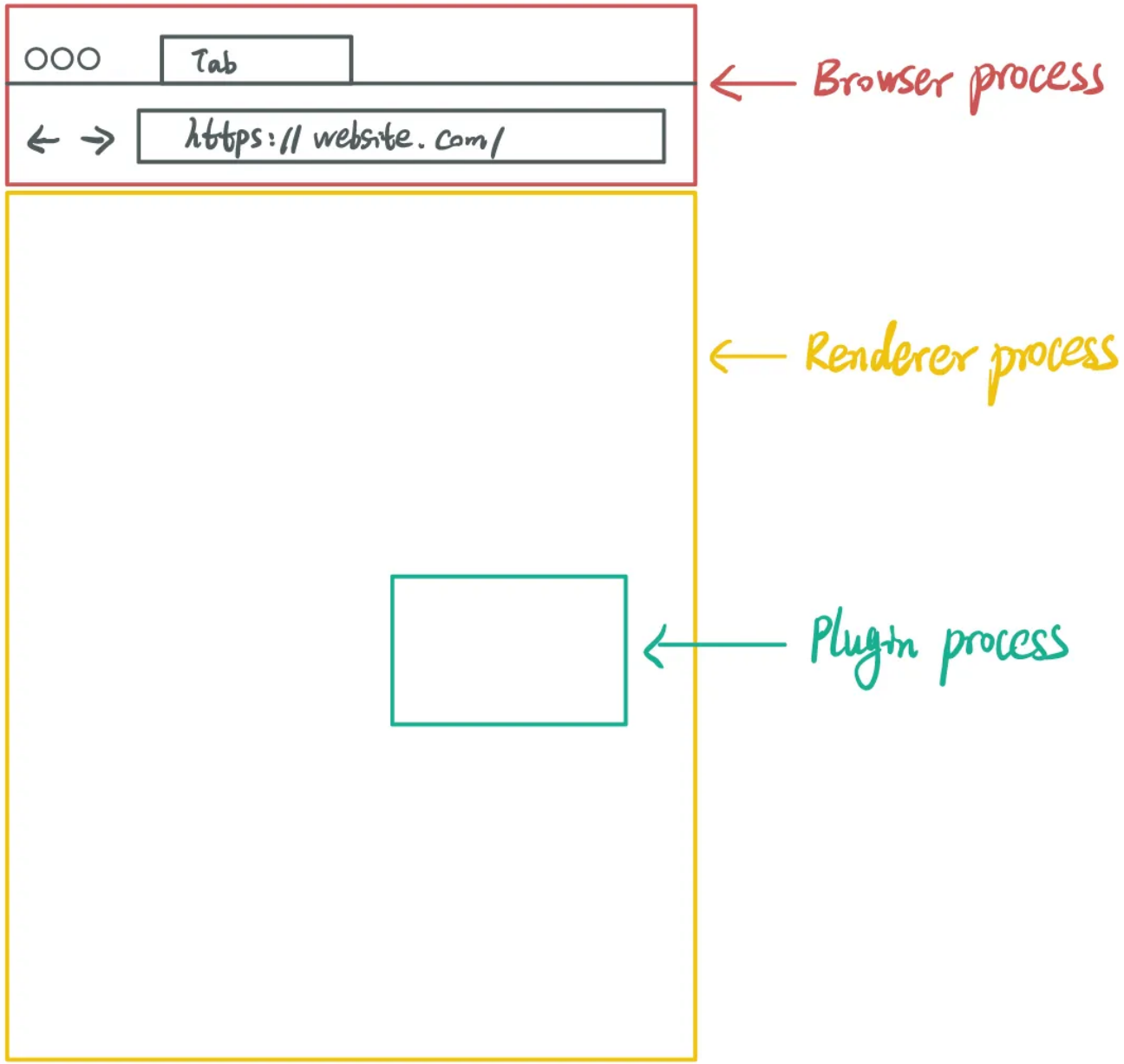
Components of Browser



Post-read: https://web.dev/howbrowserswork/

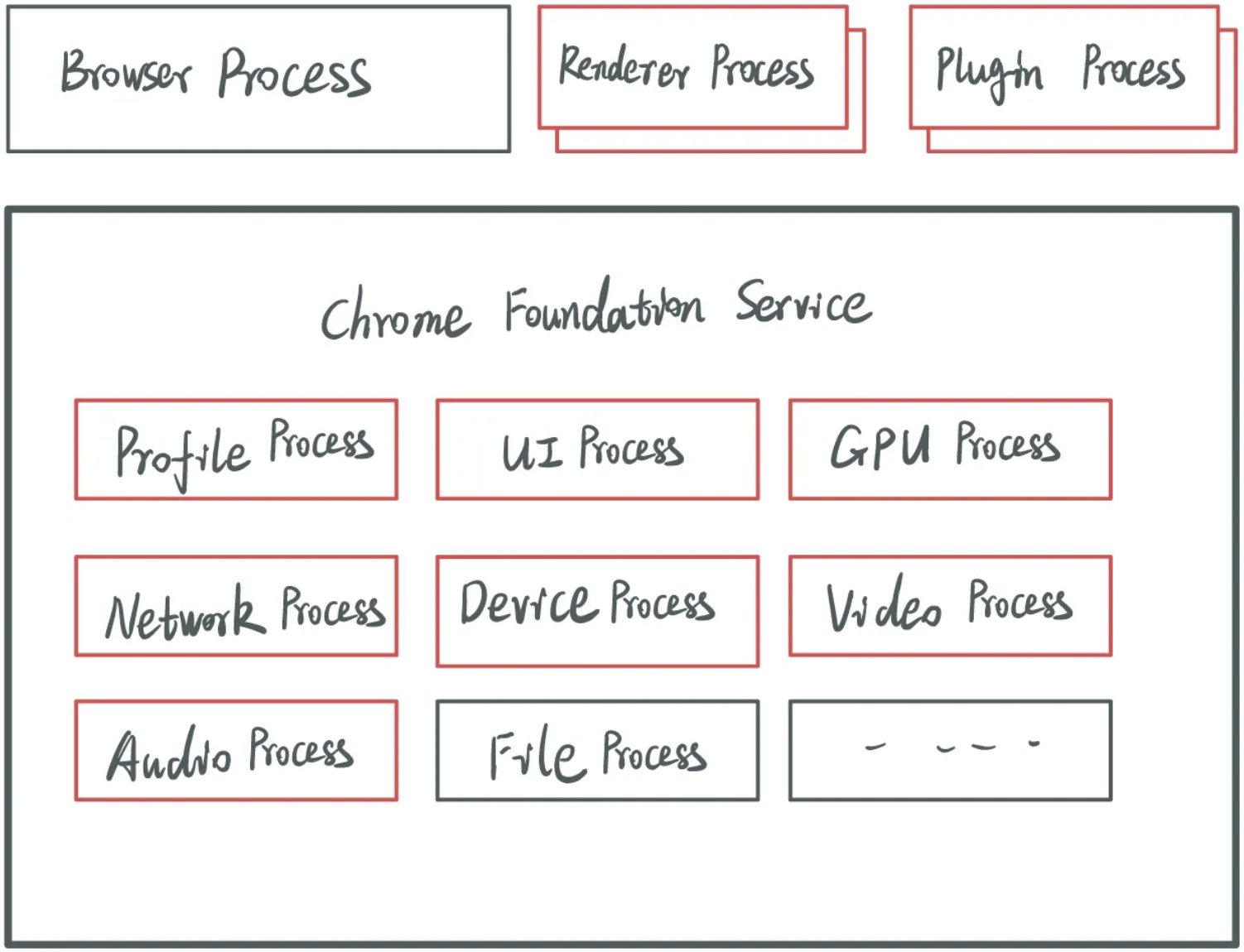
Single Process Browser Execution

Was in old browsers: IE5, IE6

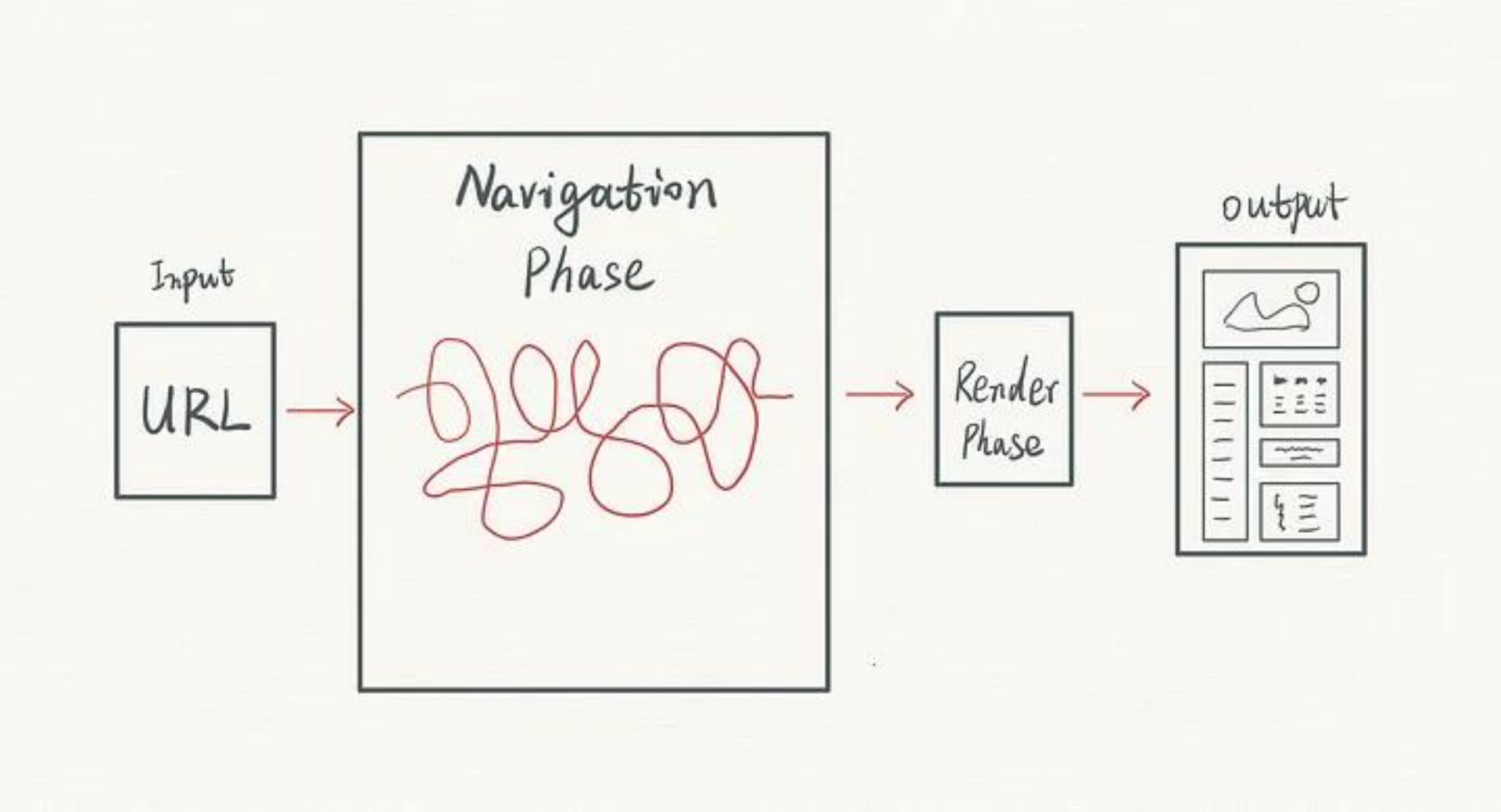


Multi Process Browser

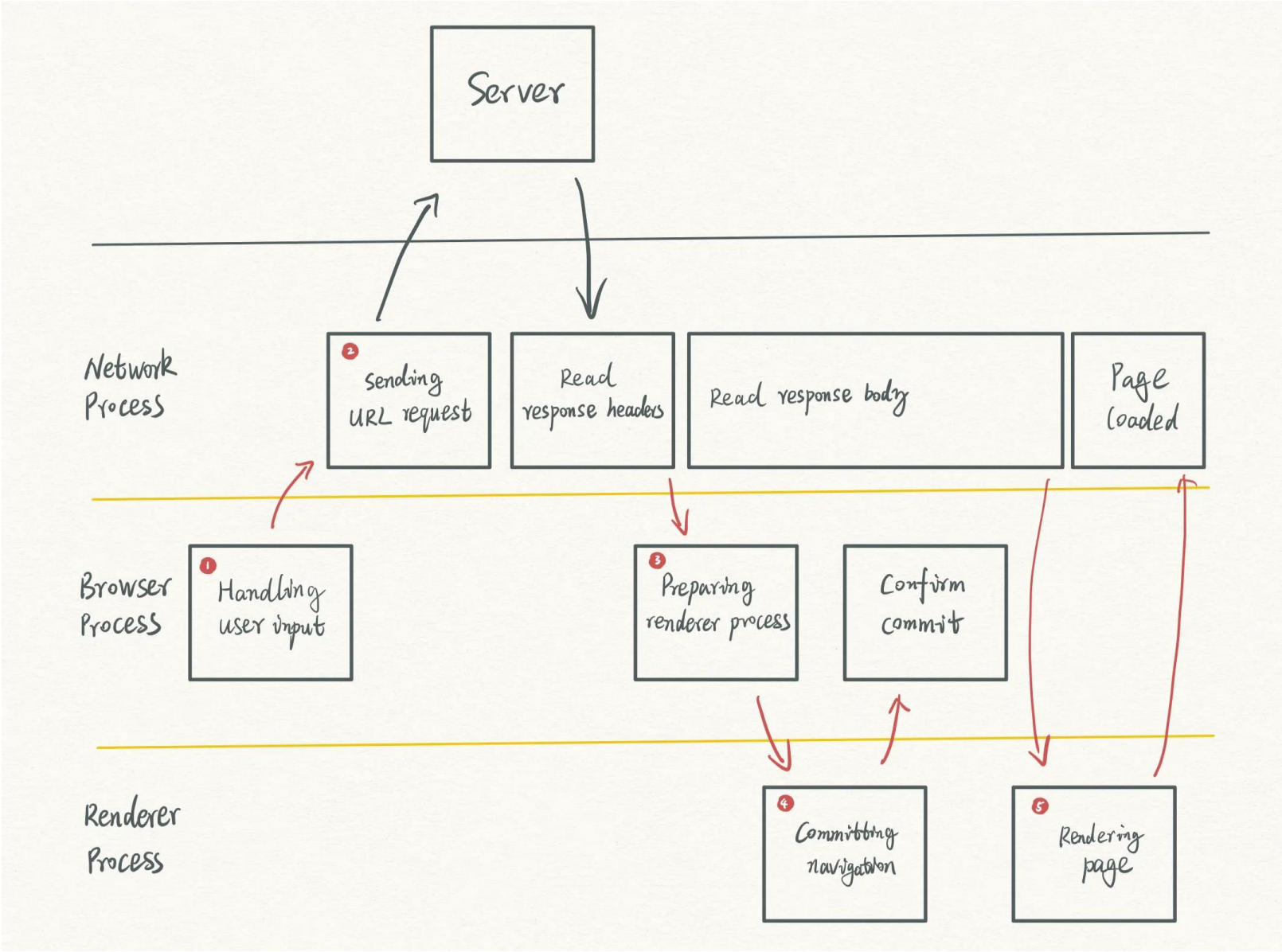
Service Oriented Architecture



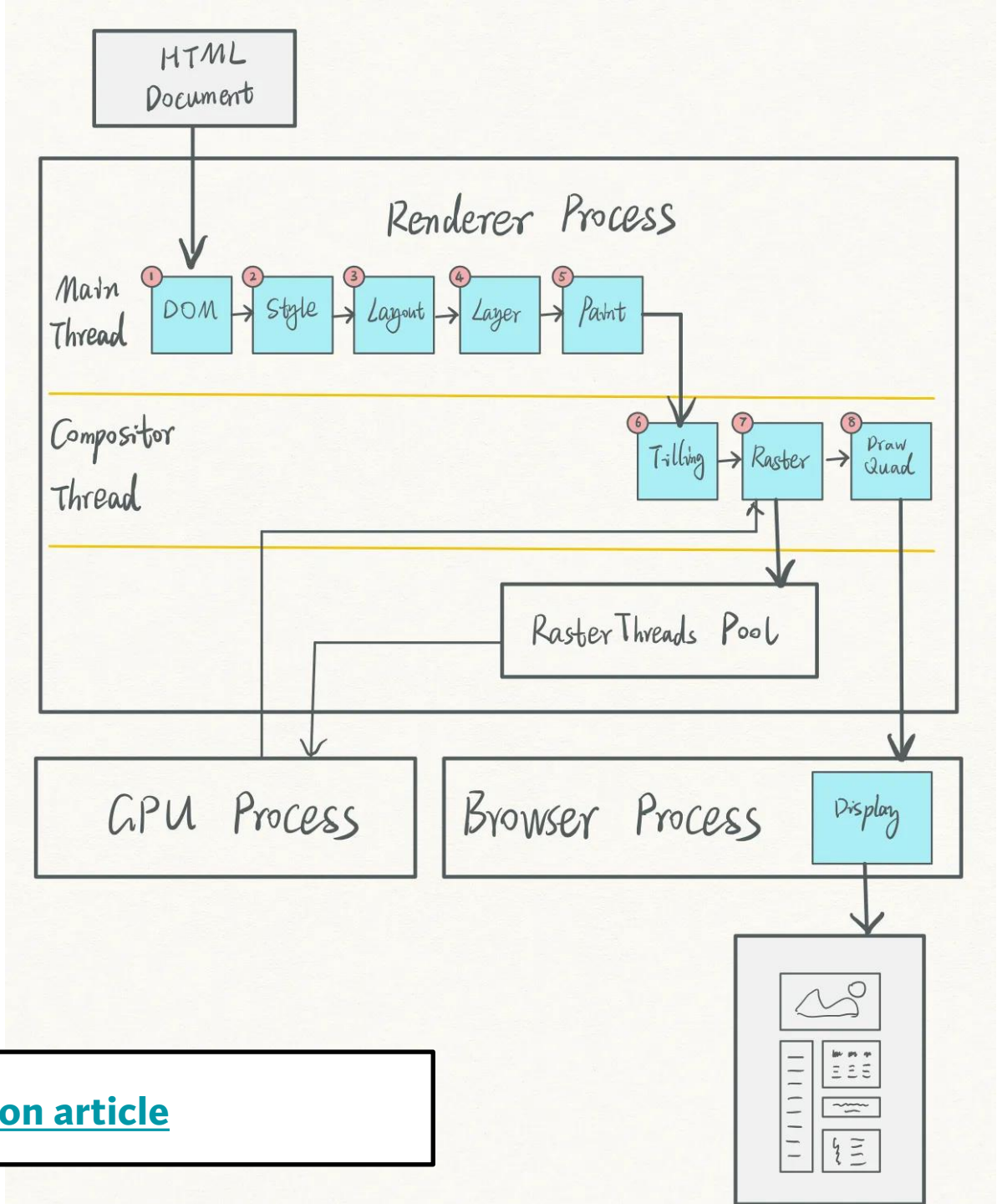
High Level Browser Workflow- Phases



High Level Browser Workflow- Navigation Phase



Render Phase



Post-read: [Detailed Browser execution article]

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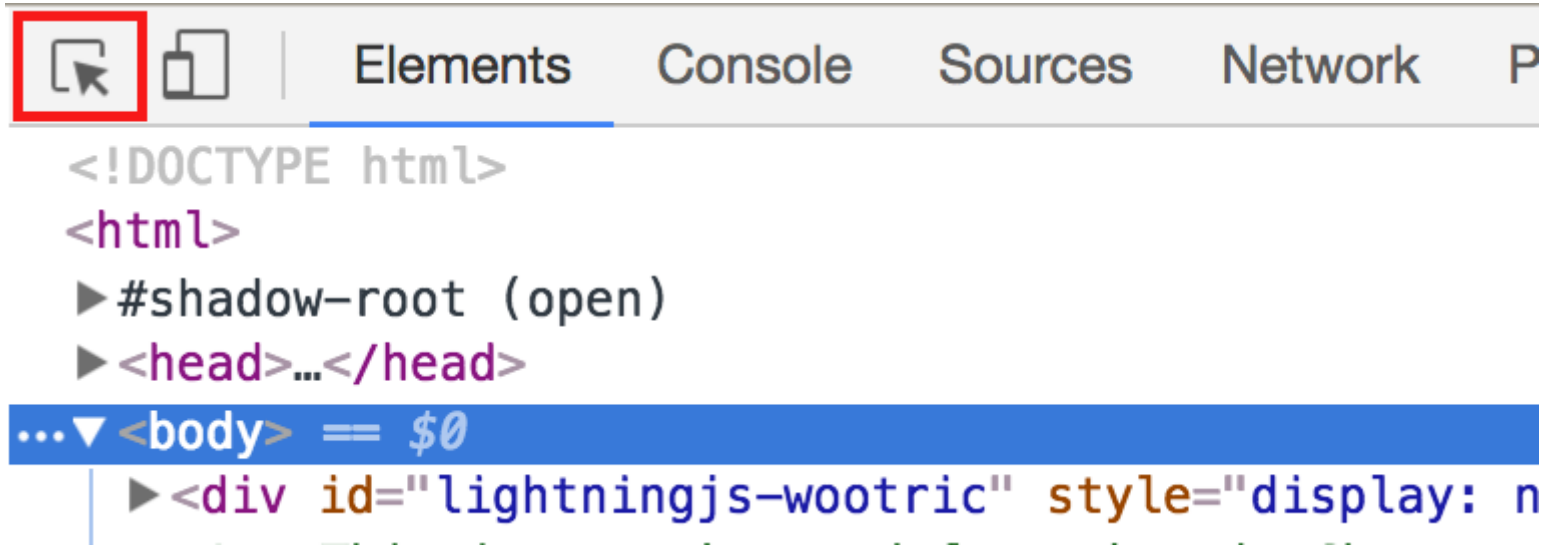
Mastering Dev tools

Quick Walkthrough inside browser dev tools

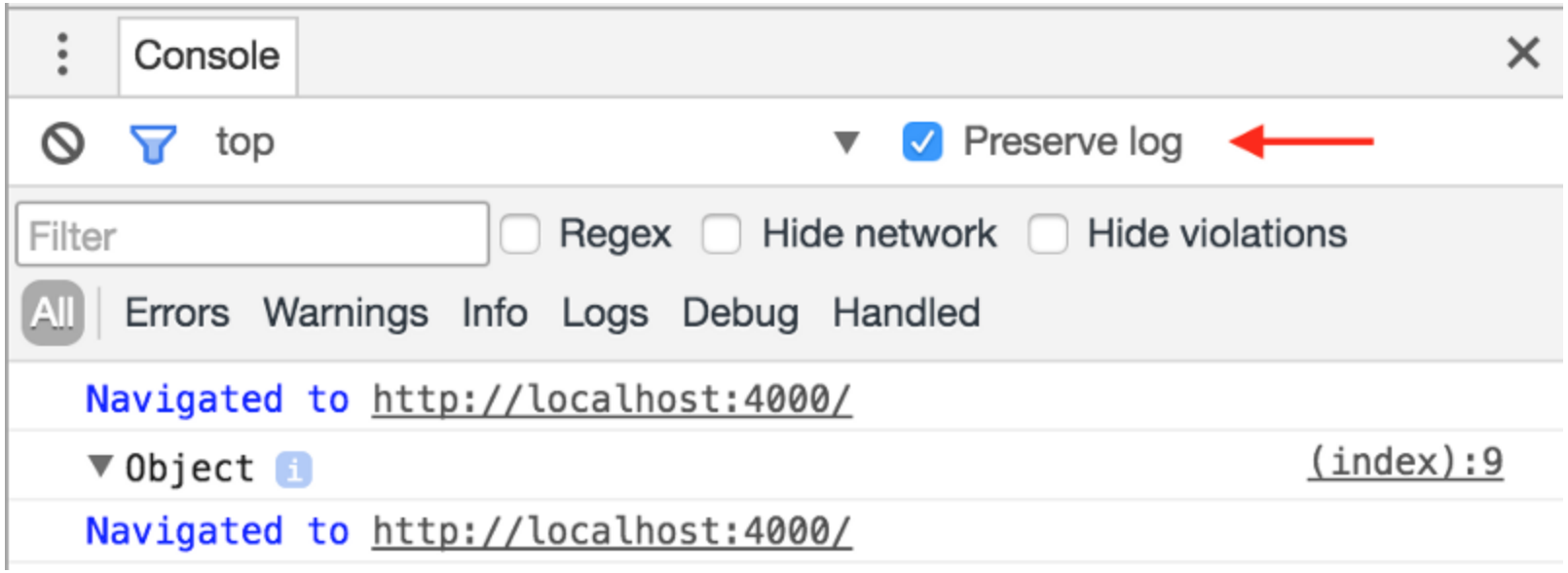
1. **Elements**
2. **Javascript Code**
3. **Storage**
4. **Network**
5. **Performance**

Selection Mode

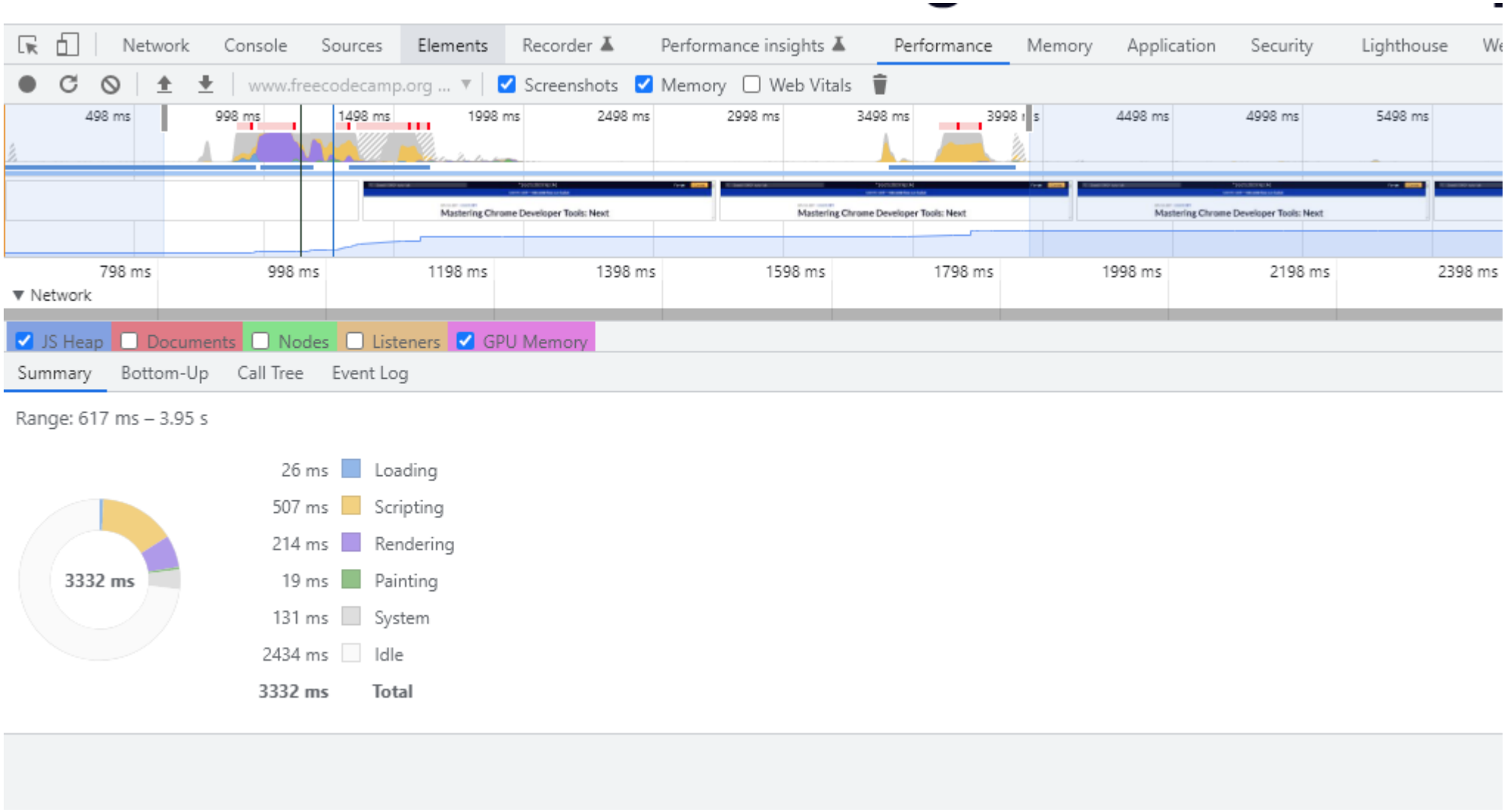


Prettify CSS and JavaScript

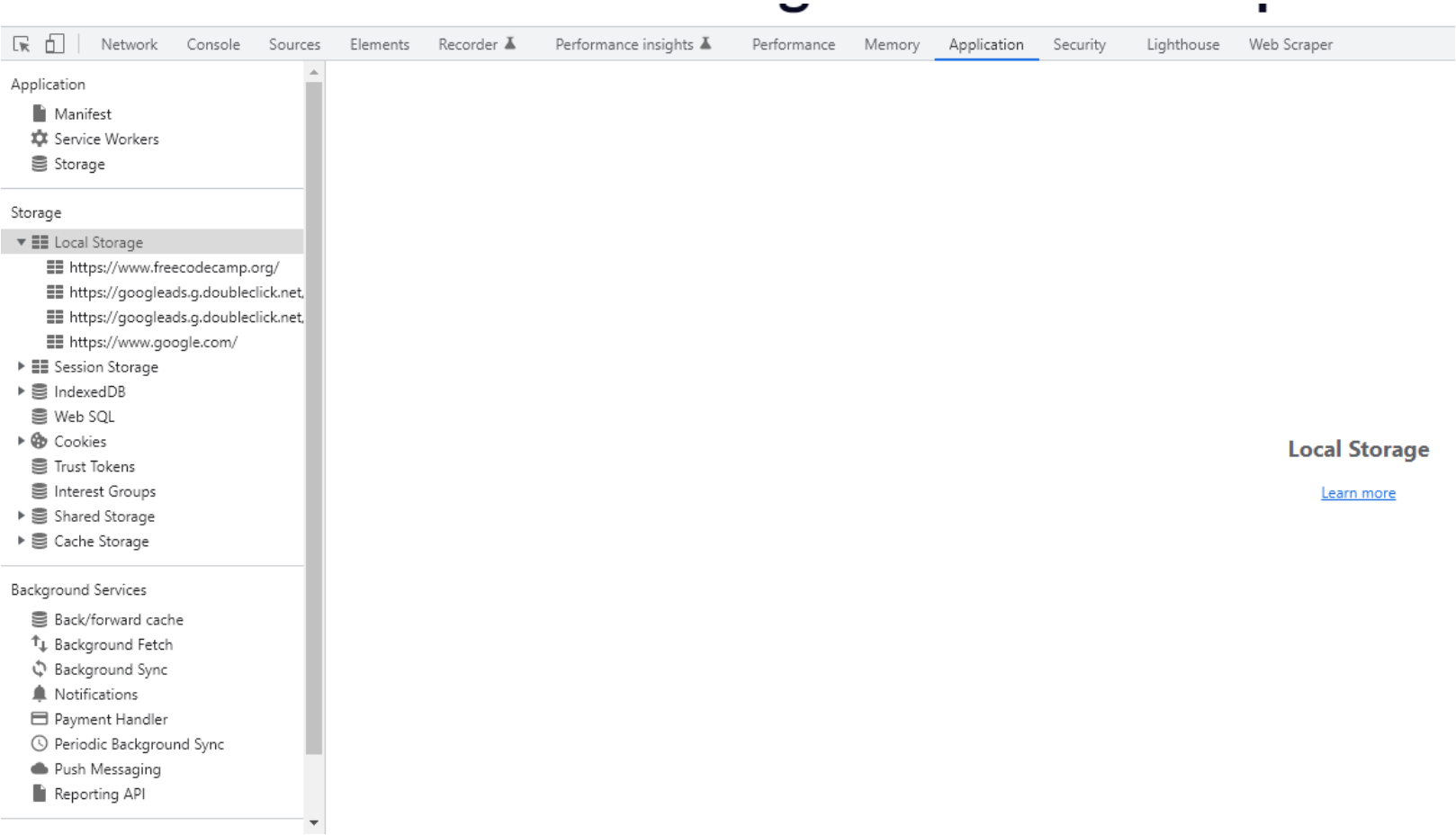
Preserve Log



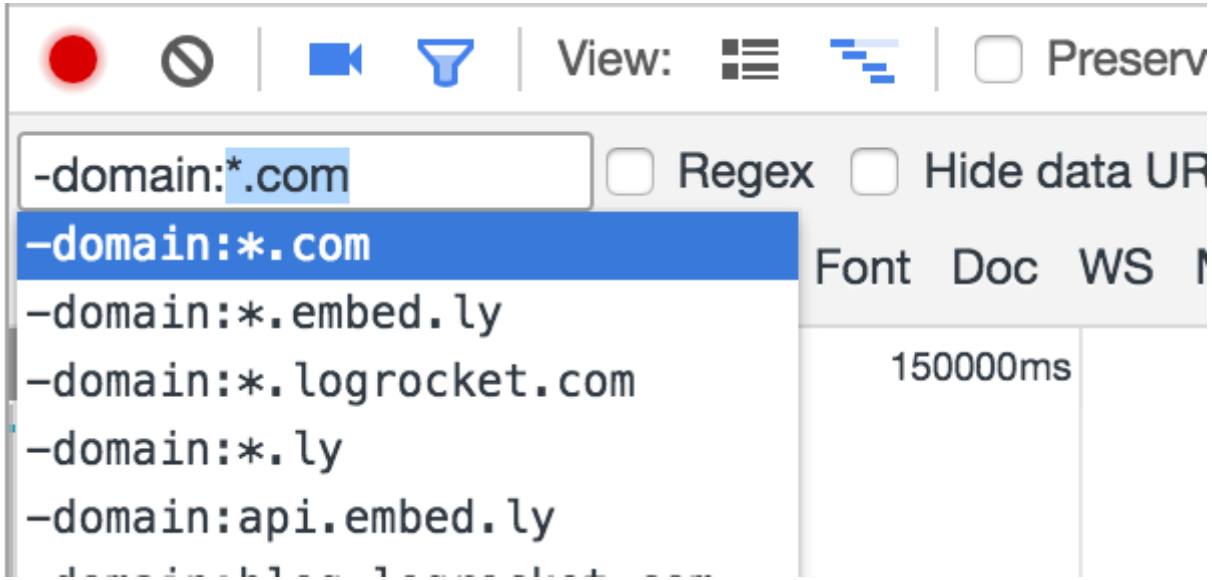
Performance



Storage


Network
Console
Sources
Elements
Recorder
Performance insights
Performance
Memory
Application
Security
Lighthouse
Web Scraper
Application
Manifest
Service Workers
Storage
Storage
Local Storage
https://www.freecodecamp.org/
https://googleads.g.doubleclick.net,
https://googleads.g.doubleclick.net,
https://www.google.com/
Session Storage
IndexedDB
Web SQL
Cookies
Trust Tokens
Interest Groups
Shared Storage
Cache Storage
Background Services
Back/forward cache
Background Fetch
Background Sync
Notifications
Payment Handler
Periodic Background Sync
Push Messaging
Reporting API
Local Storage
Learn more

Network Filters



Request Latency

Network Console Sources Elements Recorder Performance insights Performance Memory Application Security Lighthouse Web Scraper

Preserve log Disable cache No throttling

Filter Invert Hide data URLs All Fetch/XHR JS CSS Img Media Font Doc WS Wasm Manifest Other Has blocked cookies Blocked Requests 3rd-party requests

Use large request rows Group by frame

Show overview Capture screenshots

5 ms 10 ms 15 ms 20 ms 25 ms 30 ms 35 ms 40 ms 45 ms 50 ms 55 ms 60 ms 65 ms 70 ms 75 ms 80 ms 85 ms 90 ms 95 ms 100 ms

Name	Status	Type	Initiator	Size	Time	Waterfall
collect?v=1&_v=j99&a=2001254310&t=pageview&_s=1&dl...5=-&cd6=2017-06-12T16%3A05%3A...	200	xhr	tsp.bundle.js:1	24 B	57 ms	
collect?t=dc&aip=1&_r=3&v=1&_v=j99&tid=UA-55446531...088.1680545460&_u=QACAAEAAAAA...	200	xhr	tsp.bundle.js:1	22 B	149 ms	
cookie.js?domain=www.freecodecamp.org&callback=_gf...80545460%3AS%3DALNI_MazmCs6lqfGx...	200	script	show_ads_impl_fy2021.js:76	53 B	157 ms	
integrator.js?domain=www.freecodecamp.org	200	script	show_ads_impl_fy2021.js:485	122 B	55 ms	
integrator.js?domain=www.freecodecamp.org	200	script	show_ads_impl_fy2021.js:485	138 B	56 ms	
gen_204?id=ach_evt&tn=A&id=banner&cls=banner&ign=false&pw=1920&ph=210&x=0&y=70.80...	204	gif	(index)	20 B	56 ms	
gen_204?id=ach_evt&tn=NAV&cls=site-nav%20nav-padding&ign=false&pw=1920&ph=210&x=0...	204	gif	(index)	20 B	56 ms	
ads?client=ca-pub-9482786369113753&output=html&adk...bl=NS&fu=32768&bc=31&ifi=1&uci=...	200	document		16 B	124 ms	
sodar?sv=200&tid=gda&tv=r20230330&st=env	200	xhr	tsp.bundle.js:1	11.3 kB	69 ms	
rum	204	xhr	tsp.bundle.js:1	186 B	6 ms	
sodar2.js	200	script	show_ads_impl_fy2021.js:60	6.4 kB	122 ms	
runner.html	200	document	sodar2.js:32	5.1 kB	27 ms	
aframe	200	document		536 B	60 ms	
hMk8RYfShm1WO-i6nufLdZfHD_DaI5FkV6wggQWjY74.js	200	script	tpc.googlesyndication.com/sodar/sodar2/...	14.2 kB	19 ms	
generate_204?yVHu_A	204	text/plain	Other	10 B	20 ms	
sodar?id=sodar2&v=225&t=2&li=gda_r20230330&jk=1096...-rhkbu7HLiTFQMGQf9BymIOTNNFO8...	204	text/html	Other	0 B	55 ms	
sodar?id=sodar2&v=225&li=gda_r20230330&jk=1096958594781856&rc=null	204	text/html	aframe	0 B	52 ms	
collect?v=2&tid=G-FKVJ4HT3MH&gtm=45je33t0&_p=20012...ques&en=page_view&ep.post_autho...	204	ping	js?id=G-FKVJ4HT3MH&l=dataLayer&cx=c...	17 B	52 ms	
rum	204	ping	vb26e4fa...:1	60 B	6 ms	

Debugging in production

Network Console Sources Elements Recorder Performance insights Performance Memory Application Security Lighthouse Web Scraper

Page Filesystem Overrides

- top
  - www.freecodecamp.org
    - news
      - assets
        - css
        - js
          - fitvids-5d12072cbf.js
          - toggle-ad-layout-099254b065.js
      - mastering-chrome-developer-tools-next-level-
  - Page Manipulator
  - adservice.google.co.in
  - adservice.google.com
  - cdn-media-1.freecodecamp.org
  - cdn.freecodecamp.org
  - fonts.googleapis.com
  - fonts.gstatic.com
  - pagead2.googlesyndication.com
  - partner.googleadservices.com
  - static.cloudflareinsights.com
  - tpc.googlesyndication.com
  - tweak: mock and modify HTTP requests
  - www.google-analytics.com
  - www.googletagmanager.com
  - aframe
  - aswift_0 (ads)
  - google_esf (zrt_lookup.html)

fitvids-5d12072cbf.js

```
4          let count = 0;
5
6          if (!document.getElementById('fit-vids-style')) {
7            const head = document.head || document.getElementsByTagName('head')[0];
8            const css =
9              // eslint-disable-next-line max-len
10             '.fluid-width-video-container{flex-grow: 1;width:100%;}.fluid-width-video-wrapper{width:100%;position:relative;padding:0;}.flu
11           const div = document.createElement('div');
12   0.2 ms  div.innerHTML = '<p>x</p><style id="fit-vids-style">' + css + '</style>';
13   0.1 ms  head.appendChild(div.childNodes[1]);
14         }
15
16   0.3 ms [...postContent.children].forEach(node => {
17           const selectors = [
18             'iframe[src*="player.vimeo.com"]',
19             'iframe[src*="youtube.com"]',
20             'iframe[src*="youtube-nocookie.com"]',
21             'iframe[src*="kickstarter.com"][src*="video.html"]',
22             'iframe[src*="player.bilibili.com"]',
23             'object',
24             'embed'
25           ];
26
27           let allVideos = [...node.querySelectorAll(selectors.join(','))];
28           allVideos = allVideos.filter(node => node !== 'object object');
29
30           allVideos.forEach(videoNode => {
31             if (
32               (videoNode.tagName.toLowerCase() === 'embed' &&
33                 videoNode.parentNode.getAttribute('object').length) ||
34               videoNode.parentNode.classList.contains('fluid-width-video-wrapper')
35             ) {
36               return;
37             }
38             if (
39               !getComputedStyle(videoNode)['height'] &&
40               !getComputedStyle(videoNode)['width'] &&
41               (isNaN(videoNode.getAttribute('height')) ||
42                 isNaN(videoNode.getAttribute('width')))
43             ) {
```

Other Browsers are similar?

Pretty much same with different panel names

Browser Data Storage - Insights

Cookies vs. Local Storage vs. Session Storage

	Cookies	Local Storage	Session Storage
Capacity	4kb	10mb	5mb
Browsers	HTML4 / HTML 5	HTML 5	HTML 5
Accessible from	Any window	Any window	Same tab
Expires	Manually set	Never	On tab close
Storage Location	Browser and server	Browser only	Browser only
Sent with requests	Yes	No	No

Knowledge Check

- Situation: You want to analyze the network traffic of a webpage and find out which requests are taking the longest time to load.
- Question: Which panel in Chrome DevTools should you use to analyze the network requests and responses of a webpage?

- Situation: You want to inspect and manipulate browser storage, such as cookies and local storage.
- Question: Which panel in Chrome DevTools should you use to inspect and manipulate browser storage on a webpage?

Pre-Requisites: Installing Git & Setup

For Windows:

1. Download the Git for Windows installer from the Git website.
2. Run the installer and follow the prompts.
3. Open the command prompt and type "git --version" to confirm that Git was installed correctly.

For macOS:

1. Install Xcode command-line tools by running the command "xcode-select --install" in the terminal.
2. Install Homebrew package manager by running the command "/bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/HEAD/install.sh)""
3. Install Git by running the command "brew install git" in the terminal.
4. Type "git --version" to confirm that Git was installed correctly.

For Linux:

1. Open the terminal and run the command "sudo apt-get update".
2. Install Git by running the command "sudo apt-get install git".
3. Type "git --version" to confirm that Git was installed correctly.

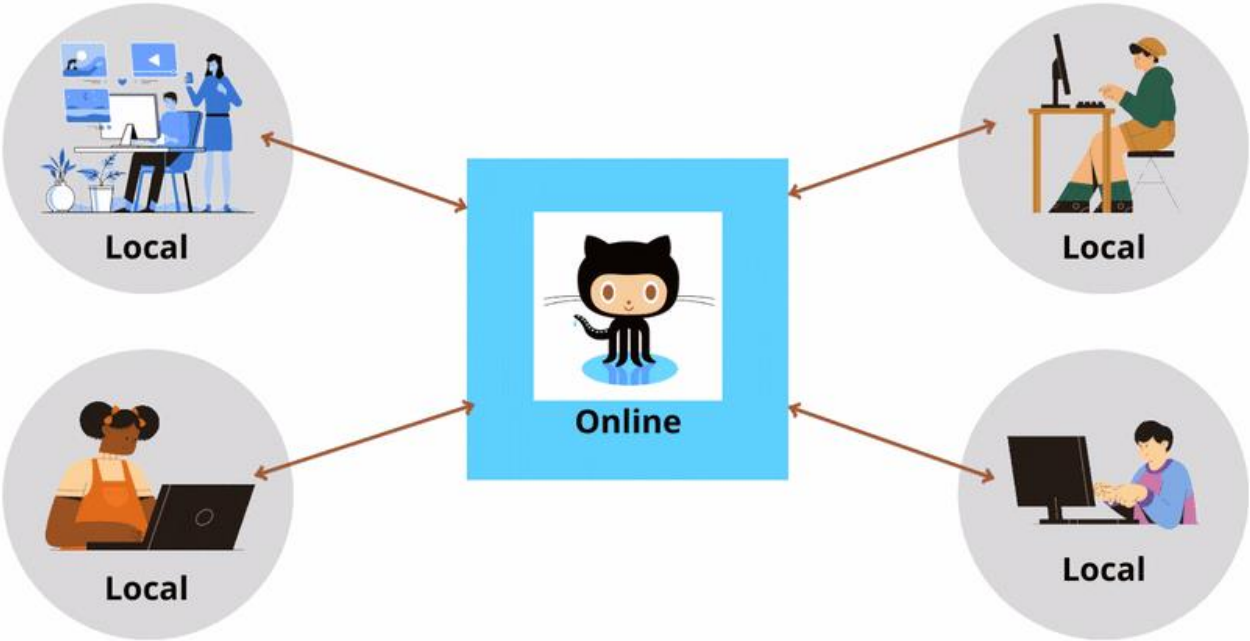
Create GitHub Account

Why Git?

Problems with this approach

- Overwriting the changes
- Track versioning

Users working on same file



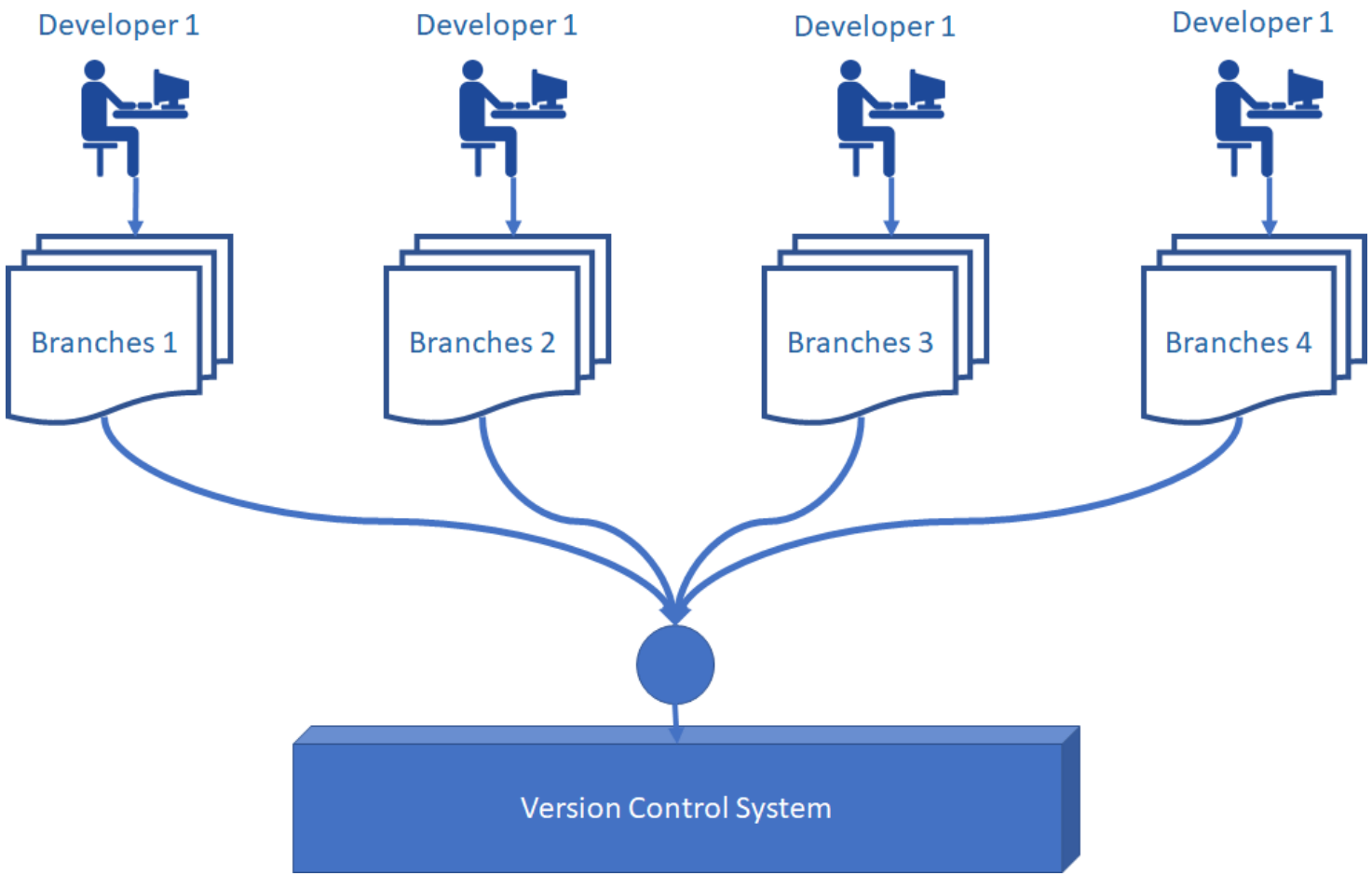
Why Git?

- Overwriting the changes
- Difficult to Track Versions

You Co-worker be like..

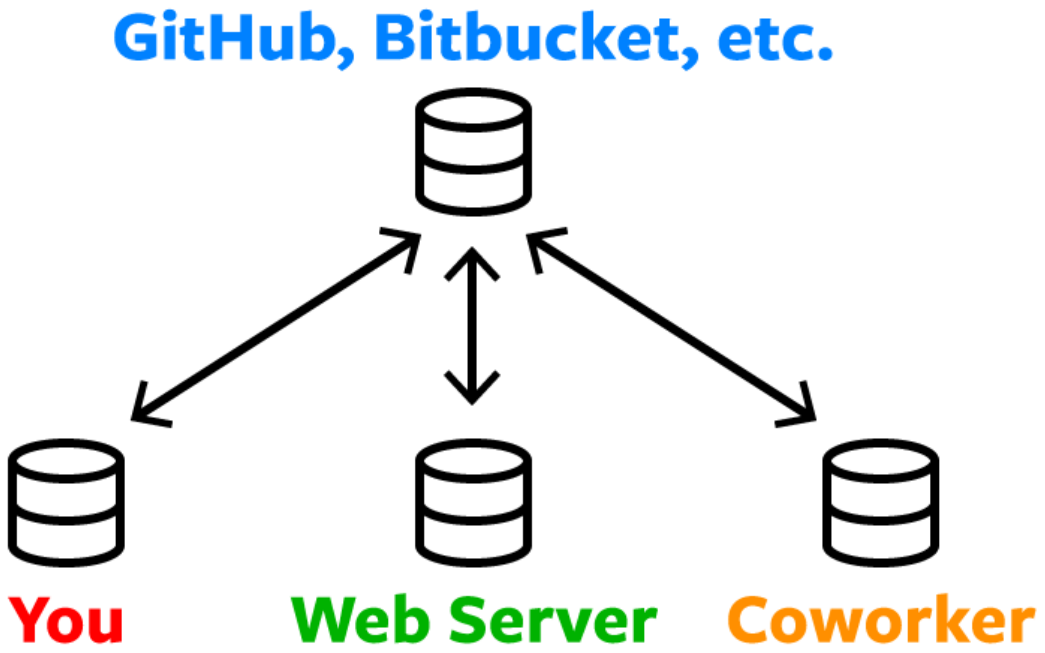
Version Control System

Version Control is a system that records changes made to files



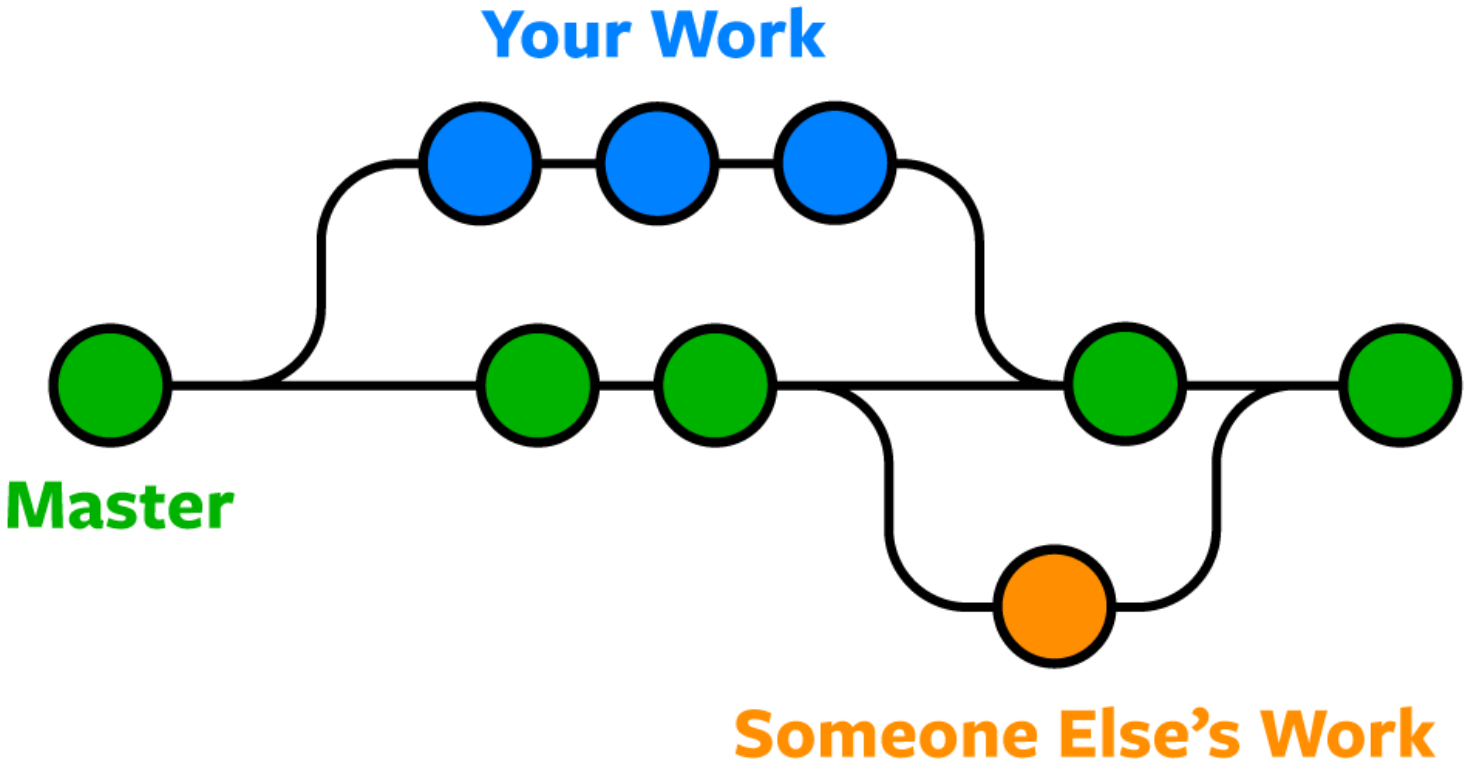
- Which changes were made?
- Who made the changes?
- When were the changes made?
- Why were changes needed?

Distributed Version Control System

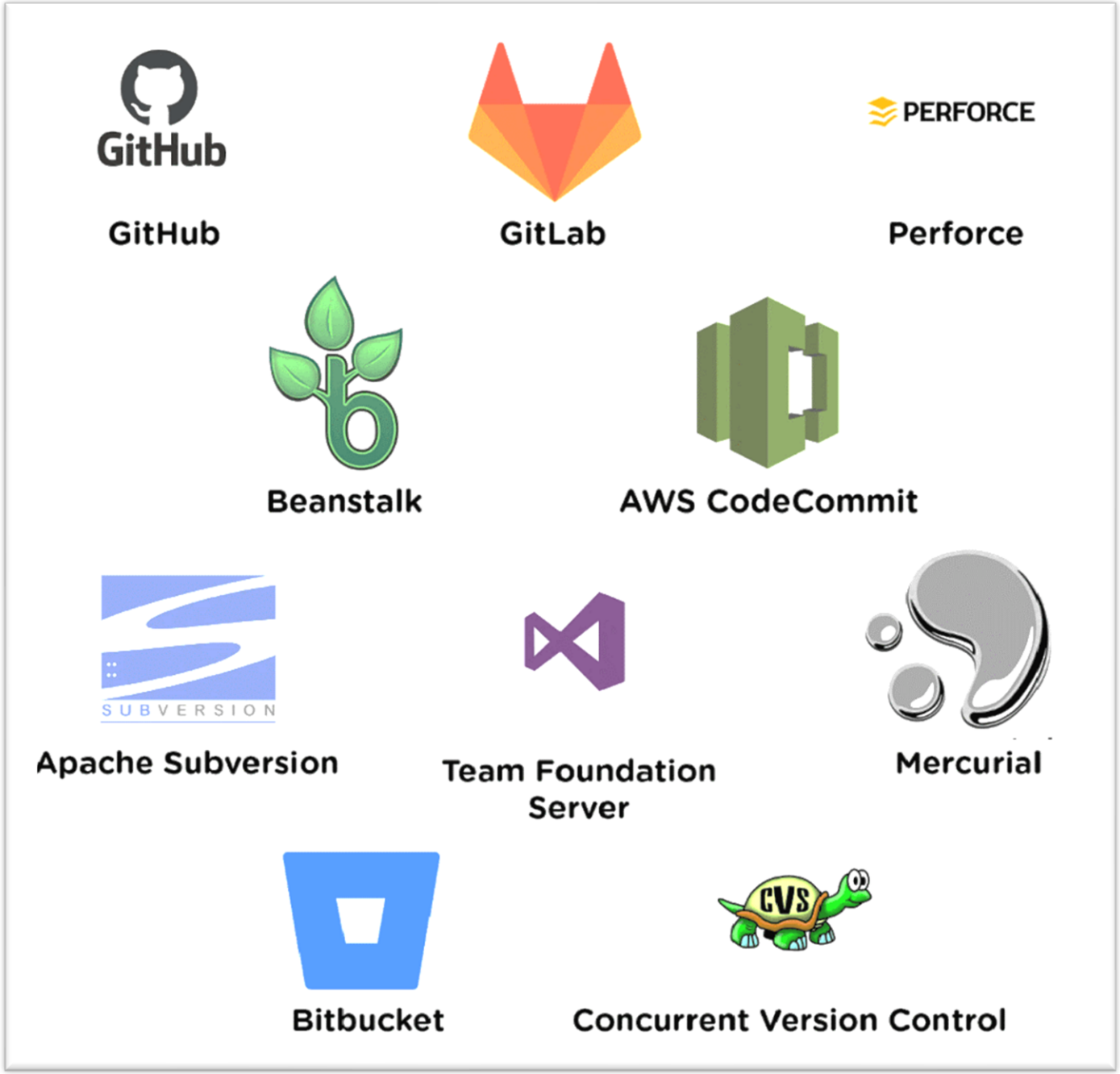


Why Git?

Distributed Version Control System



Different VCS

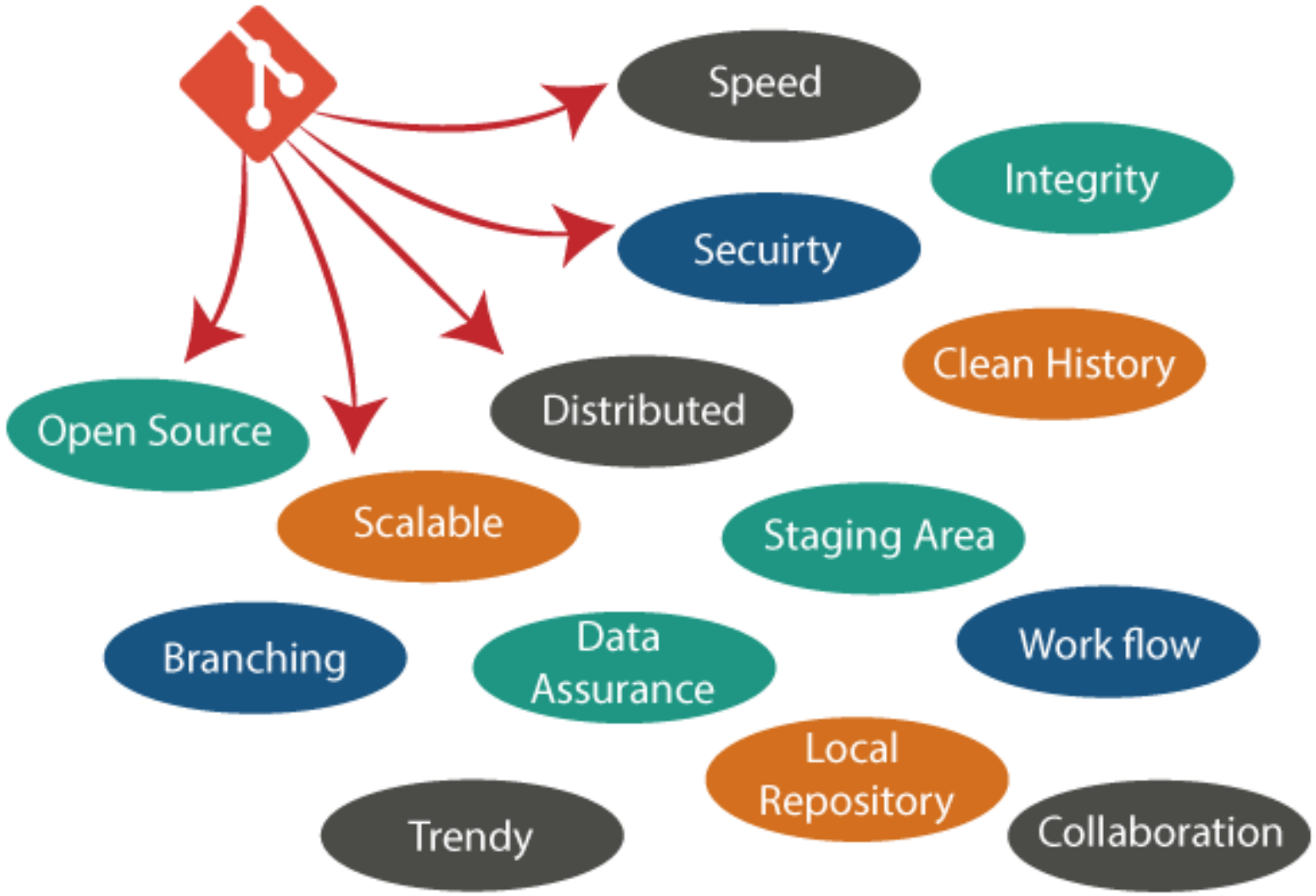


What is git

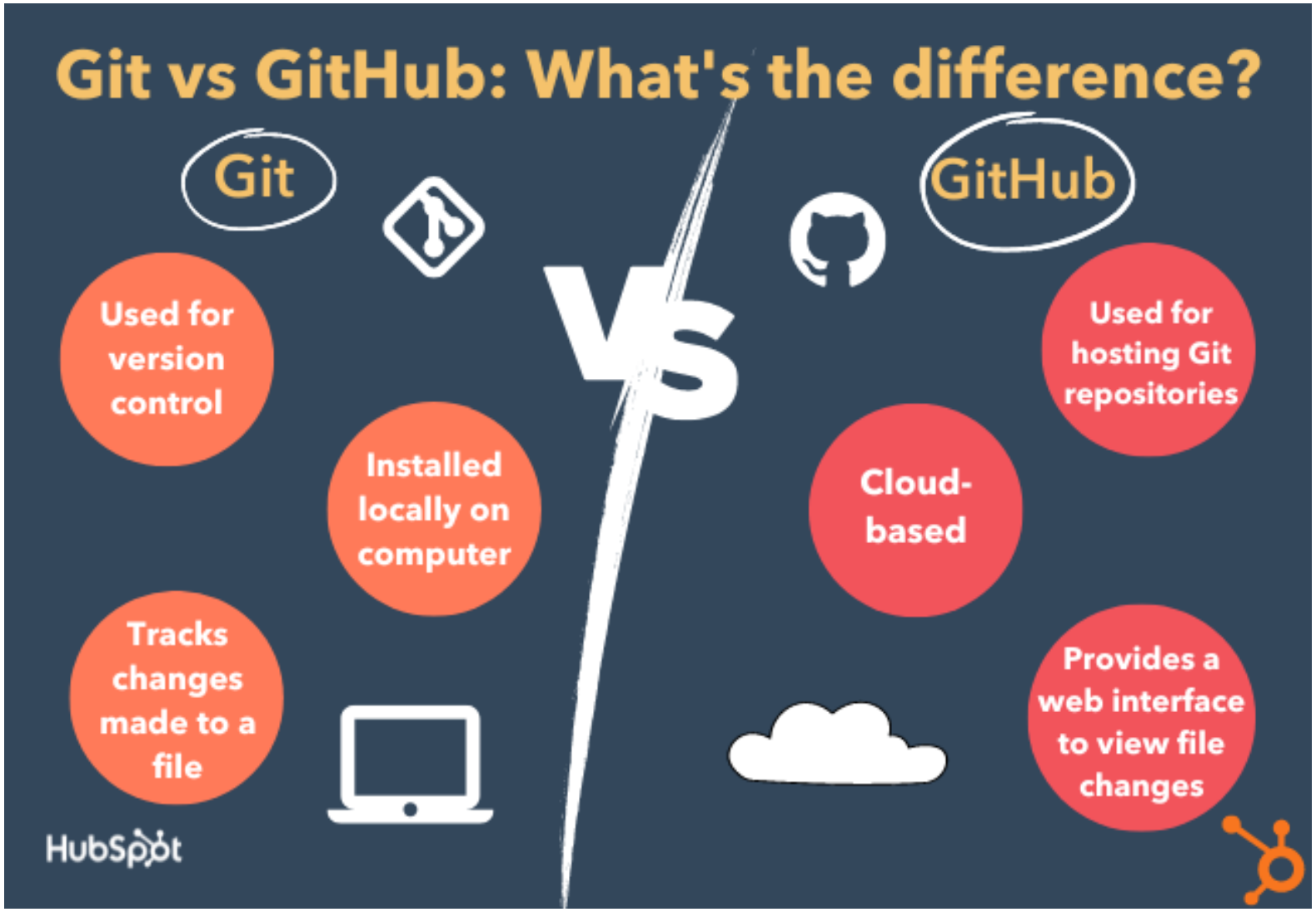
Version Control is a system that records changes made to files
Created by Linus Torvalds in 2005 for development of the Linux

- **Distributed Version Control System**
- **Collaboration**
- **CI / CD pipelines**

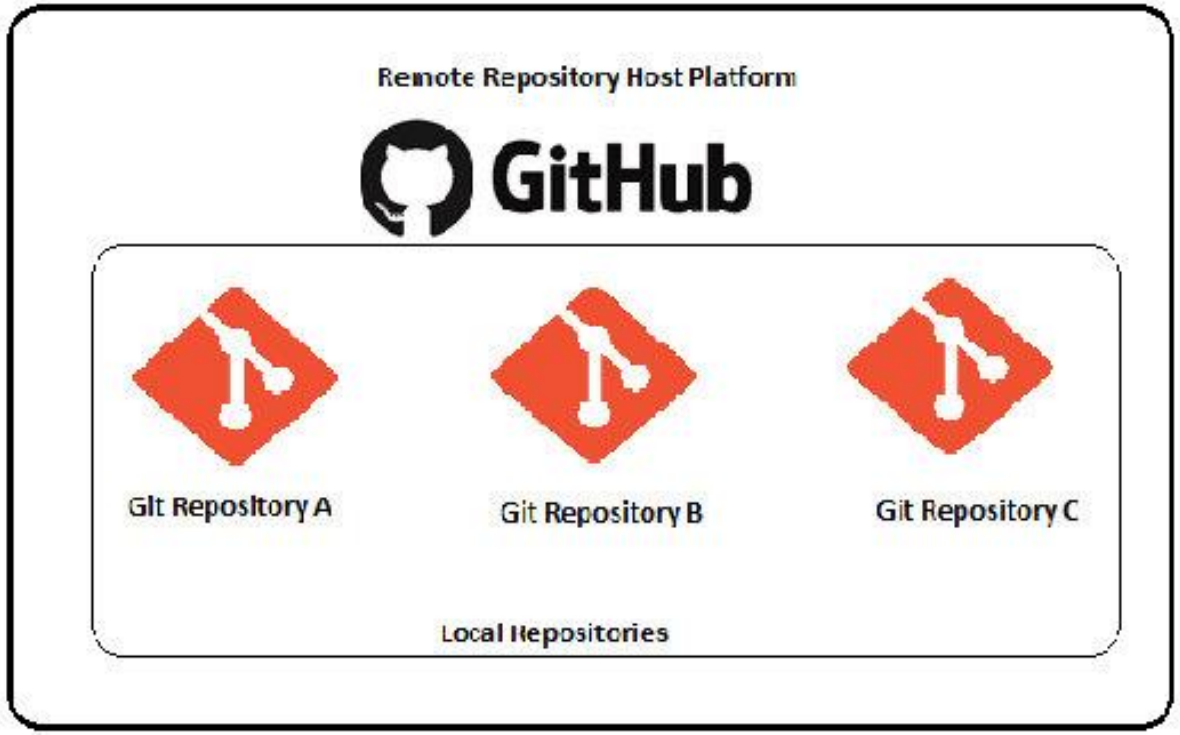
Why Git?


Speed
Integrity
Secuirty
Clean History
Distributed
Open Source
Scalable
Staging Area
Branching
Data Assurance
Work flow
Local Repository
Trendy
Collaboration

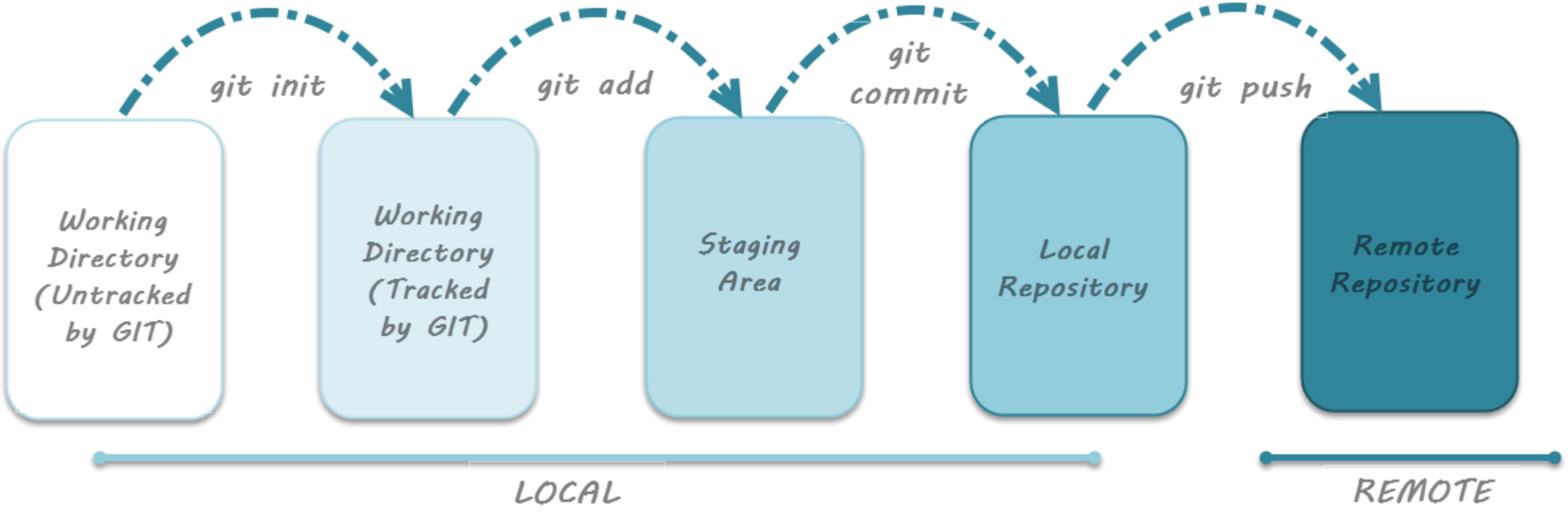
Git Vs Github



Git Vs Github



Git Life Cycle

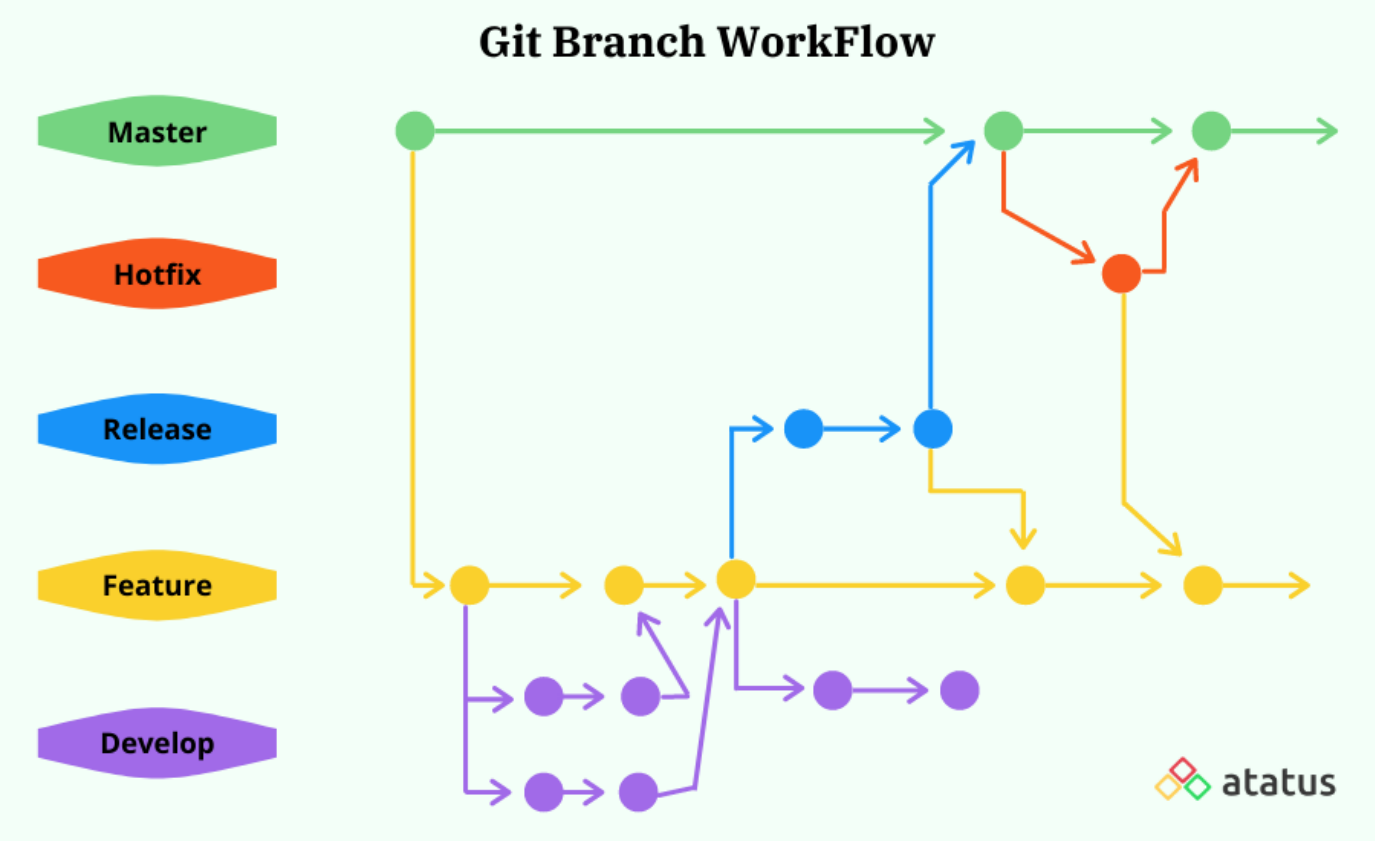


Git Commands

Command	Usage	Description
`git init`	`git init`	Initializes new repository in the current directory (adds `.git` folder)
`git clone`	`git clone https://github.com/sirMerr/git-ppt.git`	Makes a copy of a remote repository locally (to your computer)
`git status`	`git status`	Displays untracked, changed or staged files (status of repo)
`git add`	`git add .`, `git add fileA src/fileB.js`	Add current state of file(s) to staging
`git commit`	`git commit -m 'Update README.md`	Anything that's been staged with `git add` will become a part of the snapshot with git commit
`git pull`	`git pull`	Update local repository with changes from remote one. Usually used when teammate makes changes and you want to receive them in your working directory
`git push`	`git push`	Pushes new commits to remote repository

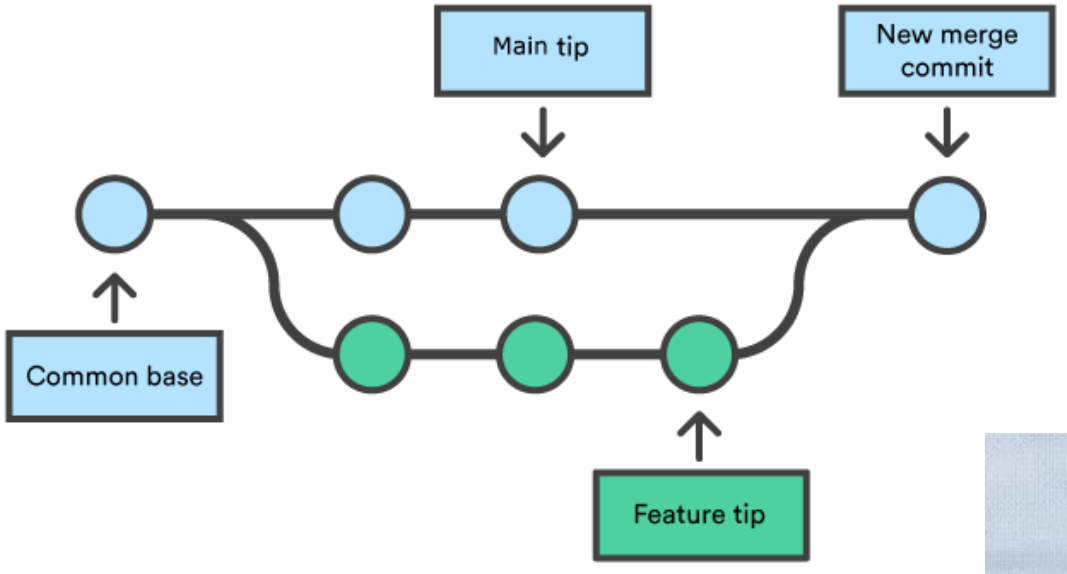
Branching

1. A list of commits in a separate unit.
2. 'Branching out'.
3. Each branch should have a singular purpose.
4. Usually for a feature or fix.



Example branching strategy

Merging



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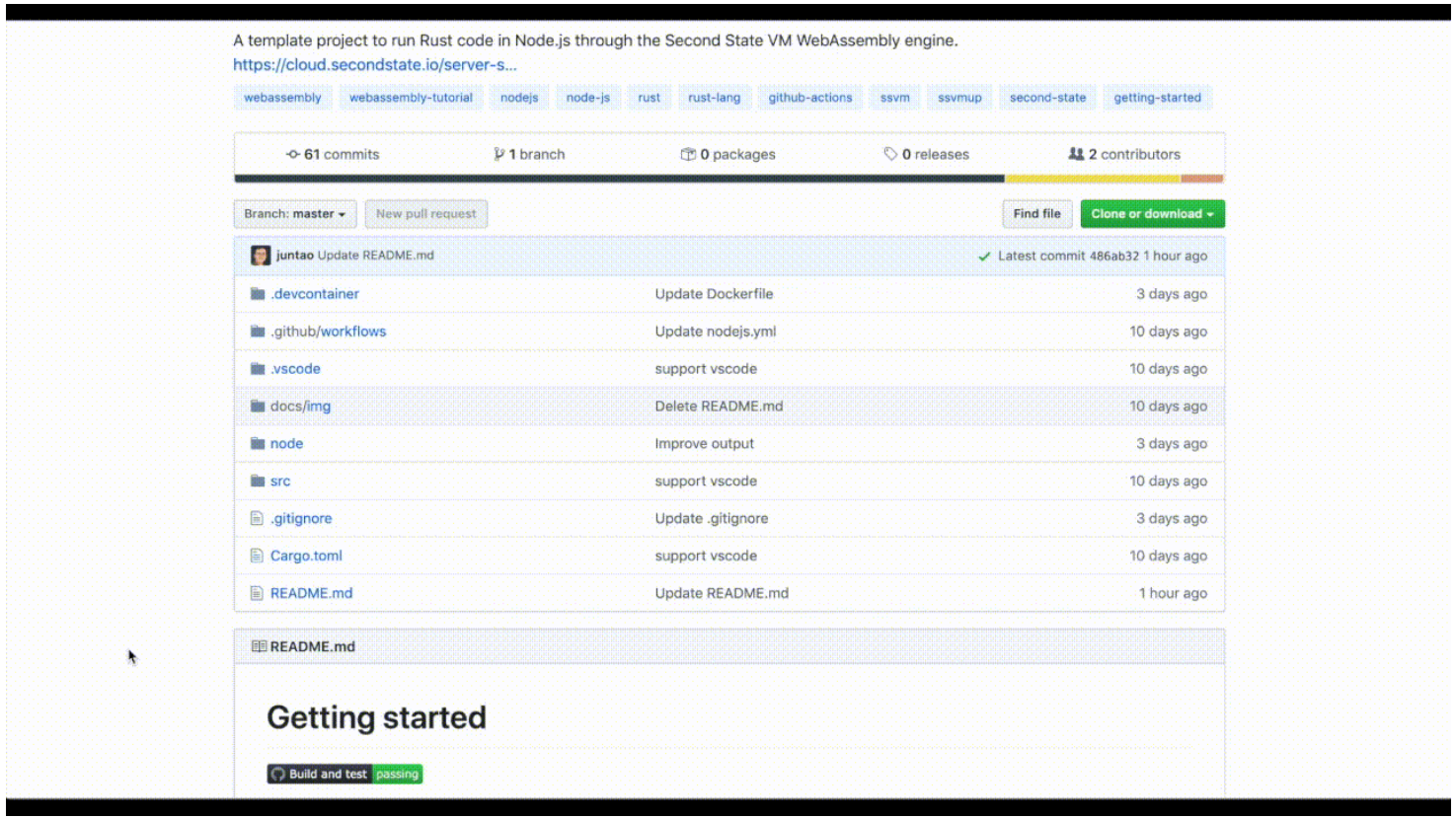
Intro to AI era in GitHub

Setup is a big pain....

In the era of AI, I don’t want to code on my machine and do all the setup!

GitHub Codespaces

1. Start Coding right in the browser
2. Cloud development environment
3. Faster than your machine



GitHub Codespaces

Code from any device

Want to code on an iPad? Go for it. You can spin up Codespaces from any device with internet access. And forget about worrying if your device is powerful enough. Codespaces lives in the cloud.

Onboard at the speed of light

No more building your dev environment while you onboard. Codespaces starts instantly from any repository on GitHub with pre-configured, secure environments. It's as easy as clicking a button.

Model, train, and analyze data

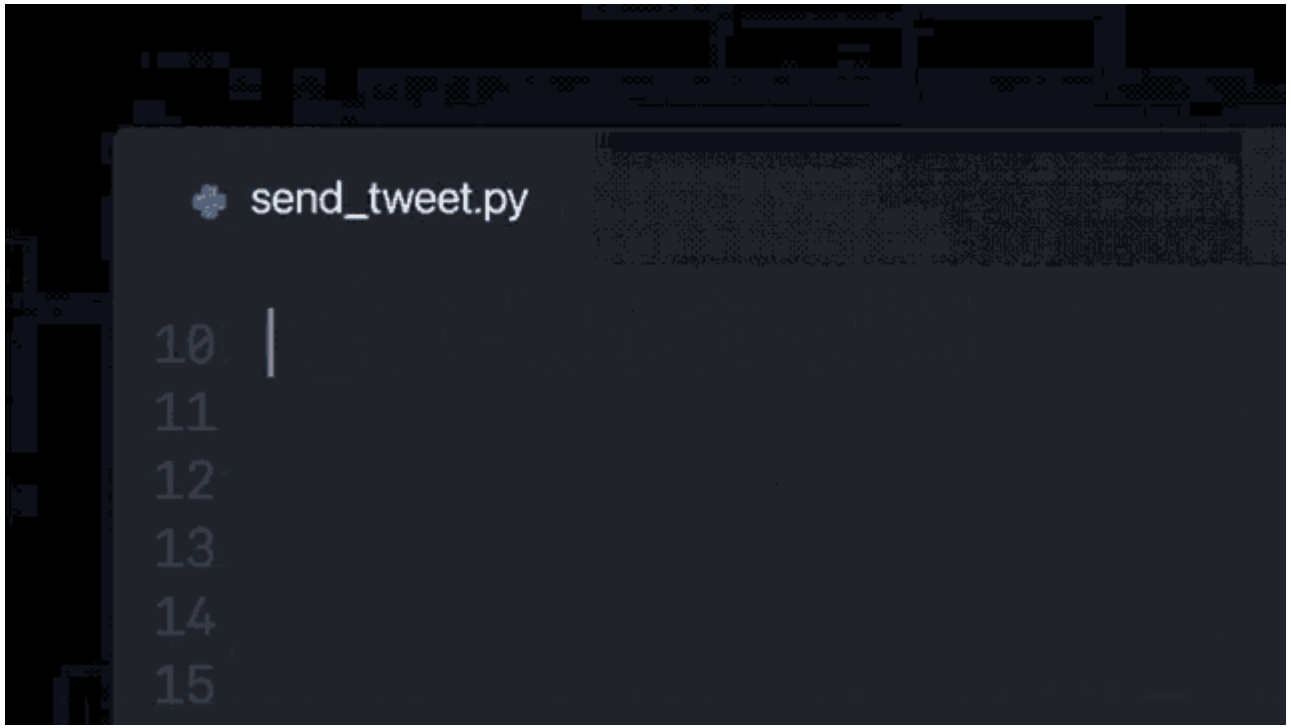
Run Jupyter notebooks right from Codespaces. Now data scientists and developers can code, develop models, and collaborate in powerful compute environments that spin up in seconds.

Fix bugs right from a pull request

Got a pull request detailing a bug or security issue? Open Codespaces right from the pull request to get to work without waiting for your dev environment to load.

Code review and quality is big pain.. Pull requests not getting approved??

GitHub-Copilot, your AI pair programmer



-Give Instruction, copilot will write for you
-Automate unit testing
-Automate code review
-Code quality

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Activity: Branching

Activity: Commit & Pushing

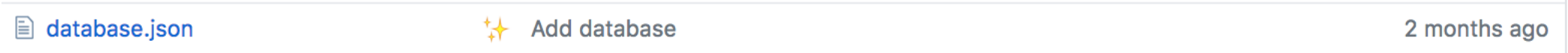
Activity: Pull requests

Using in VS Code

Best Practices & Resources

Commit message should be

- < 50 characters
- A present tense action verb (Add/Update) followed by what was changed



Your pull request

- < 50 characters
- A present tense action verb (Add/Update) followed by what was changed

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Q & A