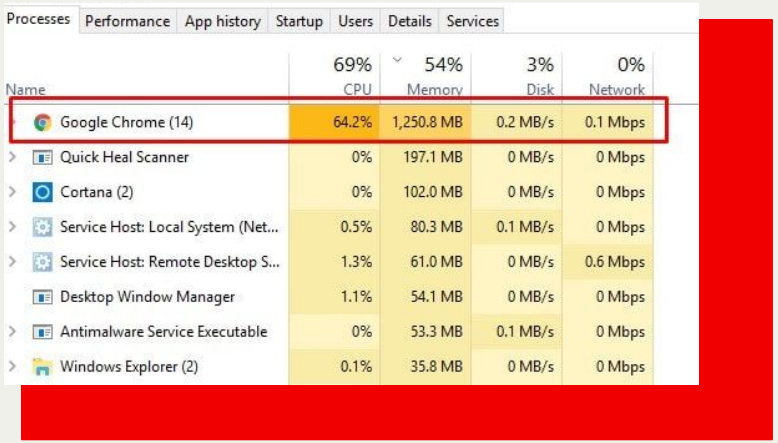
Why Google Chrome takes up so much GPU



Has this ever happened to any of you?

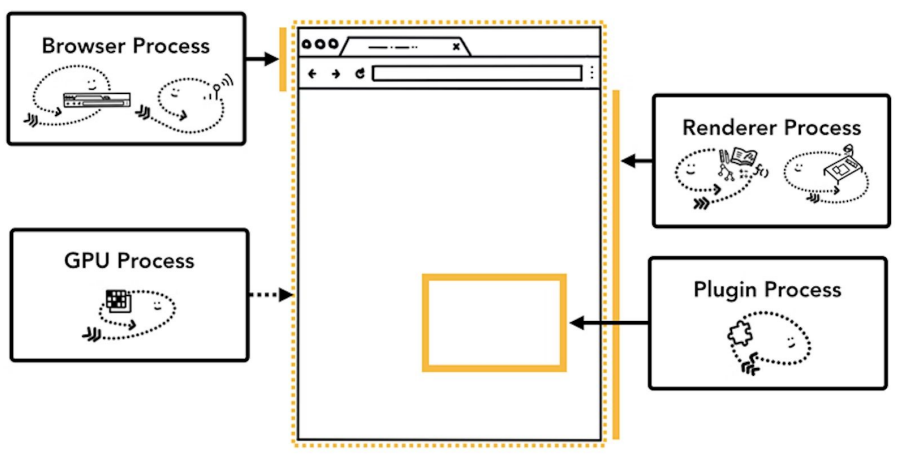
My presentation is about why it's built like this and how you can tune it down if needed

How Google Chrome Works

- Google Chrome operates by a process-based model
  - Every time you open a new tab, it creates a process and runs it in the background
  - Processes are allocated private memory space per process!
  - Processes render web pages, manage extensions, and handle user input.
- Chrome's main process is the Browser Process
  - This general process manages all windows, UI, and processes

Other Processes

- Renderer Process
  - Reads the website's build to display webpages
- GPU Process
  - Draws images, videos, and animations
- Plugin process
  - Communicates between web plugins and other processes
  - This was a part of Chrome's old model but they have changed to modern APIs with built-in capabilities
- A subprocess: Network service!
  - Acquires data like web pages and files and handles connections

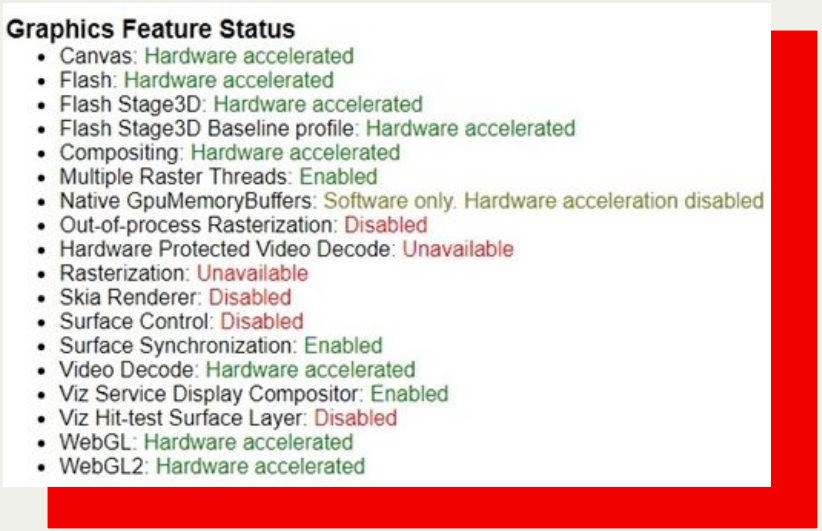


Why this can be good if your computer can handle it

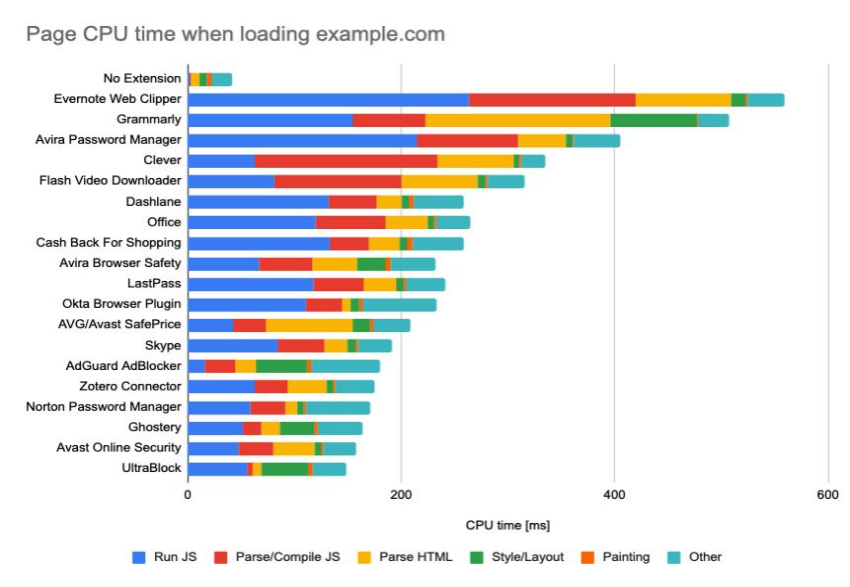
- When a process crashes, it doesn’t stop the program
  - Since each tab is split into its own process with its own data, it doesn’t affect the other processes
- The process-based model provides better security
  - Data is harder to access between processes since they are each given different memory spaces
  - Operating systems provide ways to restrict processes’ privileges so that access to private information could be denied to the processes themselves

Hardware Acceleration

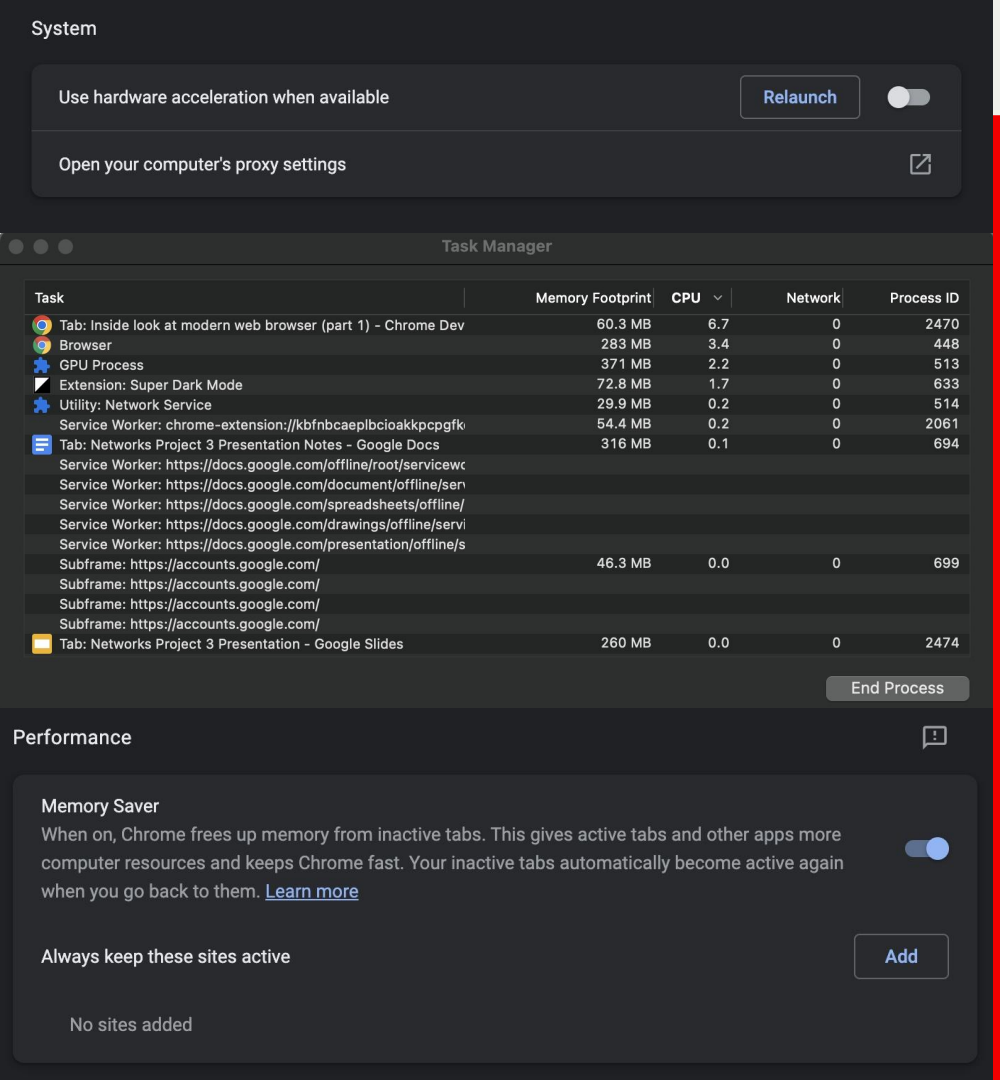
- The process-based model results in some processes doing similar tasks with duplicate data
  - These processes hit a cap in terms of allocated CPU
- Processes can be allocated more CPU if hardware acceleration is approved
  - This new space comes from offloading some of the data in the CPU, GPUs, or DSPs (digital signal processors)



Chrome Extensions



- User-installed extensions can be added to enhance user experience
  - They run in the background and monitor certain activities, even when the browser is idle
- These extensions are offered by multiple companies
  - can be unoptimized and can take up a lot more CPU usage than necessary



How to Minimize CPU usage?

1. Turn off hardware acceleration
2. Use Chrome's task manager to find taxing extensions and disable them
3. Enable memory saver

Works Cited

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