Assignment 2

Inspect Element
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Intro

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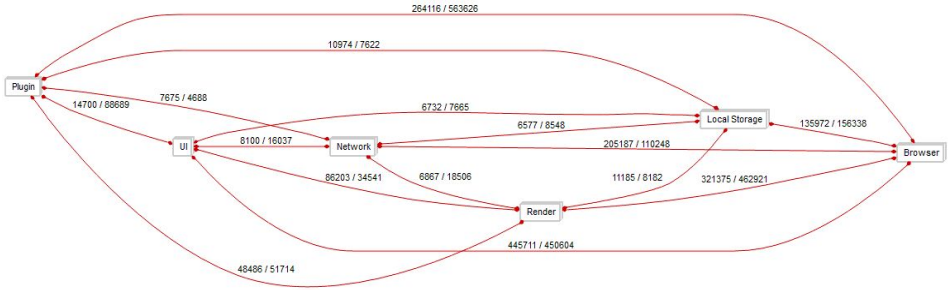
Derivation Process

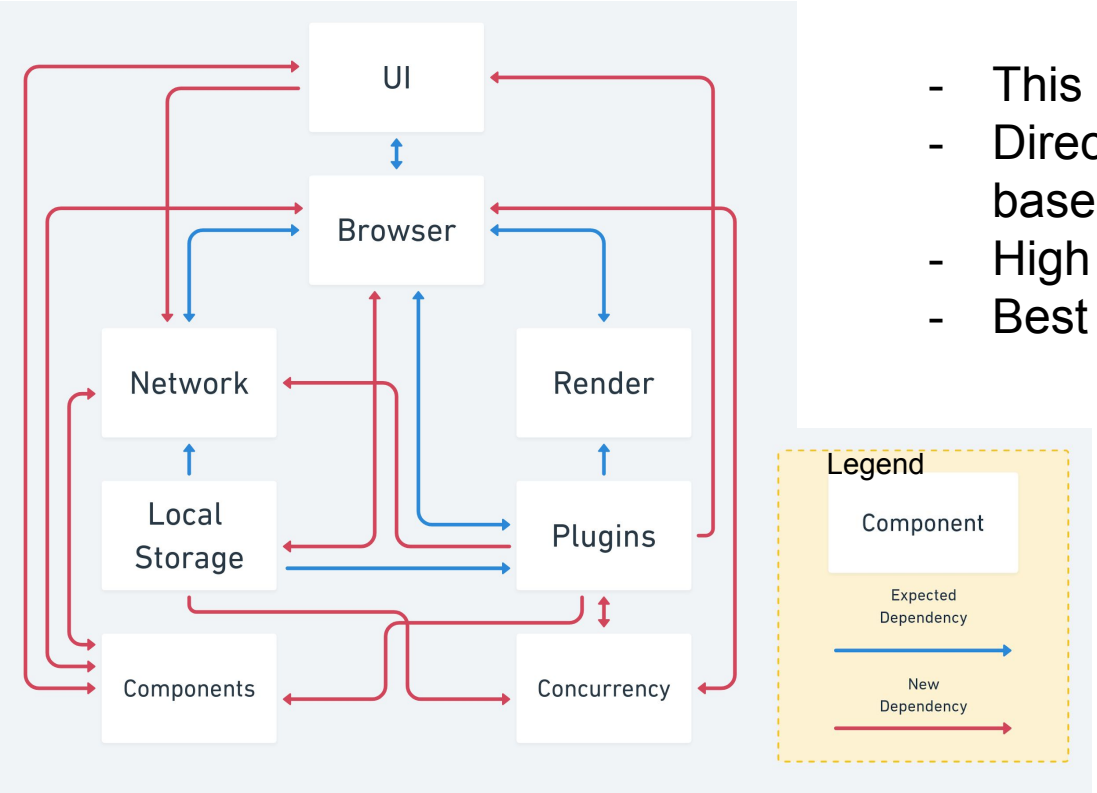
- To maximize the cohesion of our architecture, we looked through each directory in Understand one by one.
- This optimization for cohesion came with a price in the form of coupling. Each element is fully connected with high numbers of dependencies.
- This violates the benefits of our architecture style, as this level of coupling makes it impossible to change the implementation of one subsystem without affecting other subsystems
- It became clear to us that our architecture needed to change to change to correct this violation

Derivation, Continued

- To reduce coupling, we changed our approach
- Focusing on the purpose of the classes within the directory, we moved directories as units, choosing the most common purpose for each
- Although lower cohesion, we believe that these changes better reflect the concrete architecture
- Created two new subsystems...



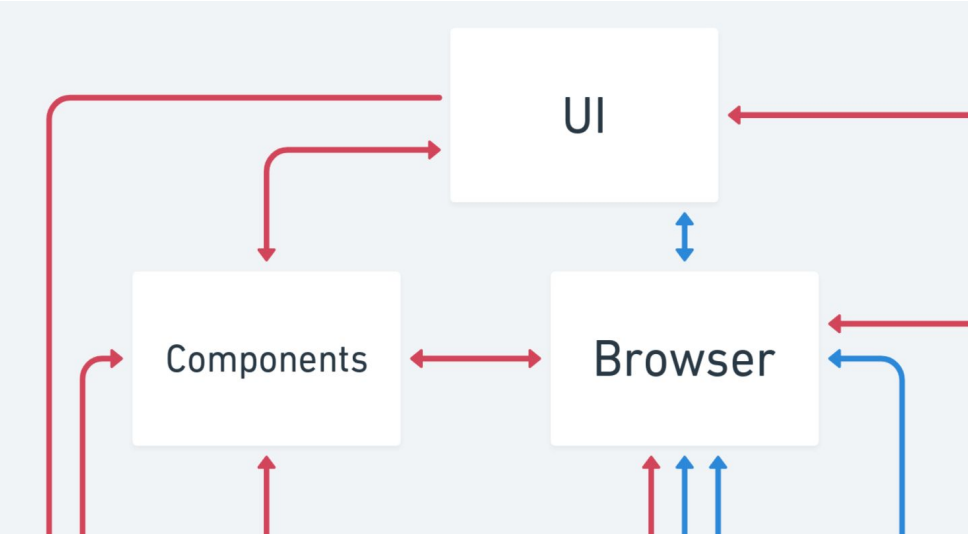
Concrete Architecture

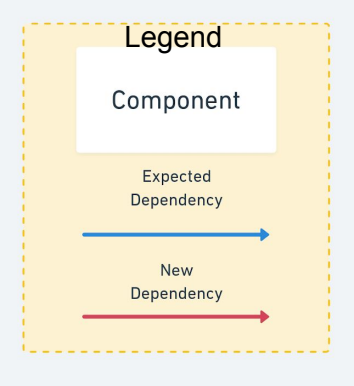


- This is the concrete architecture
- Directories were searched and sorted based on relations and services
- High coupling and high cohesion
- Best reflects Chrome as it is today

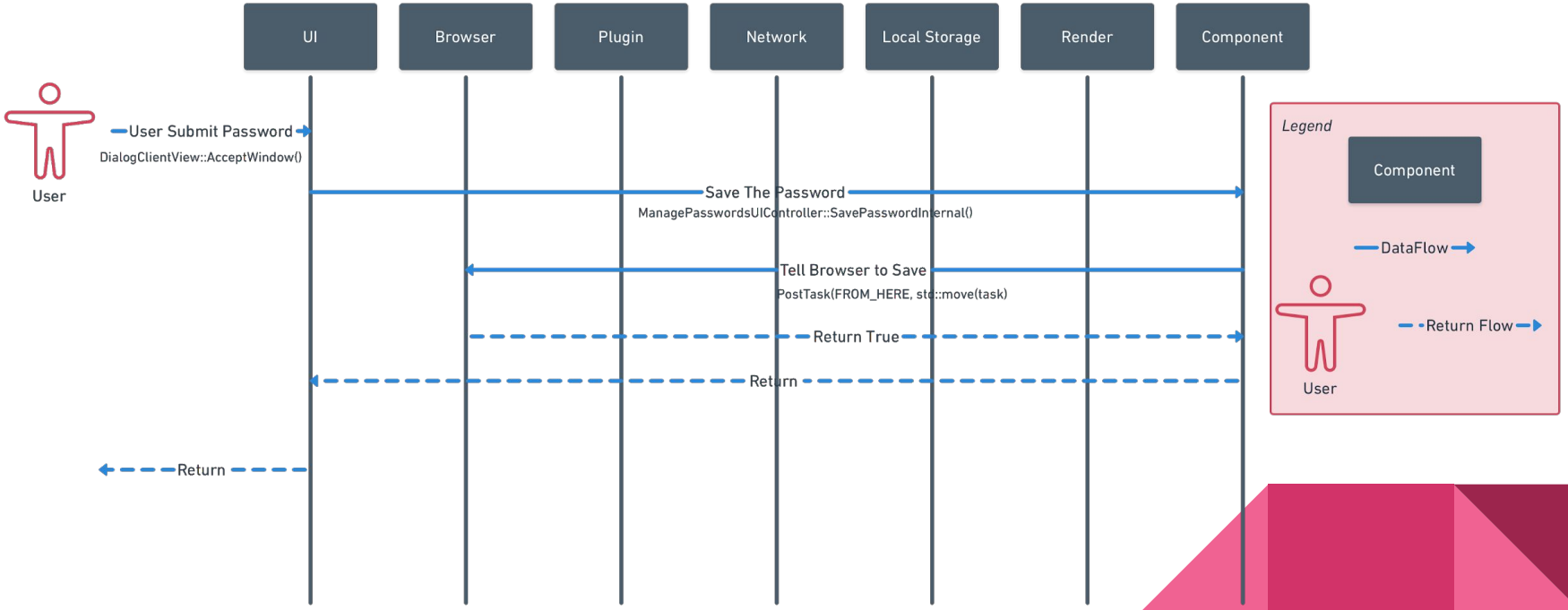
Justification

- The concrete is object-oriented and is *not* layered
  - Too many dependencies
- UI -> Browser becomes UI <-> Browser
  - Platforming handling
- New subsystem Components is codependent on UI

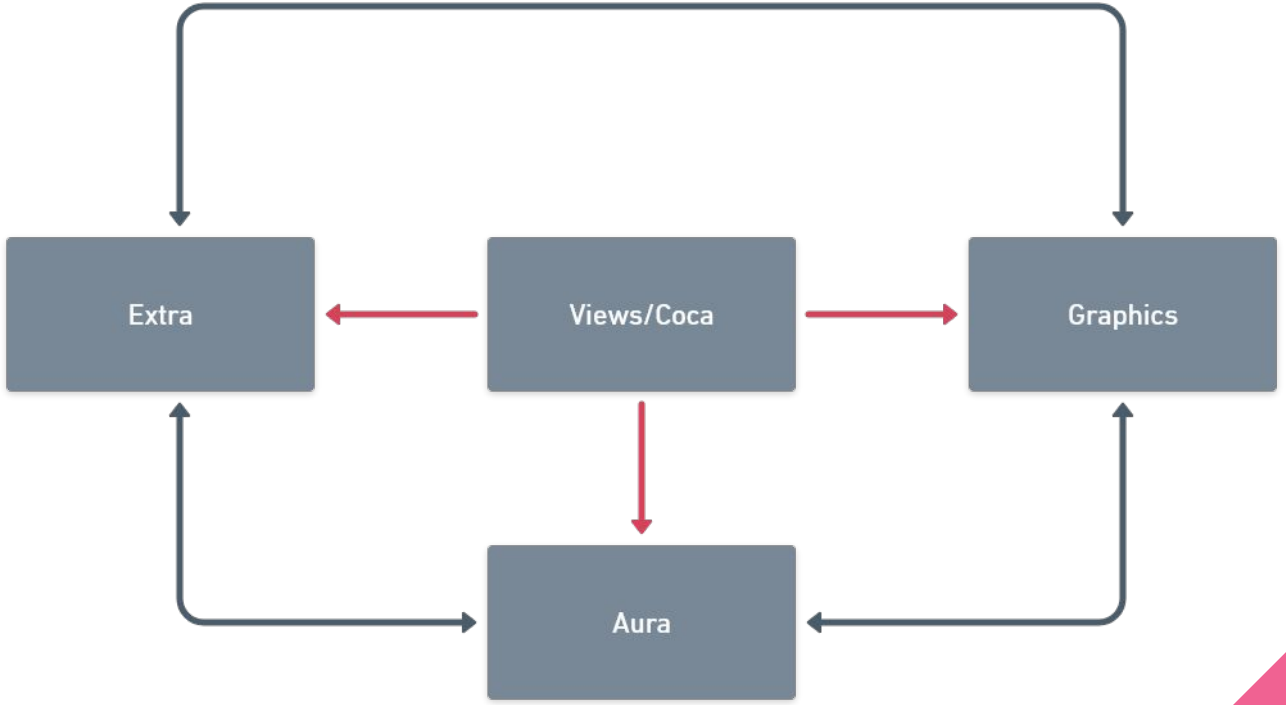


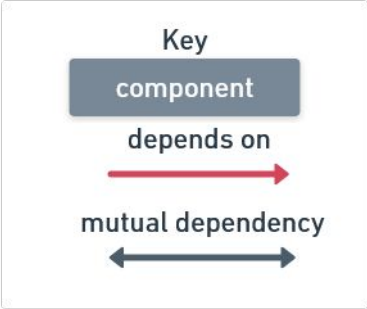


Sequence Diagram



Concrete UI


Extra
Views/Coca
Graphics
Aura


Key
component
depends on
mutual dependency

Concurrency

- We originally required a “centralized concurrency controller”
- Previously determined to be a part of Browser subsystem
- Upon researching the concrete architecture, we discovered that this was its own subsystem
- Our previous report had noted that Mojo was the system they were using
- Thus, we created the “Concurrency” subsystem
- Main dependencies:
  - Plugin: for controlling sandboxed plugins, broker interfaces
  - Browser: for handling tabs, windows, iframes

Components

- Our previous report suggested multiple extensions assessing the plugin subsystem
- We neglected to include these in any subsystem
- After viewing the codebase, the components directory housed most of these extensions, however were given more permissions
- Main dependencies:
  - UI: for interaction with the application window (bookmarks' 'star')
  - Network: for network access & network interruptions

A3 Idea

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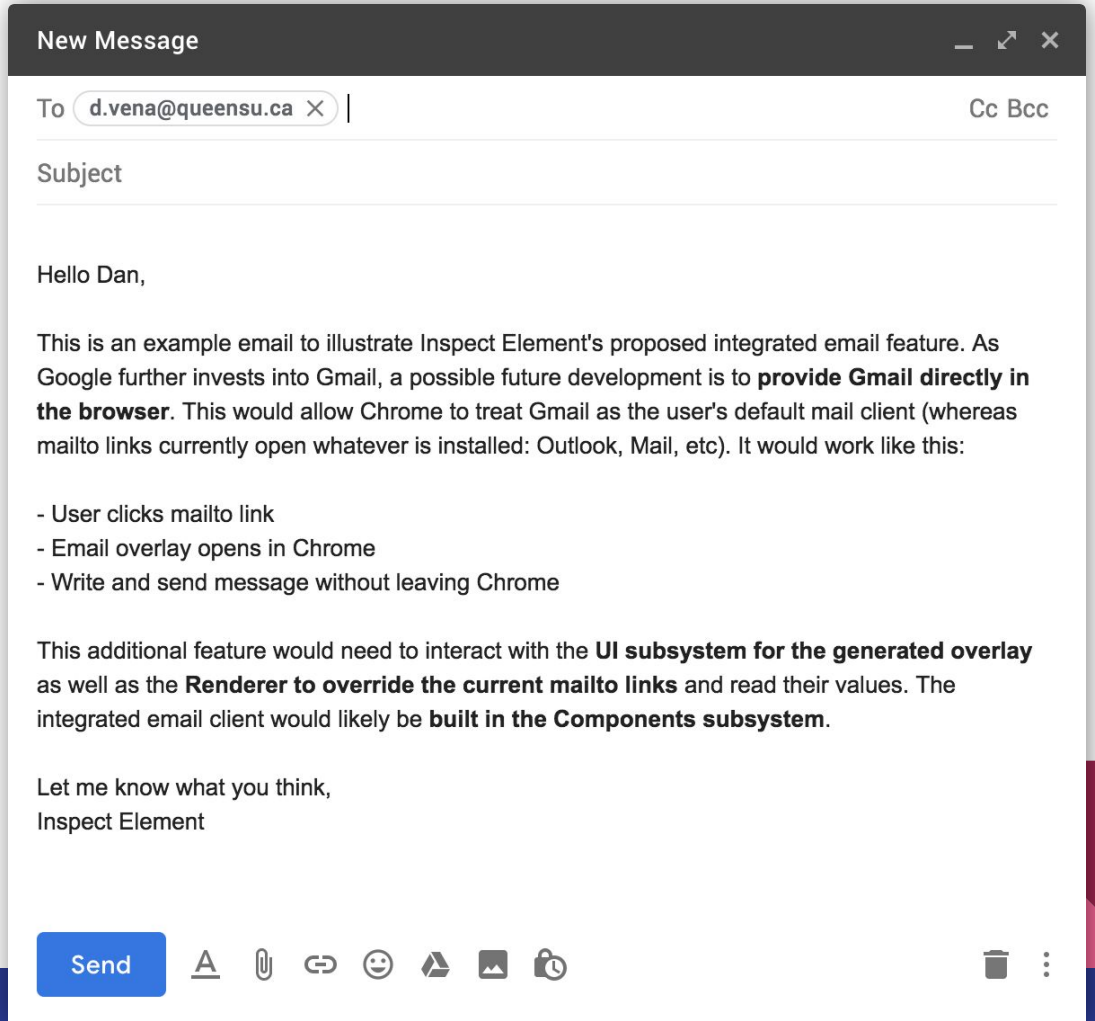


Lessons Learned

Thick coupling & Low Cohesion

- Not layered style, all object oriented
- Hack-y files and classes

New subsystems & new dependencies

- Components & Concurrency added
- Local Storage component does not work as expected

Concrete Architecture of Chrome has difficult modifiability

- Interfaces vs. Huge interdependent codebase
- Not layered, less modifiable

Lessons Learned: **Chrome Team Issues**

Amount of interfaces creates modifiability difficulties

- Comes from thick coupling

Open Source issues expanded

- Created a huge codebase
- Some poorly documented subdirectories included

Object oriented style side effects in a huge codebase

- Next to impossible to test in the concrete architecture

Lessons Learned: **Limits of Findings**

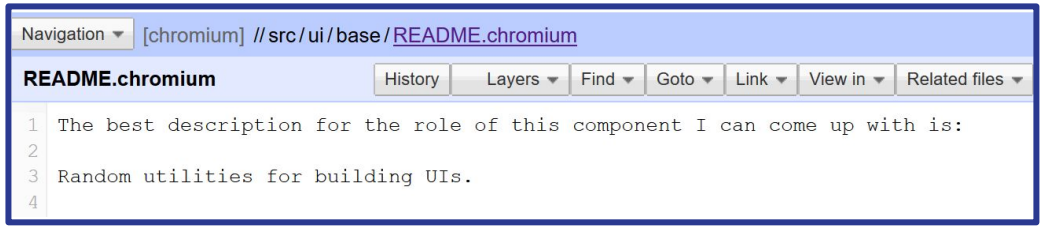
Owners of the code are listed only by emails

- Possible to search codebase for email

Comments on lots of main directories do not include README.md

- Certain README.md files are just not helpful

Understand software can be slow on such a huge codebase



Lessons Learned: **Process of Using Understand**

The Good: **What works**

- Familiar aesthetic interface
- Functional
  - Good visual representation of systems & subsystems

The Bad: **Inconveniences**

- Long wait times
- Workarounds needed
- Exporting/Importing

The Ugly: **Ruins functionality**

- Crashes and saving

Lessons Learned: **Our Team Issues**

Achievements:

- Regular meetings
- Individual work then discussion

Working on:

- Better concurrency
- Working consistently

Chrome-clusion

- Chrome is a very large piece of software making it hard to *Understand*
- Documentation was still hard to follow and dive through (occasionally no ReadMe's)
- Chrome has very high coupling within its Concrete Architecture
- Chrome's Concrete Architecture contains two more components than we previously thought
- More frequent group meetings