Concrete Architecture of Chrome

Intro

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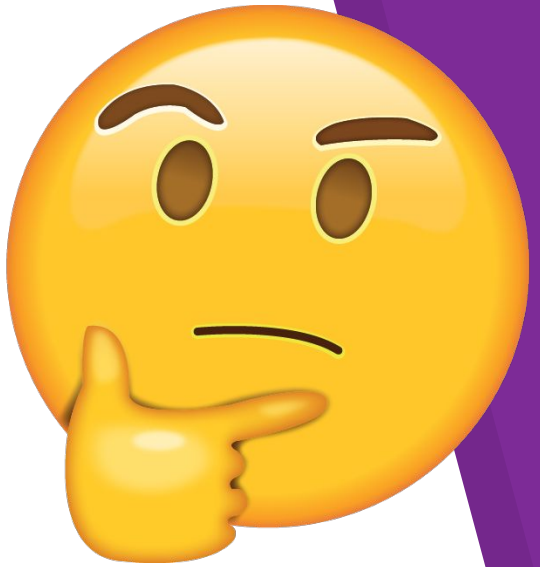
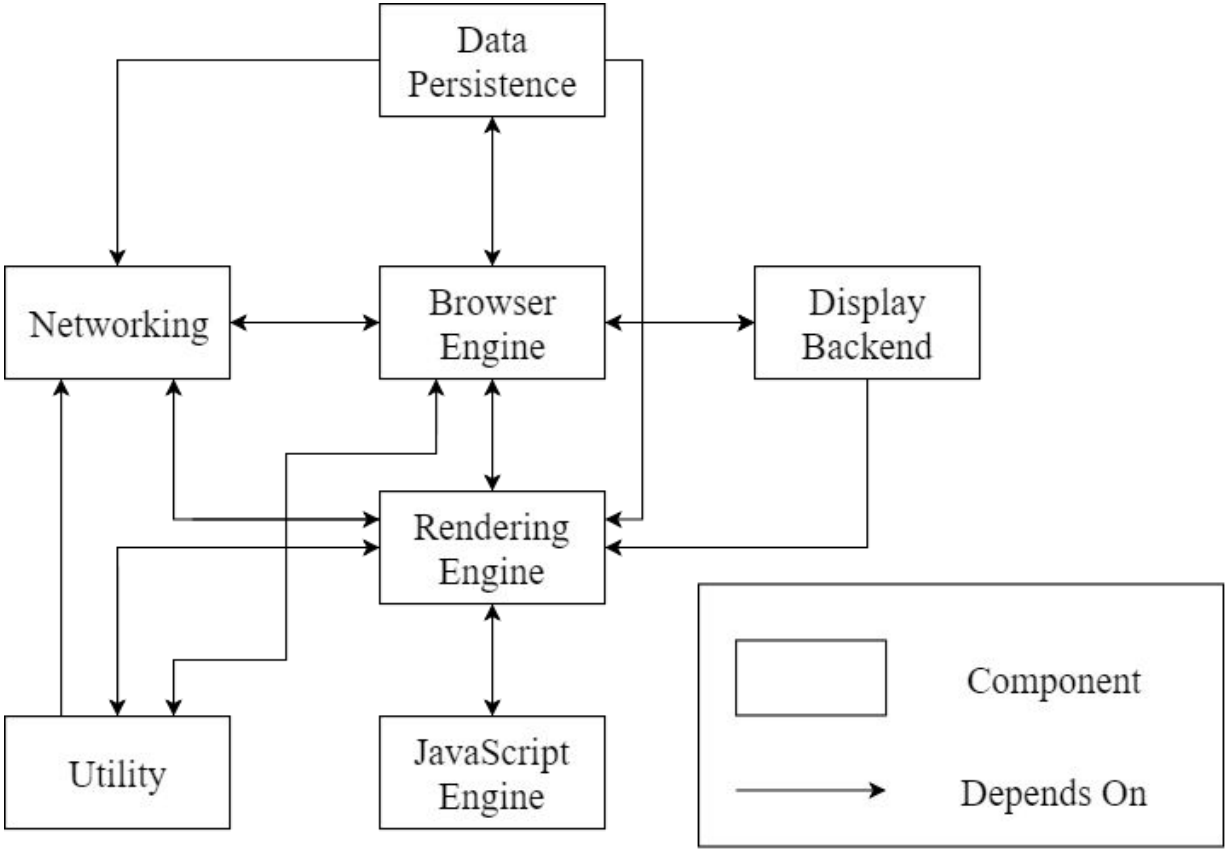
- SciTools Understand
- New Dependencies
- More coupling
- Utility system

Derivation Process

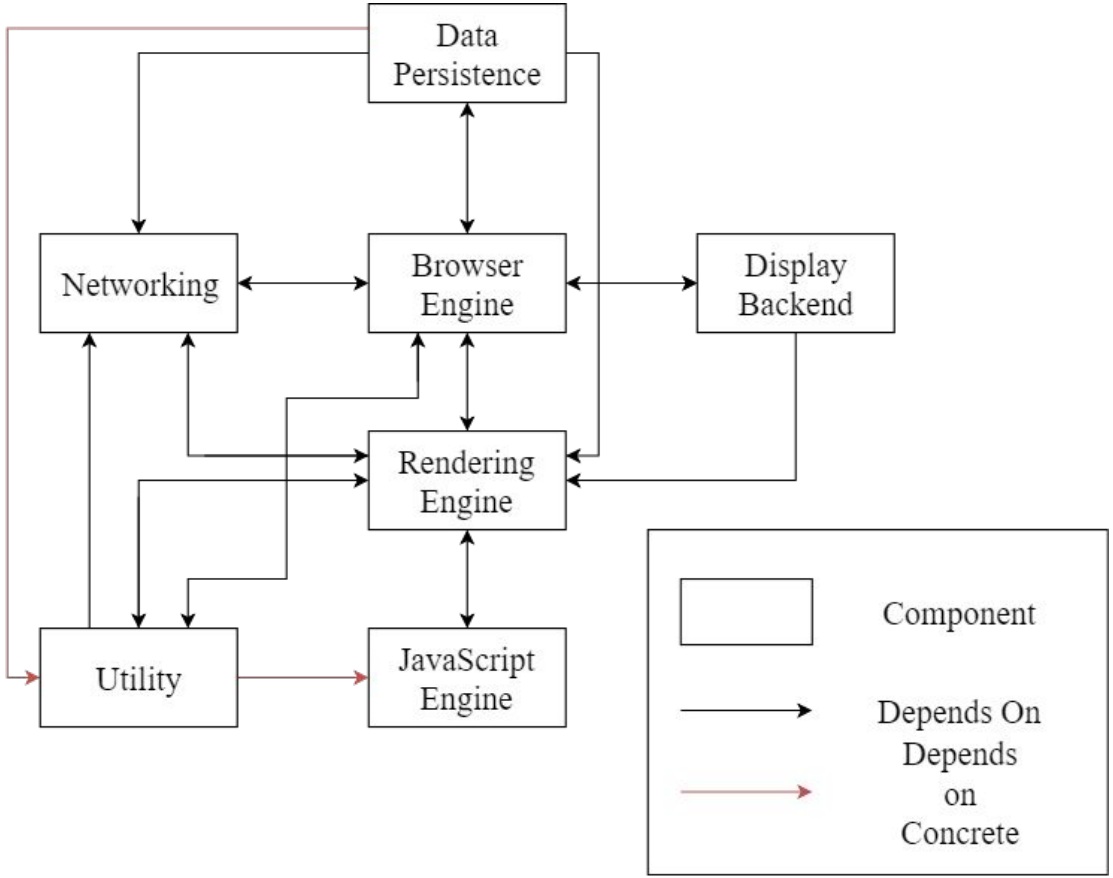
- Understanding *Understand*
- Iterative procedure:
  - Mapping concrete to conceptual
  - Combine components
  - Update conceptual



Conceptual Architecture Revisited



Concrete Architecture



Unexpected Dependencies

Conceptual

- Heavy Conversation
  - JavaScript Engine -> Rendering Engine
  - Data Persistence -> Browser Engine
  - Display Backend -> Browser Engine
  - Networking -> Browser Engine

- Oversight
  - Data Persistence -> Networking
  - Data Persistence -> Rendering Engine
  - Networking <-> Rendering Engine

Unexpected Dependencies

Hacks

- Data Persistence-> Utility
- Utility -> JavaScript Engine

Reflection Analysis

- More coupling than first anticipated, unexpected dependencies, testing
- Importance of utility functions
- Dependency on networking subsystem
    - Caching involves the networking subsystem
    - Important for core features of a browser (rendering, data persistence)

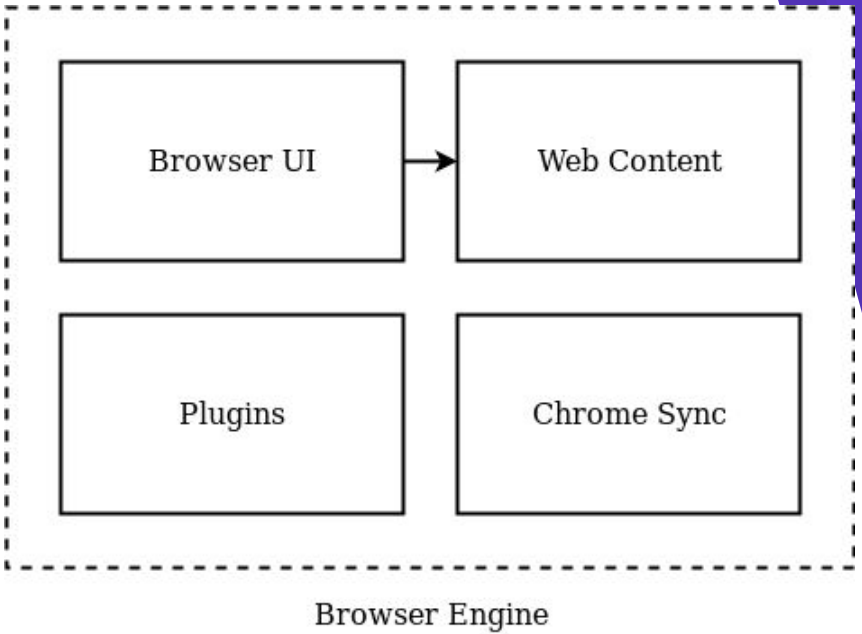
Subsystem One: Browser Subsystem

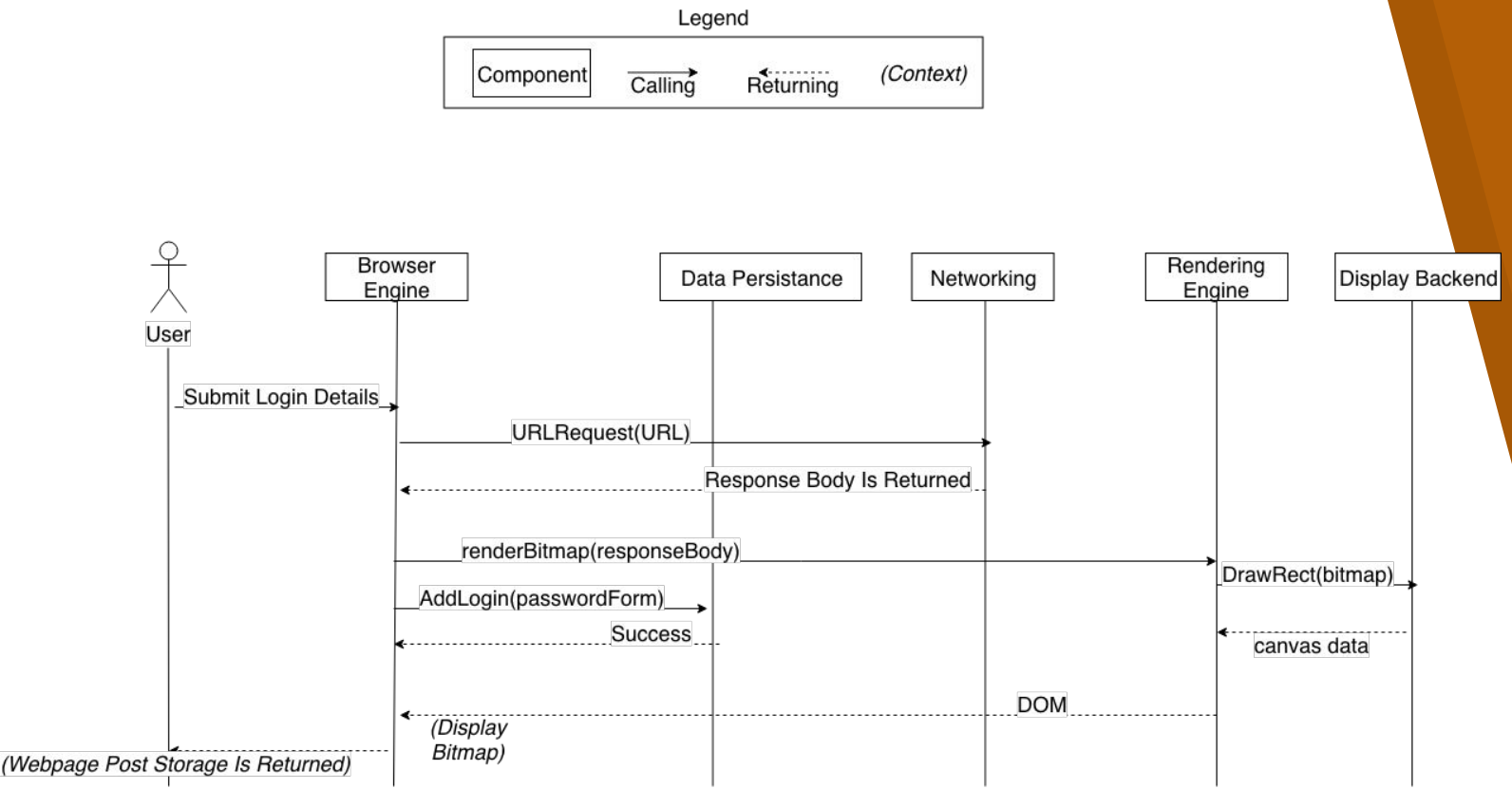
Components:

- Browser UI
- Plugins
- Web Content
- Chrome Sync

Depends on:

- Networking
- Display backend
- Rendering Engine
- Persistence
- Utilities





Sequence Diagram: Chromium Saving a password

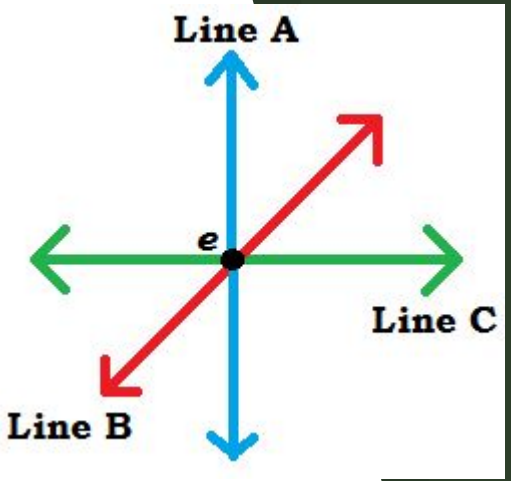
Concurrency and Sandboxing

Browser Process

- Communicates with render process
- I/O Thread
- Sandbox

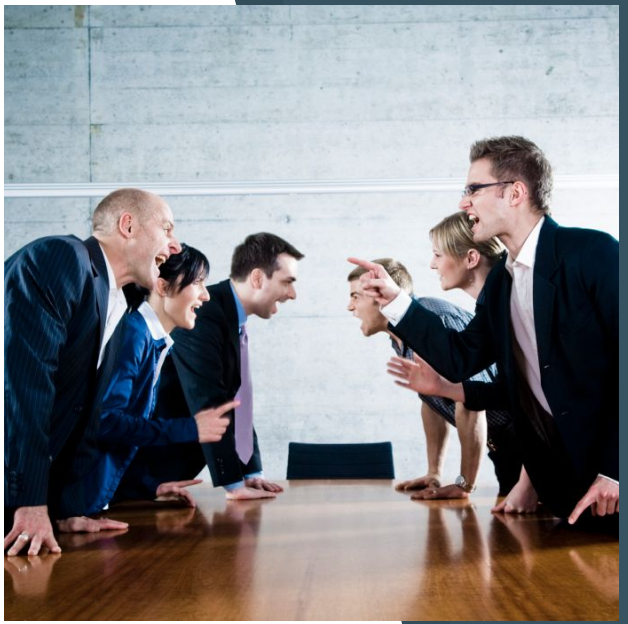
New Dependencies

- Networking



Team Issues and Challenges

- Open Source
    - people working all around the world
    - Code reviews done by “Owners”
- Lack of commenting
- High coupling



Limitations

- Size of Chrome
- Time
- Source code vs online materials
- Available Tools
  - Chromium documentation
  - Understand

Lessons Learned

- Understand
- Chrome is Complex
- Teamwork

Feature Proposal: Better Synching Tabs Across Devices

- Use Case: Start reading an article on your laptop, be able to continue reading it from the same point on your phone via a pop up.

- Subsystems involved
    - Networking
    - Data Persistence
    - Browser Engine

Conclusion

- Derivation
- Unexpected dependencies
- Reflection
- One subsystem explained
- Team issues + our limitations

THANKS FOR LISTENING!!!!