

**MICHIGAN STATE**  

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**UNIVERSITY**

# Project Plan

## Splitting the Atom. Again.

### The Capstone Experience

Team Mozilla

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*From Students...  
...to Professionals*

# Functional Specifications

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- Firefox is a MASSIVE project used by MILLIONS
- Gateway to the internet
- Fission is an ongoing Proactive security project
- It's our job to help Mozilla dot the I's



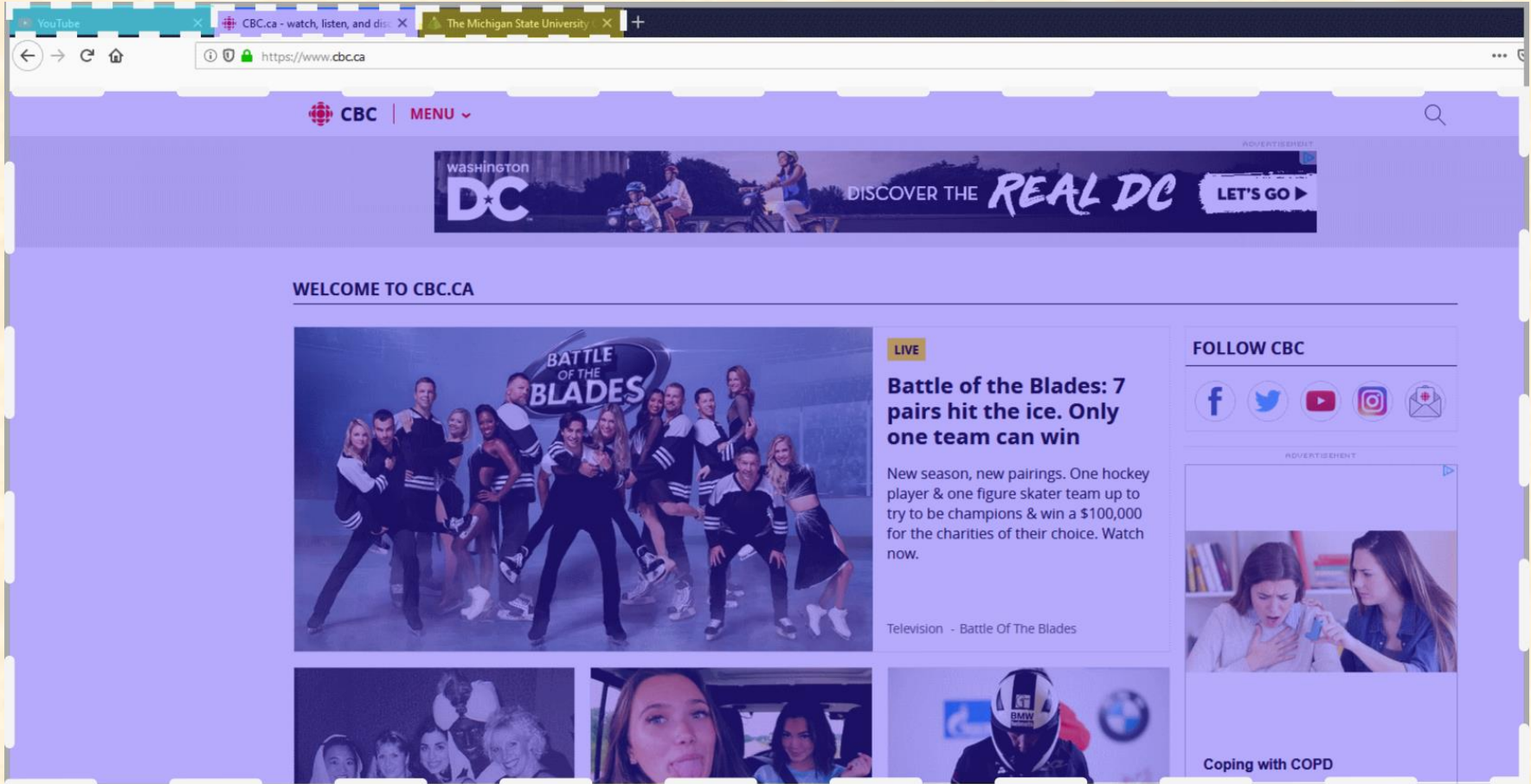
# Design Specifications

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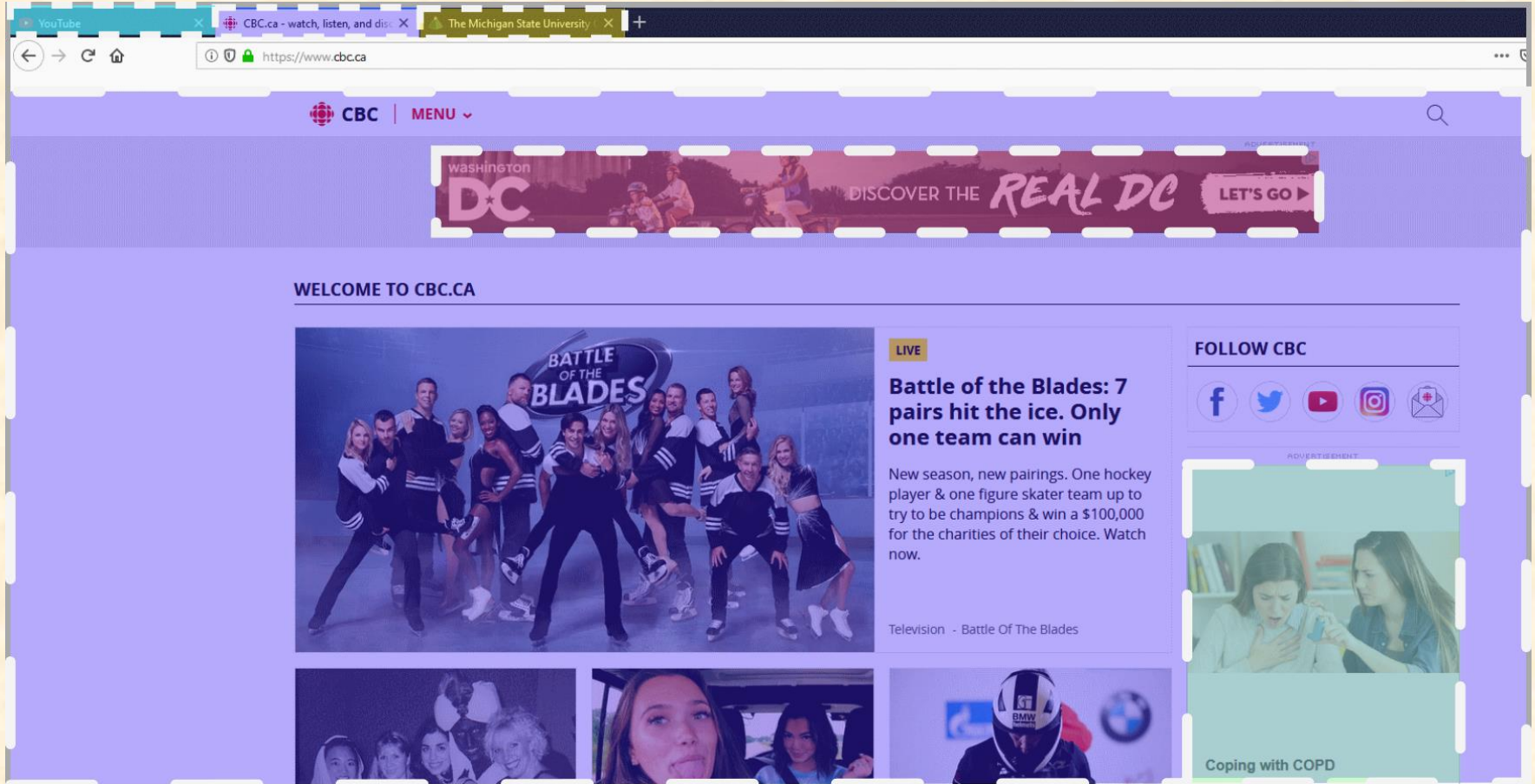
- Design should NOT be changed
  - Simply updating existing features to work in Fission
    - Replacing the engine in a car
  - Firefox has 250 million monthly active users
    - Interrupting their workflow could be disruptive



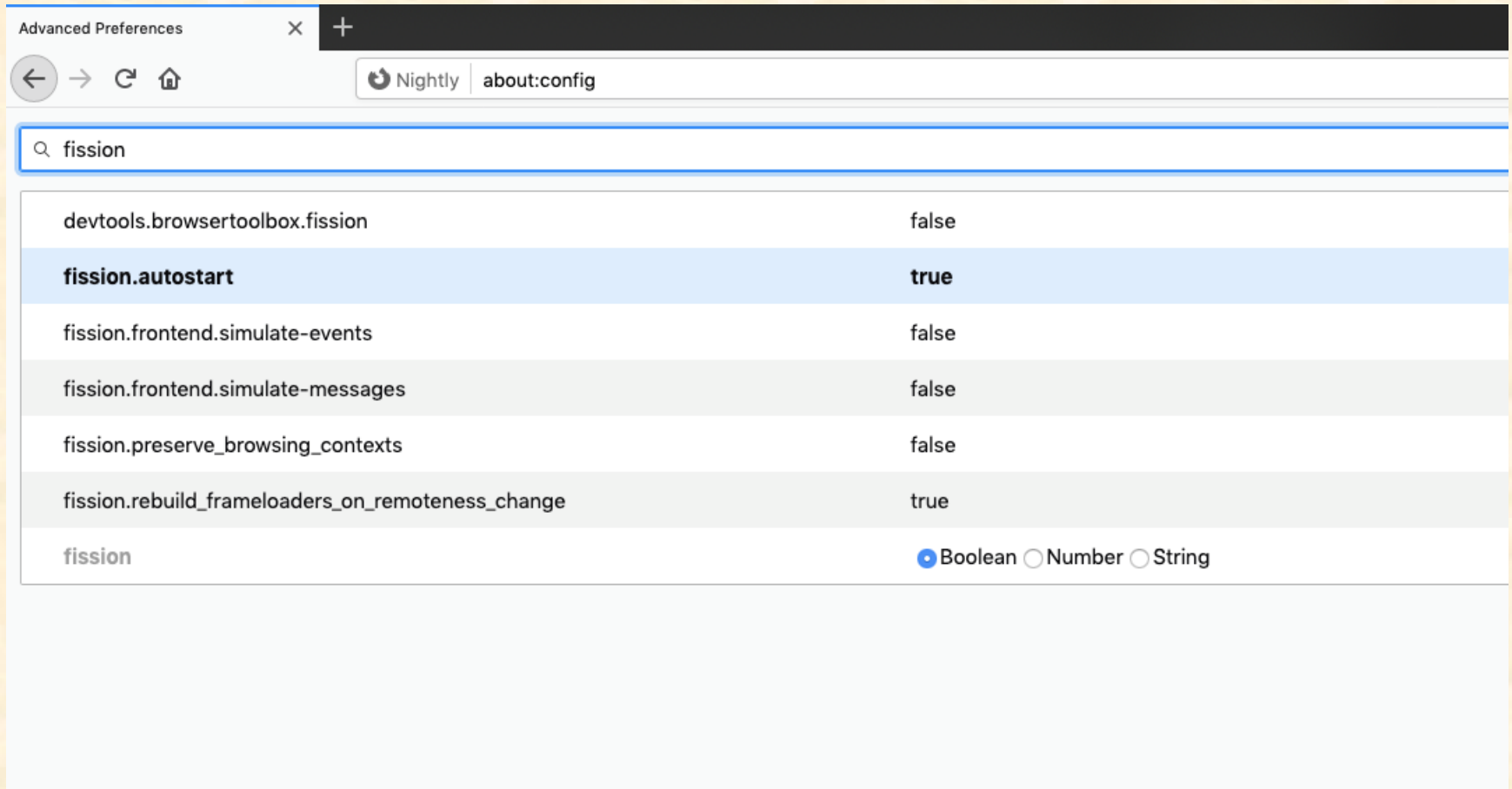
# Webpage under Firefox Release



# Webpage under Firefox with Fission



# Enabling Fission



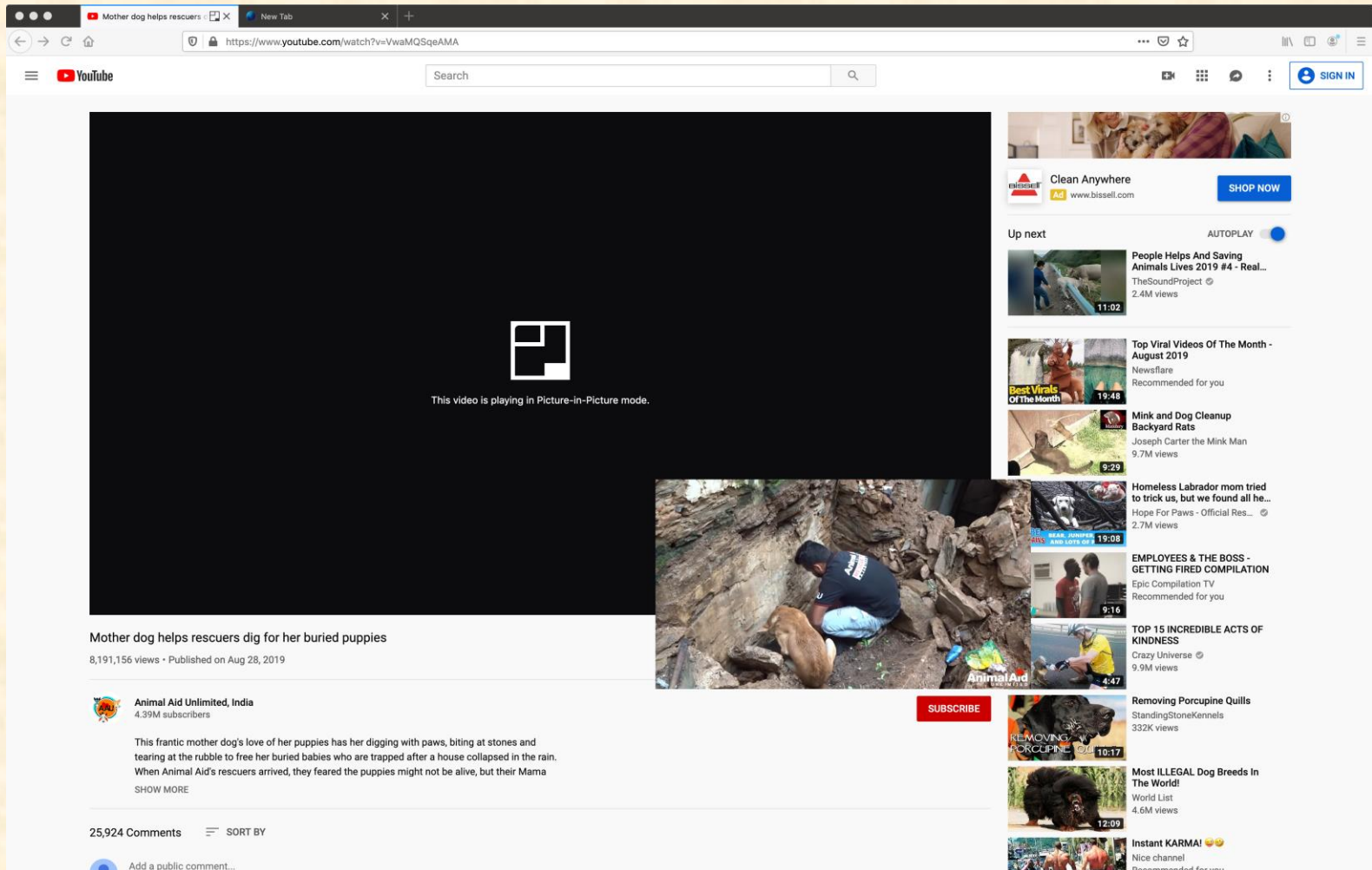
The screenshot shows a browser window with the title "Advanced Preferences" and a search bar containing "fission". The "about:config" page lists several preferences. The "fission.autostart" preference is highlighted in blue and set to "true". Other preferences include "devtools.browsertoolbox.fission" (false), "fission.frontend.simulate-events" (false), "fission.frontend.simulate-messages" (false), "fission.preserve\_browsing\_contexts" (false), and "fission.rebuild\_frameloaders\_on\_remoteness\_change" (true). At the bottom, there are radio buttons for "Boolean" (selected), "Number", and "String".

Preference Name	Value
devtools.browsertoolbox.fission	false
<b>fission.autostart</b>	<b>true</b>
fission.frontend.simulate-events	false
fission.frontend.simulate-messages	false
fission.preserve_browsing_contexts	false
fission.rebuild_frameloaders_on_remoteness_change	true

fission  Boolean  Number  String



# Example: Picture-in-Picture



The screenshot shows a web browser window with a YouTube video player. The video player is in Picture-in-Picture mode, indicated by a small icon in the center and the text "This video is playing in Picture-in-Picture mode." The video title is "Mother dog helps rescuers dig for her buried puppies" with 8,191,156 views and published on Aug 28, 2019. The channel is "Animal Aid Unlimited, India" with 4.39M subscribers. The video description reads: "This frantic mother dog's love of her puppies has her digging with paws, biting at stones and tearing at the rubble to free her buried babies who are trapped after a house collapsed in the rain. When Animal Aid's rescuers arrived, they feared the puppies might not be alive, but their Mama SHOW MORE". The video player has a "SUBSCRIBE" button and a comment section with 25,924 comments. On the right side of the page, there are several video recommendations, including "Clean Anywhere", "People Helps And Saving Animals Lives 2019 #4 - Real...", "Top Viral Videos Of The Month - August 2019", "Mink and Dog Cleanup Backyard Rats", "Homeless Labrador mom tried to trick us, but we found all he...", "EMPLOYEES & THE BOSS - GETTING FIRED COMPILATION", "TOP 15 INCREDIBLE ACTS OF KINDNESS", "Removing Porcupine Quills", and "Most ILLEGAL Dog Breeds In The World!".



# Technical Specifications

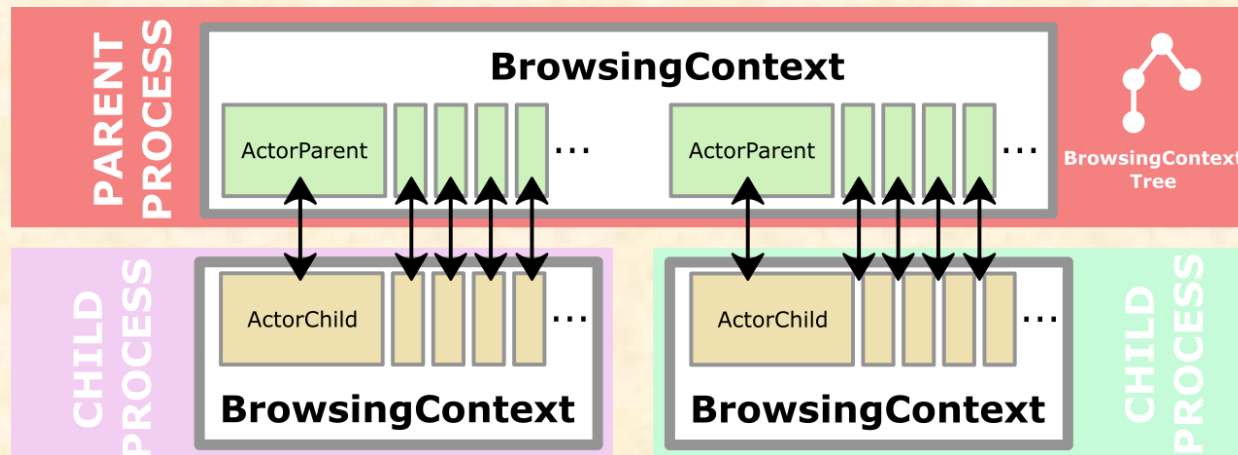
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- Pre-fission Firefox used framescripts to allow for UI/content separation
- A message manager was used to enable communication between the processes
- JSWindowActors are the fission replacement for framescripts
- Each JSWindowActor contains a parent and child pair, This allows for messaging between the processes as they are created

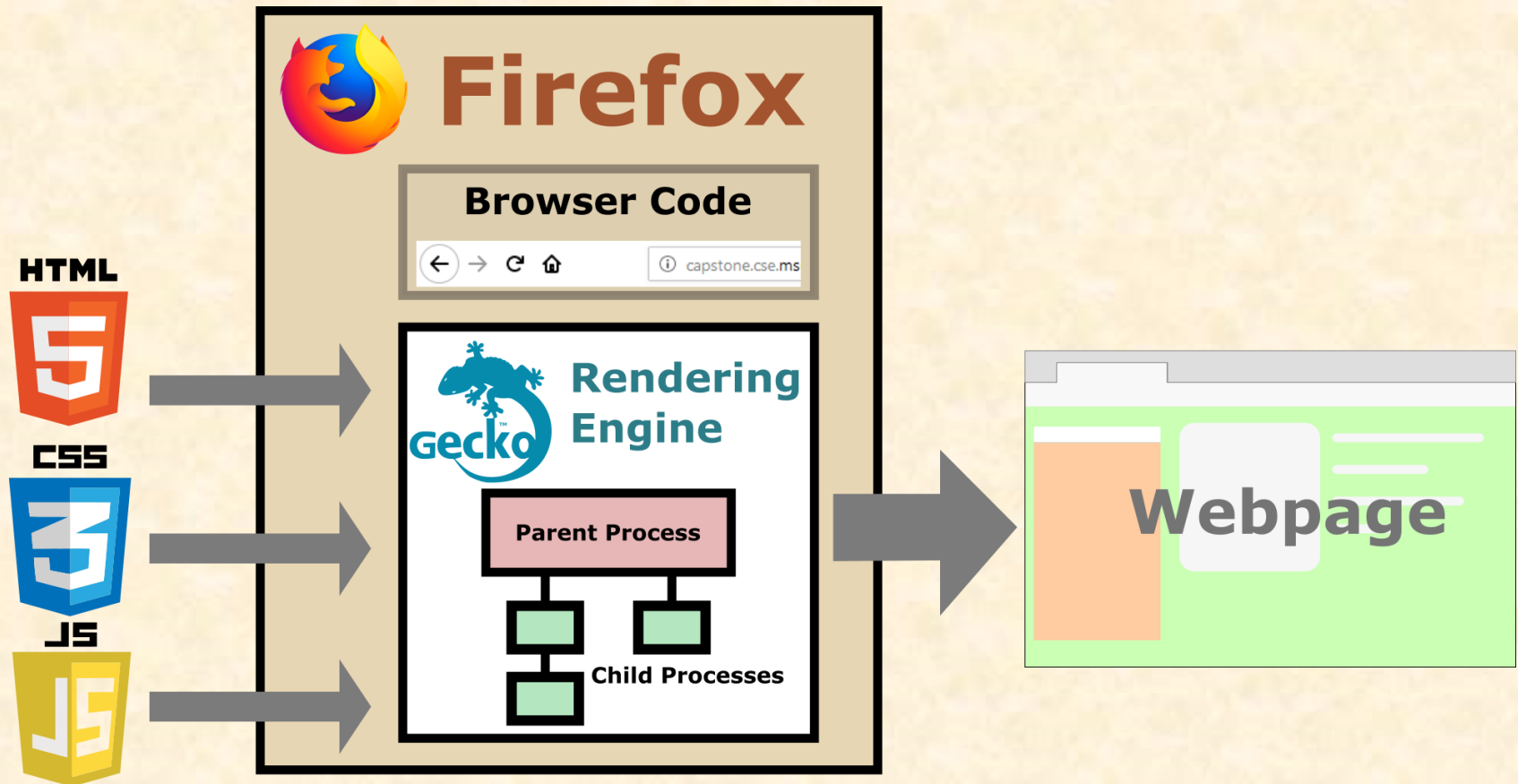




# Technical Specifications



# System Architecture



# System Components

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- Hardware Platforms
  - x86 processors
- Software Platforms / Technologies
  - JavaScript – Language of codebase
  - Mercurial – Revision-control tool
  - Phabricator – to participate in code reviews
  - SearchFox - source code search engine



# Risks

- Need to design websites to test Fission
  - What works on one site might not work on another
  - Develop websites that test corner cases
- Firefox is over 20 million lines of code long
  - Work on one feature may be split across many files and the codebase has a steep learning curve
  - Searchfox lets you search the codebase and Mozilla came down for a hack weekend
- Writing code for all 250 million users of Firefox Desktop
  - 250 million users on Windows, Mac, and Linux
  - We plan to test our code on all three of these OSs
- Fission is being implemented even on experimental features
  - Fission is being implemented in areas of the browser that are still being actively developed
  - Rigorous testing and code reviews as well as comparison to other builds to prevent regression



# Questions?

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