Functional Specifications

• 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

• Design should NOT be changed
  ▪ Simply updating existing features to work in Fission
    o Replacing the engine in a car
  ▪ Firefox has 250 million monthly active users
    o Interrupting their workflow could be disruptive
Webpage under Firefox Release
Webpage under Firefox with Fission
## Enabling Fission

<table>
<thead>
<tr>
<th>Preference</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>devtools.browsertoolbox.fission</td>
<td>false</td>
</tr>
<tr>
<td><strong>fission.autostart</strong></td>
<td>true</td>
</tr>
<tr>
<td>fission.frontend.simulate-events</td>
<td>false</td>
</tr>
<tr>
<td>fission.frontend.simulate-messages</td>
<td>false</td>
</tr>
<tr>
<td>fission.preserve_browsing_contexts</td>
<td>false</td>
</tr>
<tr>
<td>fission.rebuild_frameloaders_on_remoteness_change</td>
<td>true</td>
</tr>
<tr>
<td>fission</td>
<td>□ Boolean □ Number □ String</td>
</tr>
</tbody>
</table>
Example: Picture-in-Picture
Technical Specifications

• 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

Diagram showing the relationship between BrowsingContext, ActorParent, and ActorChild processes.
System Architecture

Firefox

Browser Code

HTML
CSS
JS

Rendering Engine

Parent Process
Child Processes

Webpage

The Capstone Experience
Team Mozilla Project Plan Presentation
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System Components

• 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?