Project Plan
Optimizing Firefox Localization

The Capstone Experience

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Functional Specifications

• Competition among browsers

• Continued migration to Fluent
  ▪ better user experience

• Better developer experience
  ▪ tests mitigate errors from repetitive tasks

• Gauging performance gains
Design Specifications

• New translation paradigm
  ▪ asymmetrical translations

• Faster interface
  ▪ faster loading with WebAssembly

• Extended tooling around Fluent
Screen Mockup: Fluent Migrations

Number of localizable strings in mozilla-central

- Fluent: 2309
- Properties: 7125
- DTD: 2597
- *.inc: 19
- *.ini: 43

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---|---|---|---|---|---|---
0 | 2000 | 4000 | 6000 | 8000 | 10000 | 12000 | 13000
Screen Mockup: Yellow Screen of Death
## Console Tool

### Usage
```bash
convert.py [options] [arguments]
```

### Options
- `-h`
  - Displays help message
- `-dry-run`
  - Runs without writing output .ftl

### Arguments
- `bug_id`
  - ID number of bug for tracking
- `xul`
  - Path from mozilla-central to XUL file to be updated
- `ftl`
  - Path from mozilla-central to output .ftl file
- `dtd`
  - Comma delimited list of dtd files to be migrated
- `mozilla-central`
  - Path to mozilla central repository
- `recipe`
  - Path to output generated migration script
Screen Mockup: Console Tool - Reference Checking

Console Tool

[Usage]
checkref.py [options] [arguments]

[Options]
-h Displays help message

[Arguments]
xul Path to XUL to have references to FTL files checked
ftl FTL file to check references of
mozilla-central Path to mozilla-central repository
Technical Specifications

● Software Technologies
  ○ Python
    ■ Used to develop migration scripts for translating localization files from .dtd to .ftl (Fluent) format.
    ■ Converts variables and associated translations from .dtd into a new .ftl file.
    ■ When parsing invalid or incomplete .dtd files from our localizers, Firefox crashes with the “Yellow Screen of
      Death”. Fluent will help fix parser-based browser crashes.
  ○ JavaScript
    ■ Currently used as a part of a Fluent-based text-parser for web pages.
    ■ When attempting document localization, this parser searches through a document and localizes all specially
      marked elements.
    ■ Currently implements a Promise system for asynchronous translation.
  ○ Rust
    ■ Improvement upon currently implemented JavaScript-based text parser.
    ■ Will be transpiled into JavaScript using WebAssembly.
    ■ Development of Rust-based text parser in progress. Will theoretically speed up text parsing.
  ○ XHTML, XML & XUL
    ■ Mark-up and binding languages used to define the browser and user interface.
    ■ Uses localization information from .dtd and Fluent files to properly localize the UI.
  ○ Fluent
    ■ Tool used to improve software localization.
    ■ Provides an effective method for mapping complex language translations.
    ■ Employs modularity, simplicity, and composability for tandem use with other technologies.
Technical Specifications

● Testing Technologies
  ○ Mochitest Framework
    ■ Automated testing framework build on top of MochiKit JavaScript Libraries.
    ■ Used to locally create and run browser tests by simulating user activity at high speeds.
    ■ Displays test success or failure through the use of JavaScript function calls.
  ○ ESLint Engine
    ■ Uses a set of configuration files loaded within the Firefox codebase so JavaScript can be analyzed for errors.
    ■ Comprised of a set of rules which analyzes code for correctness and style consistency.
  ○ Try Server
    ■ Used to remotely test a patch before checking it into the core Firefox repository.
    ■ Tests patch to determine correctness and identify bugs.
    ■ Can view a list of issues with patch using treeherder.mozilla.org.
  ○ Python UI Test
    ■ Similar to Mochitests, yet designed to be more powerful.
    ■ Can restart the browser within the test.
System Architecture
System Components

• Hardware Platforms
  ▪ Microsoft Windows
  ▪ MacOs
  ▪ Linux
  ▪ Android/IOS

• Software Platforms / Technologies
  ▪ MSYS based terminal for building Firefox on Windows
  ▪ Mercurial VCS
  ▪ Bugzilla ticket tracker
  ▪ Phabricator for code review
  ▪ Mozilla Try server and Mochitests
  ▪ Visual Studio Code, vim, emacs, notepad++ text editors
  ▪ Searchfox
Risks

• Large Codebase
  ▪ An enormous code base of more than 35 million lines of code written in many programming languages
  ▪ use searchfox.org, communicate with Firefox developers

• Asynchronization
  ▪ The previous localization system had always translated strings synchronously
  ▪ Searchfox and the tests run through the testing framework

• Tooling
  ▪ Current tooling around the task of migrating the past localization system to Fluent is sparse and much has to be done by hand
  ▪ Talking with developers involved in migrating Firefox to using Fluent and seeing what their greatest needs are

• Benchmarking Rust based Fluent Parser
  ▪ Test the viability of a new parser written in Rust and transpiled into WebAssembly
  ▪ Sophisticated telemetry tools
Questions?