



# IcedTea and LiveConnect

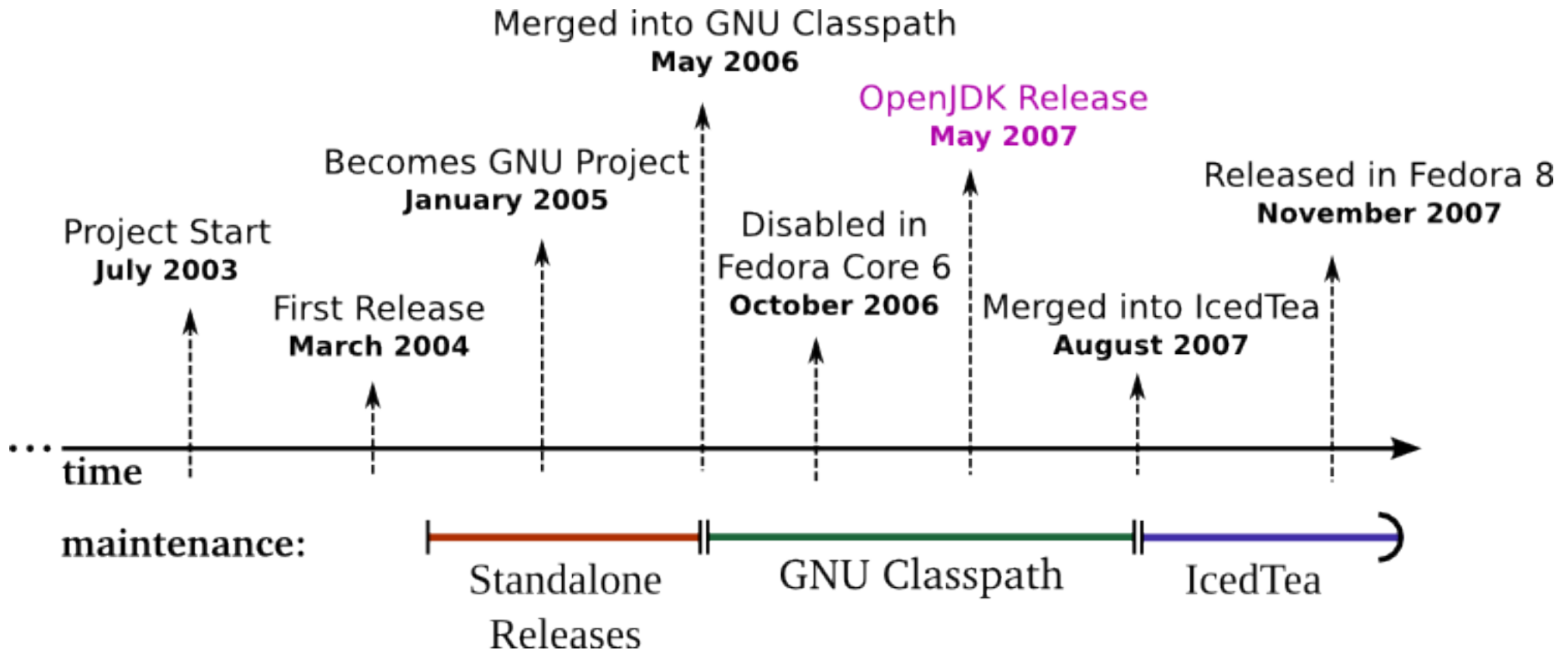
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*Senior Software Engineer*

# Overview

- **gcjwebplugin**
- **IcedTeaPlugin**
  - Motivation
  - Design
  - Future
  - Demos

# gcjwebplugin History



# gcjwebplugin Successes

- "Thanks for all you[r] work, nice to have a java plugin for x64 browsers now!"  
-- *Justin Conover*
- "For me, it is working beautifully!"  
-- *Antonio Olivares*
- "check out the iced-tea java plugin for x86\_64, works like a champ!"  
-- *Ben Little*
- "This is great!"  
-- *David L*

# gcjwebplugin Successes

- No browser crashes
- Out-of-process-VM design
- x86-64 port
- ppc and ppc64 ports in Fedora Rawhide

# gcjwebplugin Shortcoming

- Most common IcedTea bug report:
  - missing **LiveConnect** support:  
10 reports
  - ~6% of total bug reports in  
IcedTea, Red Hat Bugzillas



# Motivation

Provide LiveConnect support in Fedora.

# Plan

Rewrite gcjwebplugin as an XPCOM component. Call the result IcedTeaPlugin.





# What is LiveConnect?

- Browser feature
- Allows Java/JavaScript intercommunication
- OJI, XPCOM, LiveConnect
- Plugin components:
  - JNI implementation, object translator, configuration UI
- Browser components:
  - applet tag info, JavaScript caller



# Progress

First commit: September 2007

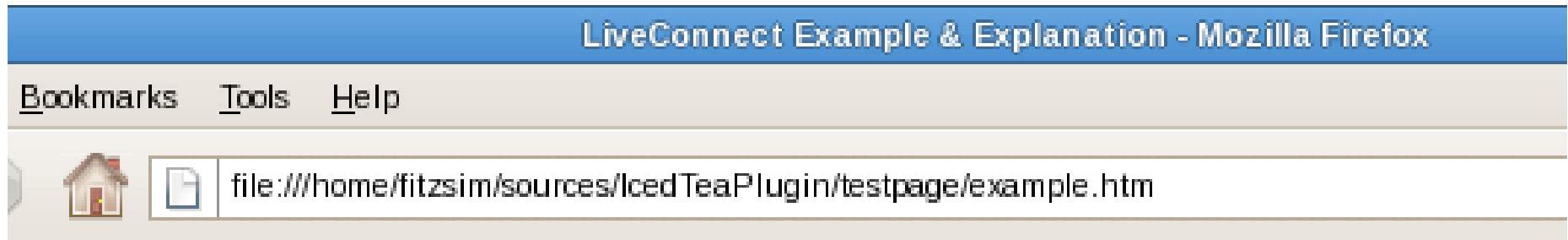
Then on-and-off work for 4 months

Then...



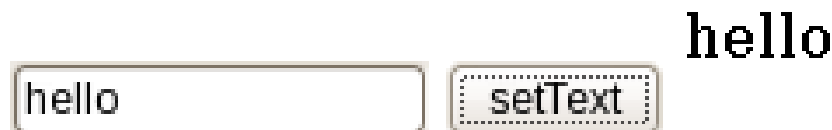
# January 21, 2008

## JavaScript-to-Java



is lifted from a [Nick Heinle tutorial](#).

The applet is embedded in this page, and connected it to JavaScript using a simple function.



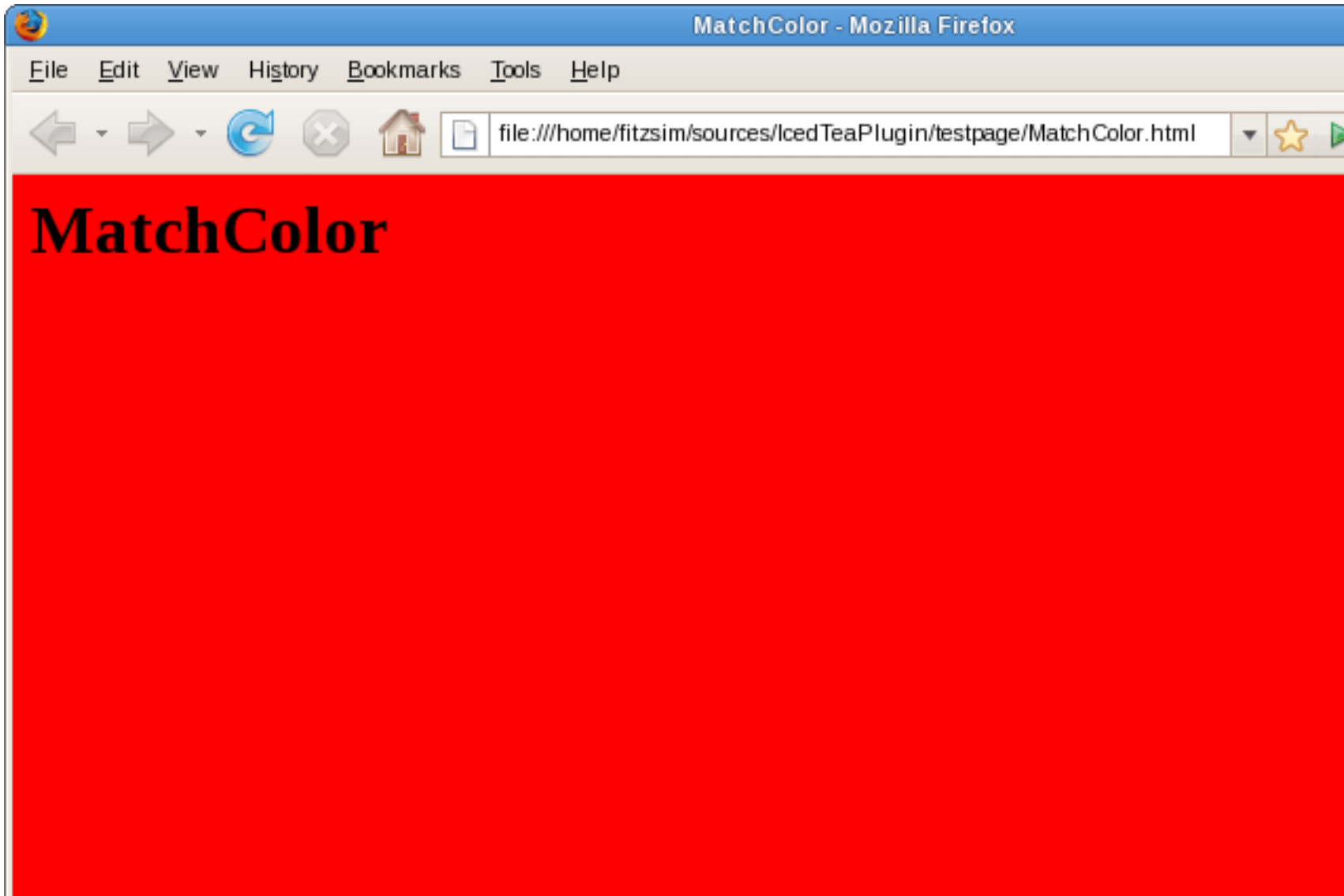
Just like the other three examples. The point is, however, that this can be made very dynamic. Embedding any Java app to your site, is to embed it with the APPLET tag.

```
<APPLET NAME = "dynamicTextApp" CODE = "dynamicText.class" WIDTH = 100px HEIGHT = 100px>
```



# February 16, 2008

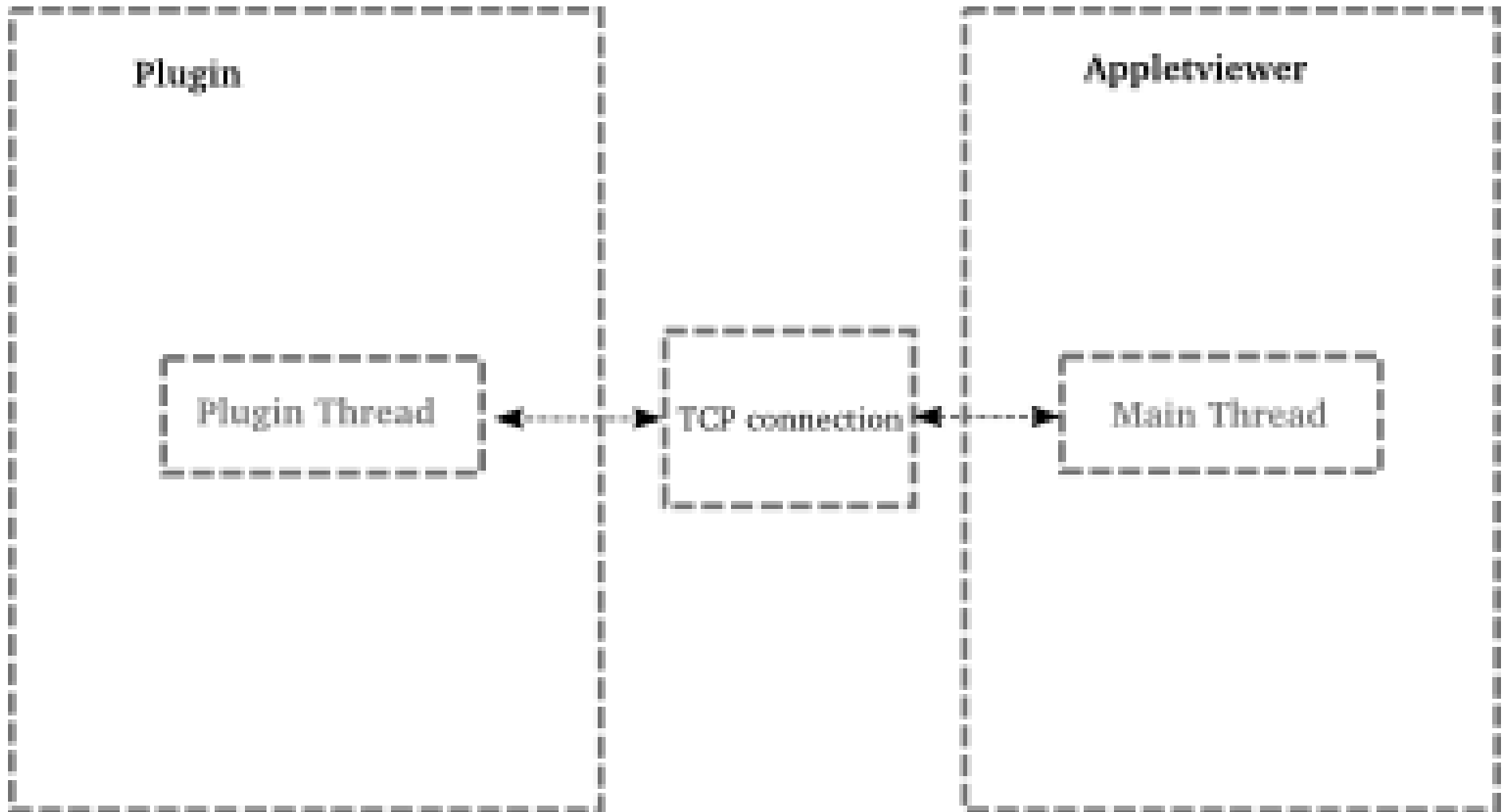
# JavaScript-to-Java



# Status

- ~5600 lines of code
- ~8000 line patch to IcedTea
- Prototype-quality
- Committed to IcedTea repository today

# Design Overview



# Implementation Details

- Out-of-process-JVM design
- LiveConnect is harder to implement in this way
- Plugin functions that make Java calls:
  - gcjwebplugin: ~5 simple
  - IcedTeaPlugin: ~50 complex



# Implementation Details

## ■ Argument encoding and decoding

**Call: boolean lessThanThirty(int candidate)**

- plugin side:

calling: "(I)Z", jvalue\* → "22"

returning: jni\_type, NSString → true

- appletviewer side:

calling: "22", Integer.class -> new Integer(22)

returning: true, Boolean.class -> "true"

- Types: Primitives, Object, String, Array

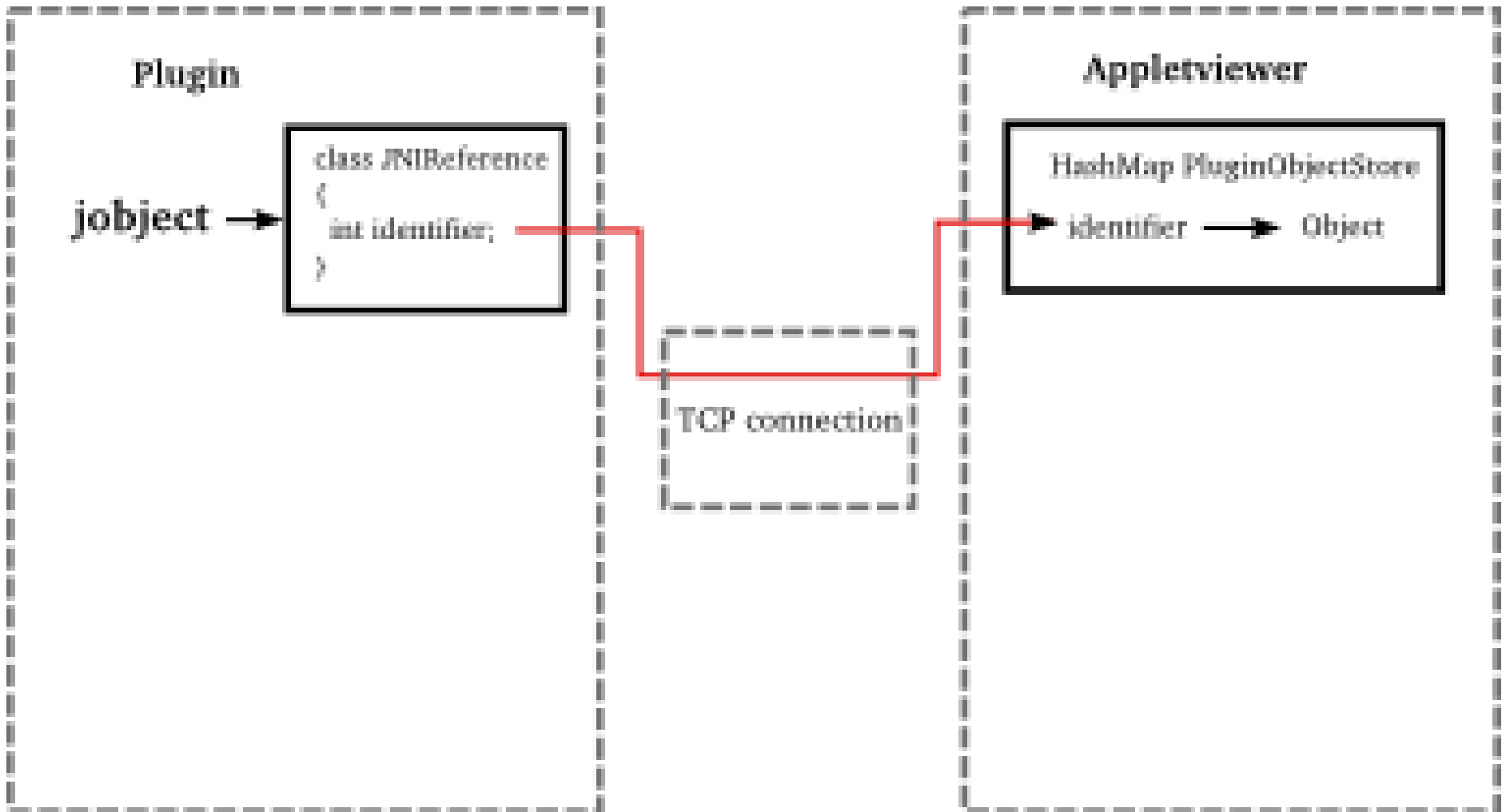


# Implementation Details

- Unicode character handling
  - Mozilla uses UCS-2, Java encodes UTF-16
    - still need to handle supplementary characters
  - Mozilla expects UCS-2 string length in characters, not bytes
  - Mozilla built with `-fshort-wchar`

# Implementation Details

- object handling



# Future Work

- Port to public XPCOM APIs
- Security
- Multithreading
- Exception handling
- Test suite
- Signed applet verification
- Multiple applets on one page

# Future Work

- FIXMEs
- Refactoring
- Binary IPC protocol
- Memory auditing
- Fix Mozilla LiveConnect memory leaks
- Win32 testing?
- Package OpenOffice SVG Importer for Fedora



# Demo

# Thank You

- Joshua Sumali
- FOSDEM 2008 organizers



# Questions?

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