IcedTea Java Plugin

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Overview

- **IcedTeaPlugin**
  - History
  - Design
  - Future
  - Demos

Plugin History

- Project started by Thomas Fitzsimmons in September 2007
- Prototype working code in by February 2008
- Taken over by Deepak Bhole in August 2008, full time work on plugin started
- First stable release was publicly available on October 27th 2008 in IcedTea 1.3.1
- First 64-bit plugin

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Plugin Design

- Overview
- Performance
- Security
- Other notes

Design - Overview

- **Design Goals**
- Features and stats
- Code components

- **Full compatibility with GCJ Web Plugin**
- **Provide full liveconnect and signed applet support**
- **Basically, have any site with applets work “out of the box” with Fedora**

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Design - Overview

- Design Goals
- **Features and stats**
- Code components

- **~5500 lines of C++ code**
- **~5700 lines of Java code**
- **Single JVM running at any given time**
- **Applet drawing and security delegated to NetX**

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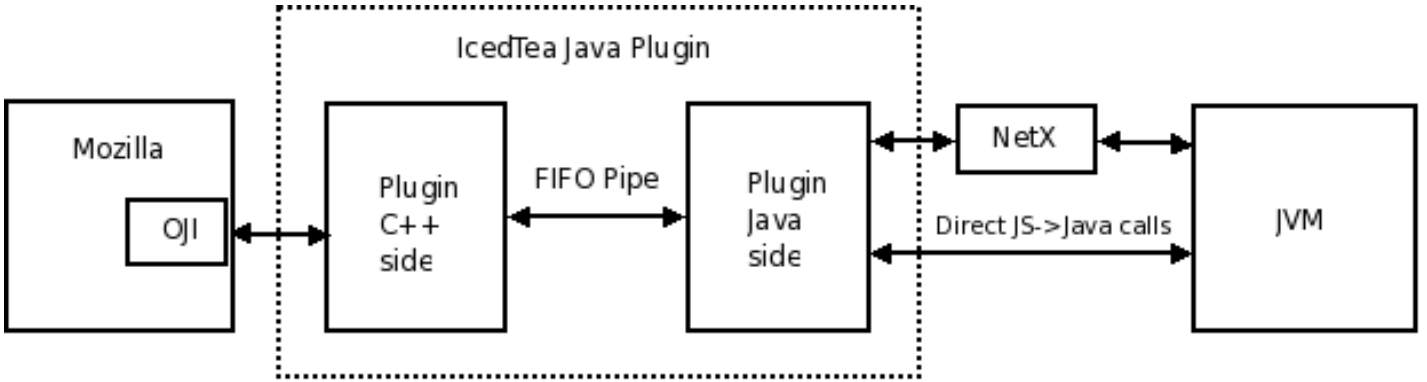
Design - Overview

- Design Goals
- Features and stats
- **Code components**

- **Split into “C++ side” and “Java side”**
- **C++ side handles all communication with the browser**
- **Java side handles all communication with the JVM instance**

Code components



OJI interface into Mozilla
C++ side talks to OJI on one side, Java on the other
C++/Java communication over a FIFO pipe
Java side talks to NetX and the JVM

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Design - Performance

- Overview
- Performance oriented design
- Limitations

- On par with the Sun plugin
- Single JVM means subsequent applet loads are fast
- Multiple applet operations can continue in parallel despite single JVM instance

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Design - Performance

- Overview
- **Performance oriented design**
- Limitations

- **Each side of the plugin (C++/ Java) is multi-threaded**
- **C++ side threading is per JS instance, handled by Mozilla for the most part**
- **Java side threads are generic worker threads that can be scaled as needed**

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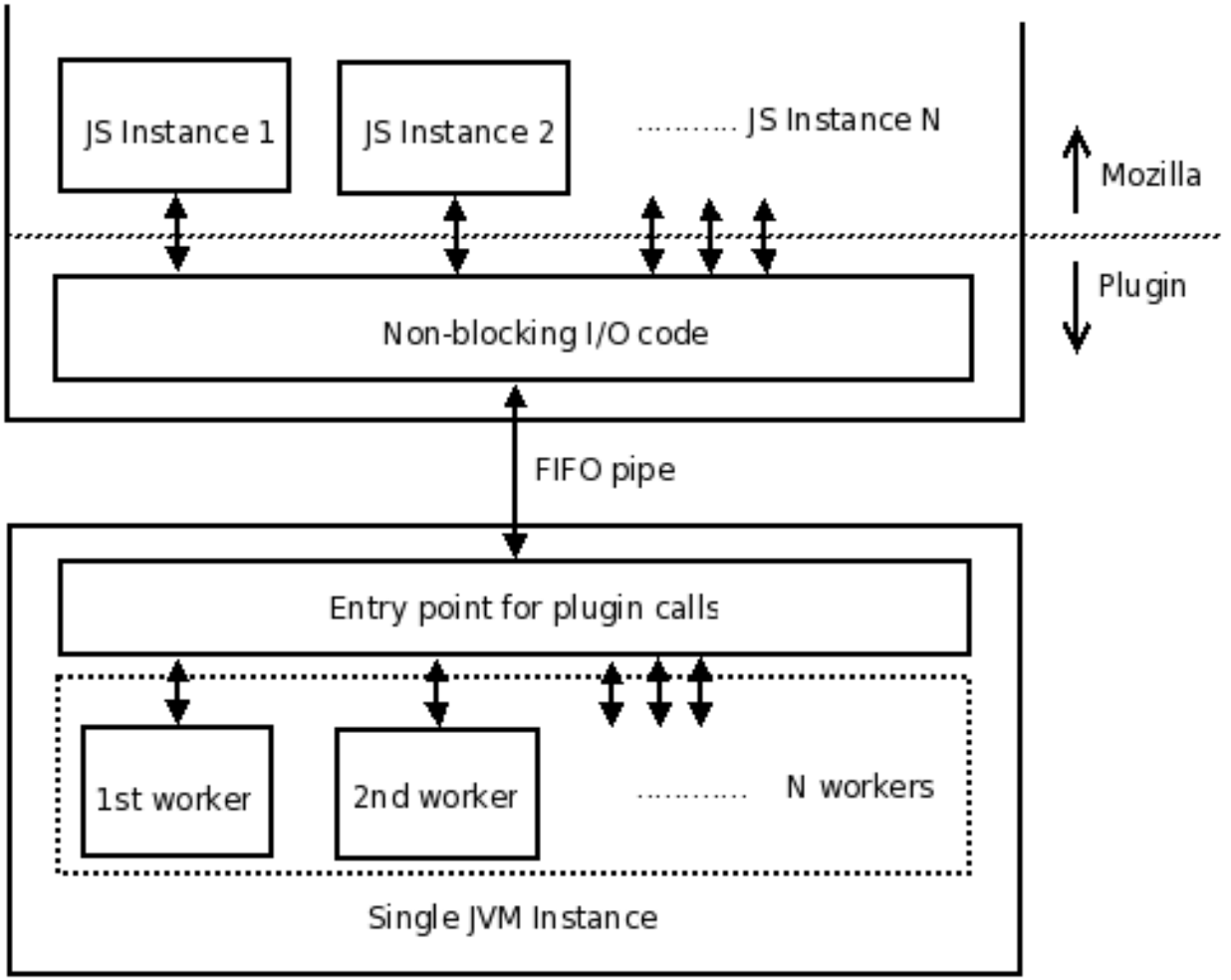
Design - Performance



Design - Performance

- Overview
- Performance oriented design
- **Limitations**

- **FIFO pipe means that events need to be polled**
- **Great deal of initial table building is a significant overhead for that first “click”**

Design – Security

- **Concerns**
- **Security oriented design**
- **NetX security**
- **Plugin Security**
- **Limitations**

- **Two main vectors of attack**
  - Applet
  - Java script -> Java
- **Single JVM instance opens possibilities of DoS**

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Design – Security

- Concerns
- **Security oriented design**
- NetX security
- Plugin Security
- Limitations

- **All security sensitive external code runs with a SecurityManager**
- **Applet security is delegated to NetX**
- **Liveconnect JS->Java call security is handled by the plugin**
- **Exceptions cannot bring down the VM**

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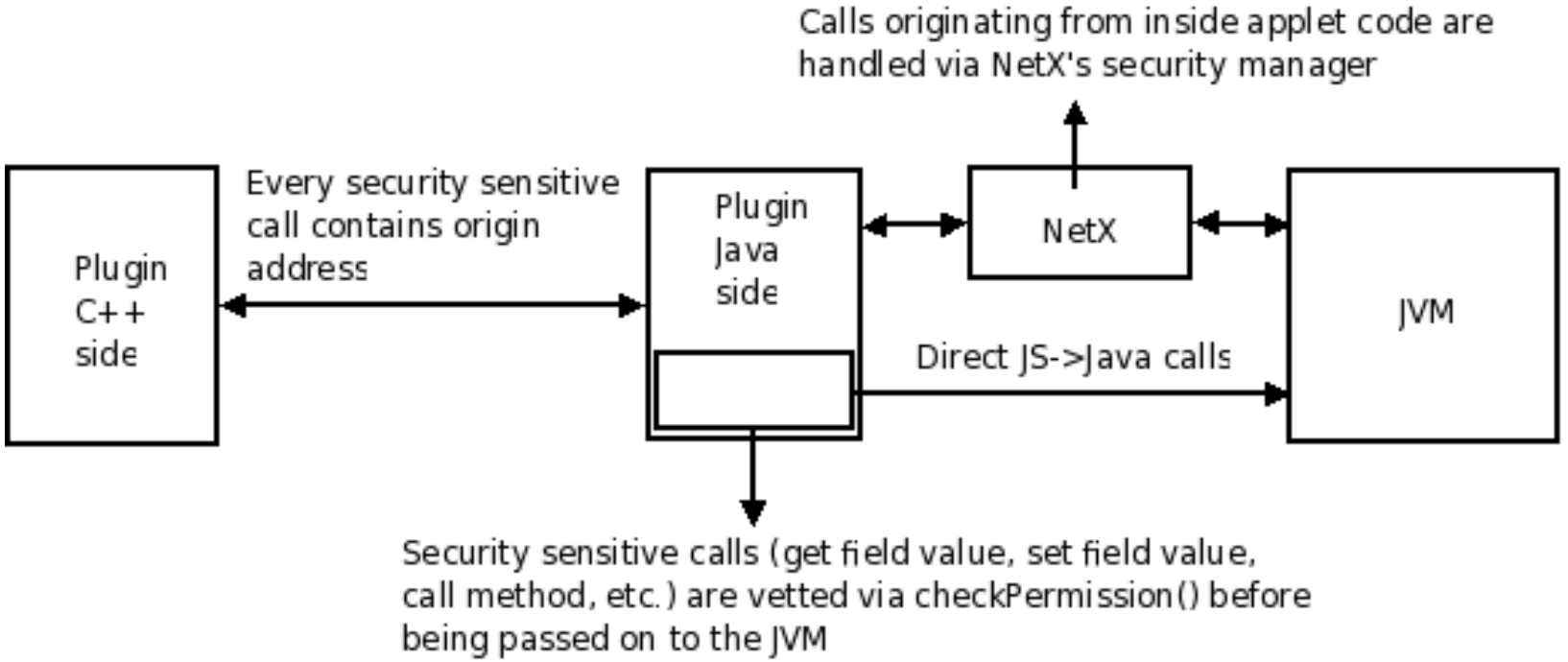
Design – Security



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Design – Security

- Concerns
- Security oriented design
- **NetX security**
- Plugin Security
- Limitations

- **Custom security manager (JNLPSecurityManager)**
- **JNLPSecurityManager not only sandboxes applets, but also handles cases where user prompt is more appropriate than denial**
- **User is prompted for socket connect permissions with untrusted applets**

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Design – Security

- Concerns
- Security oriented design
- NetX security
- **Plugin Security**
- Limitations

- **All security sensitive calls (GetField, SetField, CallMethod, etc.) are run through a security manager**
- **Execution of such calls is within a dynamically generated AccessControlContext**
- **Both, UniversalBrowserRead and UniversalJavaPermission permissions are honoured**

Design – Security

- Concerns
- Security oriented design
- NetX security
- Plugin Security
- **Limitations**

- **Attempts to tie up the JVM cannot be prevented ... but this will be true for any plugin**

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Design – Other notes

- Out of process JVM means that a VM crash cannot bring down a browser
- JVM instance is monitored, and should it go down for some reason, another VM is brought up upon request
- Objects on the VM side are automatically unreferenced when Mozilla is done with them, allowing the GC to clear up the memory
- Debugging is very easy – single variable (ICEDTEAPLUGIN_DEBUG) controls debug output, and allows the Java side code to be remotely debugged

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Future

- Create a Testsuite
- Memory auditing
- Performance improvements
- FX support
- Win32 testing

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Demos

- **DoS prevention**
- **Security demo**
- **Liveconnect in action**
  - JS->Java
  - Java->JS
- **External sites (JMol, Yahoo!, Facebook)**

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Thanks

- Thomas Fitzsimmons
- Sun
- All IcedTea contributers
- FOSDEM organizers

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Q/A

Questions?

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