The Protégé Plugin Architecture

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Overview

- What is a Plugin?
- How Plugins Work
- Plugin Types and Capabilities
- Plugin Packaging
- Plugin Bundling
- Plugin Licensing
- Coming Changes

Out of Scope

- Standard Java Development
  - Coding
  - Packaging (jars)
  - Utilities
- Implementation mechanisms
- Development environments
- Non-plugin Protégé extensions

What is a Plugin?

- Extension to Protégé
  - Requires no source code modifications
  - Loaded and managed by system
  - Changes way Protégé works
- Implementation of a Java *interface*
- Packaged as *jars*
- Installed in subdirectory of Protégé *plugins*

How Plugins Work

- Protégé, at startup, loads jars directly below *plugins* subdirectory
- Jars contain manifest of contained plugins
- System creates instances of plugin
- System calls plugin methods when needed
  "Don't call us, we'll call you."

Types of Plugins

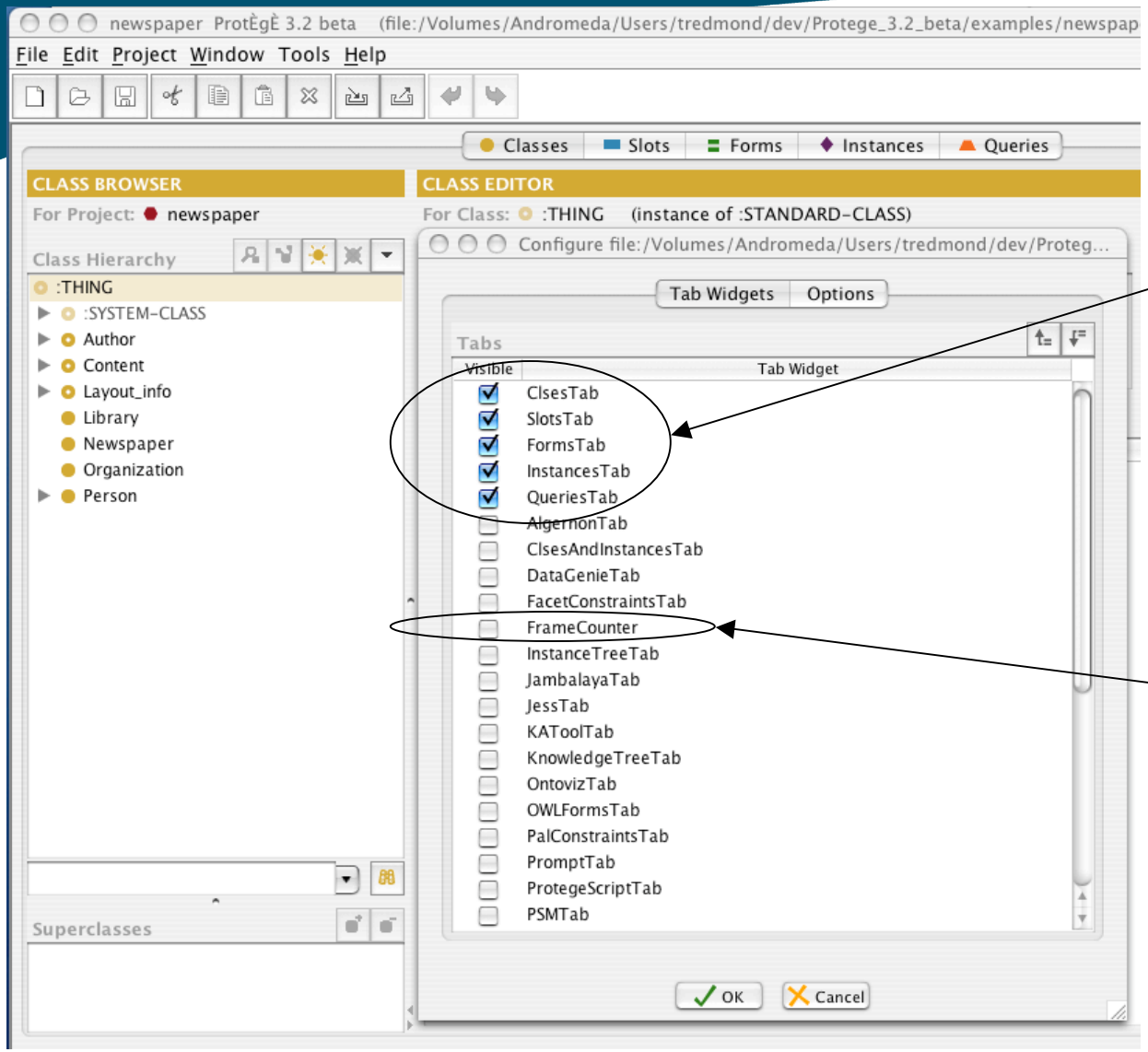
- TabWidget
- SlotWidget
- KnowledgeBaseFactory (“Backend”)
- ProjectPlugin
- ExportPlugin
- CreateProjectPlugin

Plugin: TabWidget

- What is it?
  - Large piece of screen real-estate
  - Can interact with domain KB

    browse, change, delete, corrupt
- What are its limitations?
  - Difficult to supplement or even interact with other tabs
- How hard is it to create?
  - Easy (1 day)
  - Just implement the initialize() method

Tab Plugin Configuration



Protégé is built from plugins

The Frame Counter Tab which we have added.

Not enabled.

Plugin: SlotWidget

- What is it?
  - UI Control which allows the user to display and modify a slot value
  - Follows a protocol for hiding interaction KB
- What are its limitations?
  - Works best with a *single* slot
- How hard is it to create?
  - Easy (1 day)

Plugin: SlotWidget - Protocol

- Initialize()
  - Describe how large a widget would like to be
- getValues()
  - Protégé wants the value being displayed.
- setValues()
  - Protégé wants to update the value displayed in the widget
- valueChanged()
  - tells Protégé of an update
- isSuitable()
- setEditable()

Plugin Type: KnowledgeBaseFactory

- What is it?
  - Replacement for standard storage mechanisms
    - Database
    - External server
    - …
  - Allows for parsing of different file formats
- What are its limitations?
  - Difficult to manipulate UI
  - Implementations tend to be buggy
- How hard is it to create?
  - Hard (>= 1 month)
  - Consider Import/Export plugin instead

Plugin Type: ProjectPlugin

- What is it?
  - Code that executes when “things happen” to a project (create, load, display, close, etc)
  - Get access to project, view, menu bar, tool bar and can modify them as you like
- How hard is it to create?
  - Easy (1 day)
  - Seven Possible Interfaces to implement

Plugin Type: ExportPlugin

- What is it?
  - Code that saves (part of) a knowledge-base in any format to *somewhere else*
    - files, servers, web, …
  - No change of the current backend
  - No guarantee of "lossless round trip"
  - No "live" connection
- How hard is it to create?
  - Medium (1 week)
  - Implement handleExportRequest()

Plugin Type: CreateProjectPlugin

- What is it?
  - Code that creates a knowledge-base from information from *somewhere else*
    - files, servers, web, …
  - No change of the current backend
  - No guarantee of “lossless round trip”
  - No “live” connection
- How hard is it to create?
  - Medium (1 week)

Plugin Type: CreateProjectPlugin

- canCreateProject()
  - Describes when this import plugin can be used
- createCreateProjectWizardPage()
  - The wizard for finding out where to get the data
- createNewProject()
  - Creates the project from scratch
- buildNewProject()
  - Builds the project from existing sources

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Plugin Packaging

- Plugin can contain doc and "about box" URL's or pages to integrate into the system
- Create a directory structure like:

  edu.stanford.smi.protegex.myproject/

  myproject.jar

  otherlibrary.jar

  myproject_doc.html

  myproject_about.html

  plugin.properties
- Zip it up and give it to your friends

Plugin Bundling

- Plugins of general usefulness can be “bundled” with the full release and made available to all users
- Advantage:
  - You may get a lot of users quickly
- Disadvantage:
  - You may get a lot of users quickly
- In order to be bundled the plugin must be:
  - *Well Formed*
  - *Well Behaved*
  - *Well Maintained*

Plugin Bundling – *Well Formed*

- jar file in an appropriate, recognizable directory
  - approriate: “edu.myorg.mygroup.myproject”, not “foo”
  - recognizable: last directory element: “mytab” not “foo”
- About Box and Documentation entries
- Minimal size
  - minimal documentation
    - links to more extensive documentation on web
    - no PDF, MS Word, large image files
  - no source
  - at most one small example project
  - readme.txt file if necessary
- isSuitable implemented if appropriate
  - Is it requires certain sorts of projects or additional installation (shared libraries, etc)

Plugin Bundling – *Well Behaved*

- Must "work" (not crash on startup) with the current release
- Minimal information (just errors) printed to the console window
  - Single startup line is ok (but certainly not required)
  - Use Java Logger for debugging
- Must start up and shut down smoothly
  - No time consuming code executed in static initializer
  - No long start up delays or modal dialogs that block the rest of the system
  - Must free acquired resources in "dispose()"

Plugin Bundling – *Well Maintained*

- Developer/maintainer “responsive” to problems.
- Does not mean that you offer 24x7x365 free support.

Plugin Licensing

- Plugins are not affected by the Mozilla Public License (MPL)
- You can adopt whatever license you want for your plugin
  - Open source (GPL, MPL, BSD)
  - Proprietary
- You can (try to) sell your plugin
- See FAQ for more information on plugin and non-plugin licensing issues
  - http://protege.stanford.edu/faq.html#08.00

Plugin Source

http://protege.stanford.edu/shortcourse/protege/200603/projects/0329-01pluginsCode.zip

Summary

- Plugins provide flexible and powerful mechanisms for extending Protege in many ways.
- When you encounter places where the default UI is inadequate or clumsy for your needs (and you will!) think about developing a plugin.
- Think about contributing your plugin it back to the community.