



Collabora Productivity

Integrate your applications with LO using LOKDocView

Pranav Kant

Collabora Productivity

@pranavk



Collabora Productivity

@CollaboraOffice

www.CollaboraOffice.com

Outline

- Brief introduction to LibreOfficeKit
- GObject and GObject-Introspection
- The widget – LOKDocView
- Integration examples in other languages
- Integration with gnome-documents



LibreOfficeKit



LibreOfficeKit

- A very simple C/C++ API for LibreOffice
- Exposes the core value of LibreOffice:
 - File format filters
 - Tiled rendering (documents → pixels)
 - Exposes editing, selections etc.
- A very simple header-only API – no linking
 - No socket opened, no plugins; simple init.
- LibreOffice online, Android, ‘loconv’, and this widget

Tiled Rendering

- Divide the document into smaller tiles
 - document → pixel
- Render based on demand
- Input: Tile width, tile height, tile coordinates

```
inline void paintTile(unsigned char* pBuffer,  
                    const int nCanvasWidth,  
                    const int nCanvasHeight,  
                    const int nTilePosX,  
                    const int nTilePosY,  
                    const int nTileWidth,  
                    const int nTileHeight)  
{  
    return mpDoc->pClass->paintTile(mpDoc, pBuffer, nCanvasWidth, nCanvasHeight,  
                                   nTilePosX, nTilePosY, nTileWidth, nTileHeight);  
}
```

- Bitmap-buffer rendering, with 32-bit RGBA colorspace



Communication: Client -> LO core

- Provide clients with simple API to talk to LO core
 - Mouse events, keyboard events converted into coordinates and payload forwarded to core
 - UNO commands
 - And much more



Communication: LO core -> client

- Client register different types of callbacks during init
 - GlobalCallback – registered on main LibreOfficeKit instance
 - DocumentCallback – registered on existing opened document (LibreOfficeKitDocument instance)
 - ViewCallback – registered on different created views of same document
- Tile invalidation, text selections, visible cursor information etc.

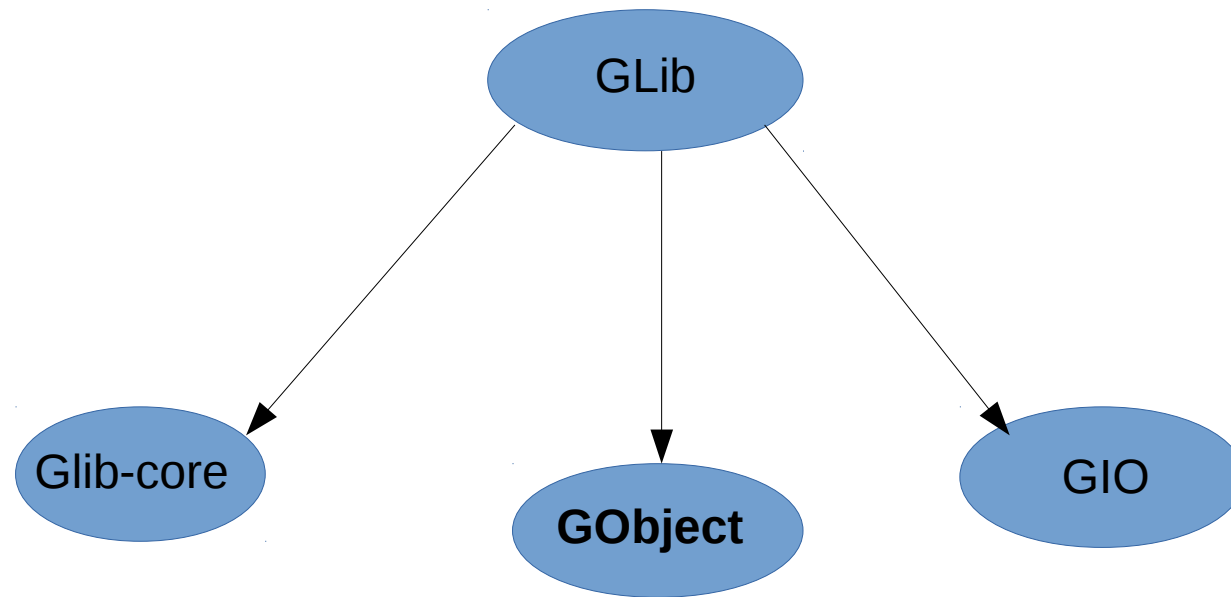
GObject

Object Oriented Programming in C

- Semi-object oriented already possible in C
 - glib-core uses it
- But no modern useful OOP features



GObject



GObject

- One among the set of libs glib provides
- Depends heavily on glib core library
- Simplify OOP and event-driven programming in C
- Inheritance, virtual functions, interfaces, reference counting, signals etc.
- Lots of boiler plate code to support these OOP features
- No multiple inheritance



GObject Introspection

GObject Introspection

- Middleware layer between GObject classes and language bindings
- Set of tools to collect and extend API metadata for GObject classes.
 - A scanner – parse C source files and generate a GIR (GObject Introspection Repository) XML format file
 - Compiler – compile the GIR file into a binary efficient disk format – typelib file



Talking in G-I

- C syntax insufficient for language bindings
 - Information about ownership transfer of dynamically allocated content

```
/**
 * lok_doc_view_new:
 * @pPath: (nullable): LibreOffice install path. Pass null to set it to default
 * path which in most cases would be $libdir/libreoffice/program
 * @cancellable: The cancellable object that you can use to cancel this
 * operation.
 * @error: The error that will be set if the object fails to initialize.
 *
 * Returns: (transfer none): The #LOKDocView widget instance.
 */
GtkWidget*          lok_doc_view_new          (const gchar* pPath,
                                              GCancellable *cancellable,
                                              GError **error);
```

G-I annotations



More annotations

- Transfer
 - (transfer none)
 - (transfer container)
 - Release the container, but not the elements
 - (transfer full)
 - Release container as well as elements
- Parameters
 - (nullable)
 - <https://wiki.gnome.org/Projects/GObjectIntrospection/Annotations>



LOKDocView



LOKDocView – A GObject

- A GObject class
- `libreofficekit/source/gtk/lokdocview.cxx`
 - Different code convention than LO core
- Wraps LibreOfficeKit in a GObject, and exposed as GObject library – **liblibreofficekitgtk.so**
- Can take advantage of gobject-introspection for client/front-end to be in higher-level languages

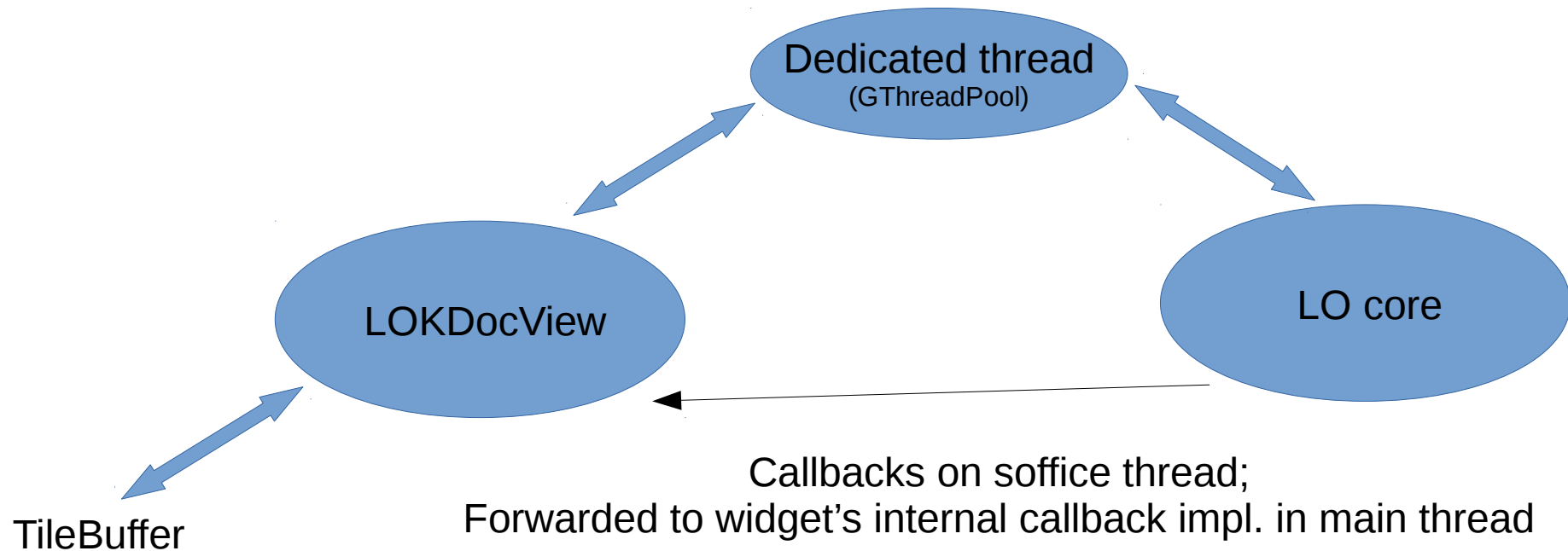


Heavy-lifting in a thread

- Responsiveness necessary for clients for better UX
- Interaction with LO core done in separate thread
 - Rendering tiles etc.
- A dedicated thread to do the interaction



LOKDocView



Integrations examples

Integration with gnome-documents



Questions ?

