

GNOME ❤ Rust

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GNOME, GIMP y C su historia



Miguel de Icaza

To: gtk-list redhat com, kde fiwi02 wiwi uni-tuebingen de, guile cygnus com

Subject: The GNOME Desktop project.

Date: Fri, 15 Aug 1997 22:19:34 -0500

We want to develop a free and complete set of user friendly applications and desktop tools, similar to CDE and KDE but based entirely on free software:

[...]

- We plan to export the GTK API through a procedural database (which will in fact be an object database) to allow easy integration with scripting languages and modules written in other languages.

- We plan to use GTK/Scheme bindings for coding small utilities and applications. When these bindings are more mature, it should be possible to write complete applications in Scheme.

[...]



GLib/GObject



GObject

Sistema de tipos registrables en tiempo de ejecución

Clases (herencia simple)

Interfaces

Señales

Propiedades dinámicas con notificación de cambios

Sistema de introspección (GObject Introspection)



GObject: Anatomía de una clase

```
/* myobject.c */
struct _MyObject
{
    GObject parent_instance;
    /* miembros publicos */
};

G_DEFINE_TYPE (MyObject, my_object, G_TYPE_OBJECT);

static void
my_object_class_init (MyObjectClass *klass)
{
    /*registrar propiedades, metodos virtuales y señales*/
}

static void
my_object_init (MyObject *self)
{
    /* inicializacion */
}

GObject*
my_object_new (void)
{
    return g_object_new (MY_TYPE_OBJECT, 0);
}

/* myobject.h */
#define MY_TYPE_OBJECT my_object_get_type ()
G_DECLARE_FINAL_TYPE (MyObject,
                      my_object,
                      MY, OBJECT, GObject)
```

GObject Introspection

Base de datos en disco de cada librería Gobject

Definición XML (GIR) para análisis estático

Base de datos binaria (.typelib) para análisis en tiempo de ejecución

Múltiples bindings disponibles:

C++ Rust C#/.NET/Mono Java SpiderMonkey(GJS) Python
Ruby Haskell

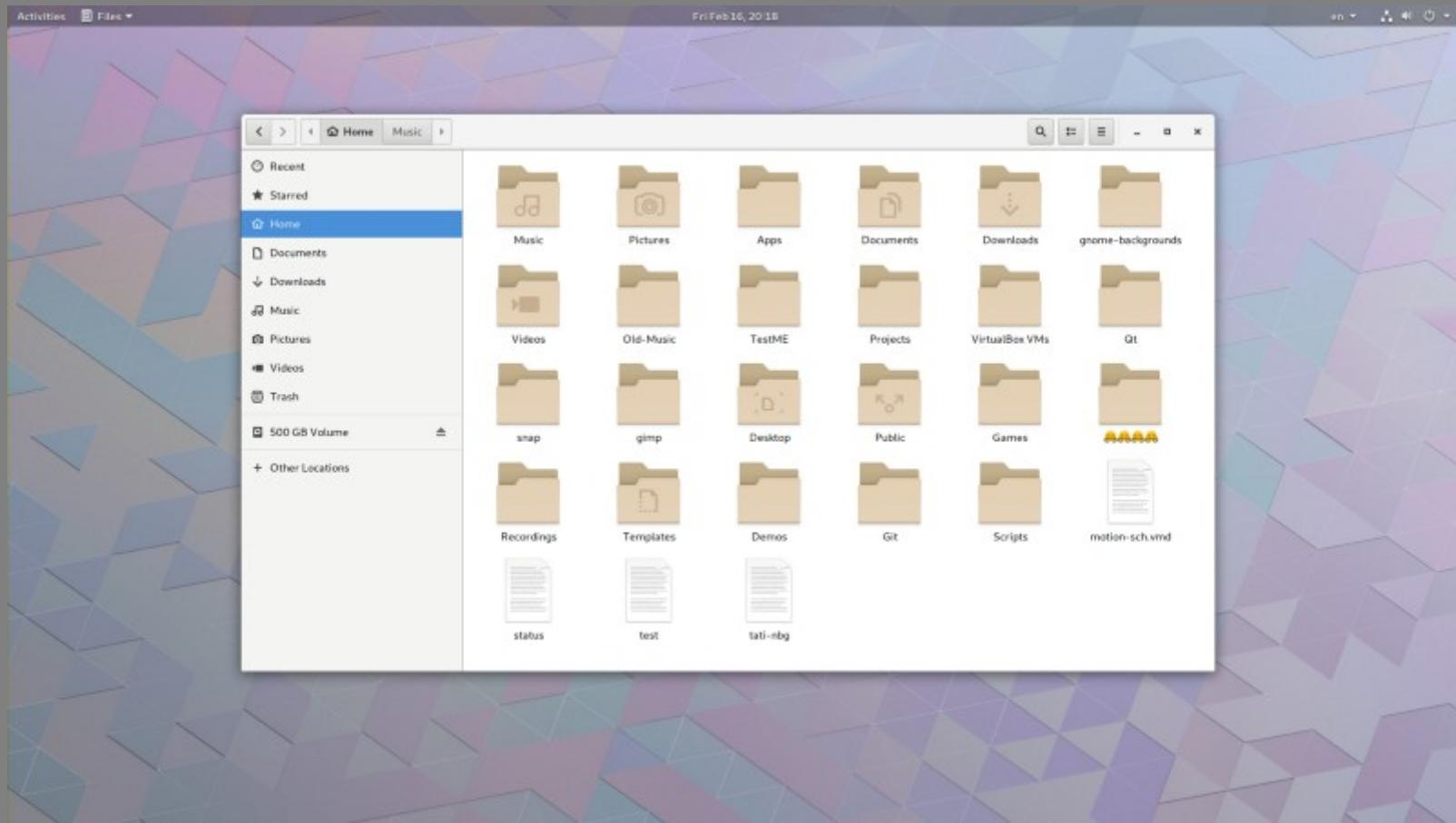


GObject Introspection

```
...
<return-value transfer-ownership="none">
    <doc xml:space="preserve">%TRUE if successful, else %FALSE with @error set</doc>
    <type name="gboolean" c:type="gboolean"/>
</return-value>
<parameters>
    <parameter name="detailed_name" transfer-ownership="none">
        <doc xml:space="preserve">a detailed action name</doc>
        <type name="utf8" c:type="const gchar*"/>
    </parameter>
...
...
```

GTK+





Visual Studio for Mac Preview

Press '⌘.' to search

Solution Explorer

MyHealth.Client.IOS > Debug | iPhoneSimulator

NewAppointmentViewModel.cs

```
143     get { return _patientEvents; }
144     set
145     {
146         _patientEvents = value;
147         RaisePropertyChanged(() => PatientEvents);
148     }
149 }

#endregion Properties

#region Commands

public IMvxCommand AcceptCommand
{
    get
    {
        return new MvxCommand(async () =>
            {
                await CreateNewAppointmentAsync();
                Close(this);
            });
    }
}

public IMvxCommand CancelCommand
{
    get { return new MvxCommand(() => Close(this)); }
}

public IMvxCommand BackCommand
{
    get { return new MvxCommand(() => Close(this)); }
}

#endregion Commands

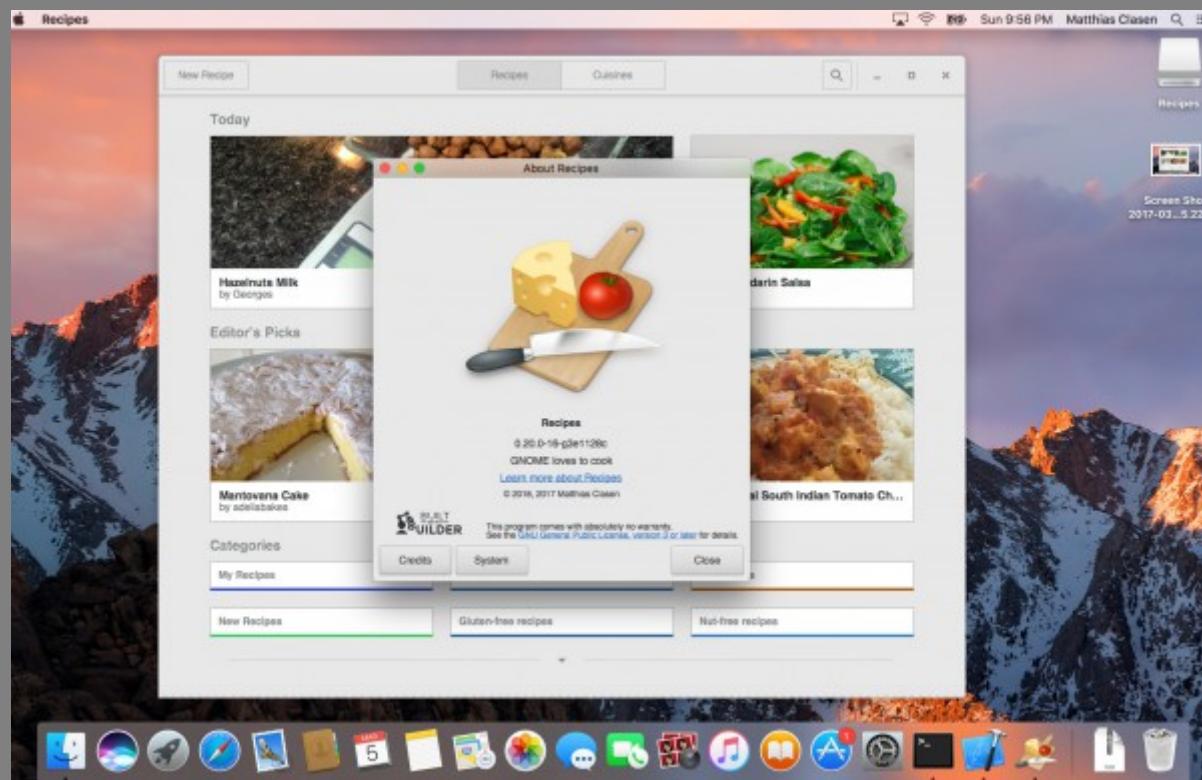
public NewAppointmentViewModel(IMyHealthClient client, IMvxMessenger messenger, IDialogService dlgSvc)
    : base(messenger)
```

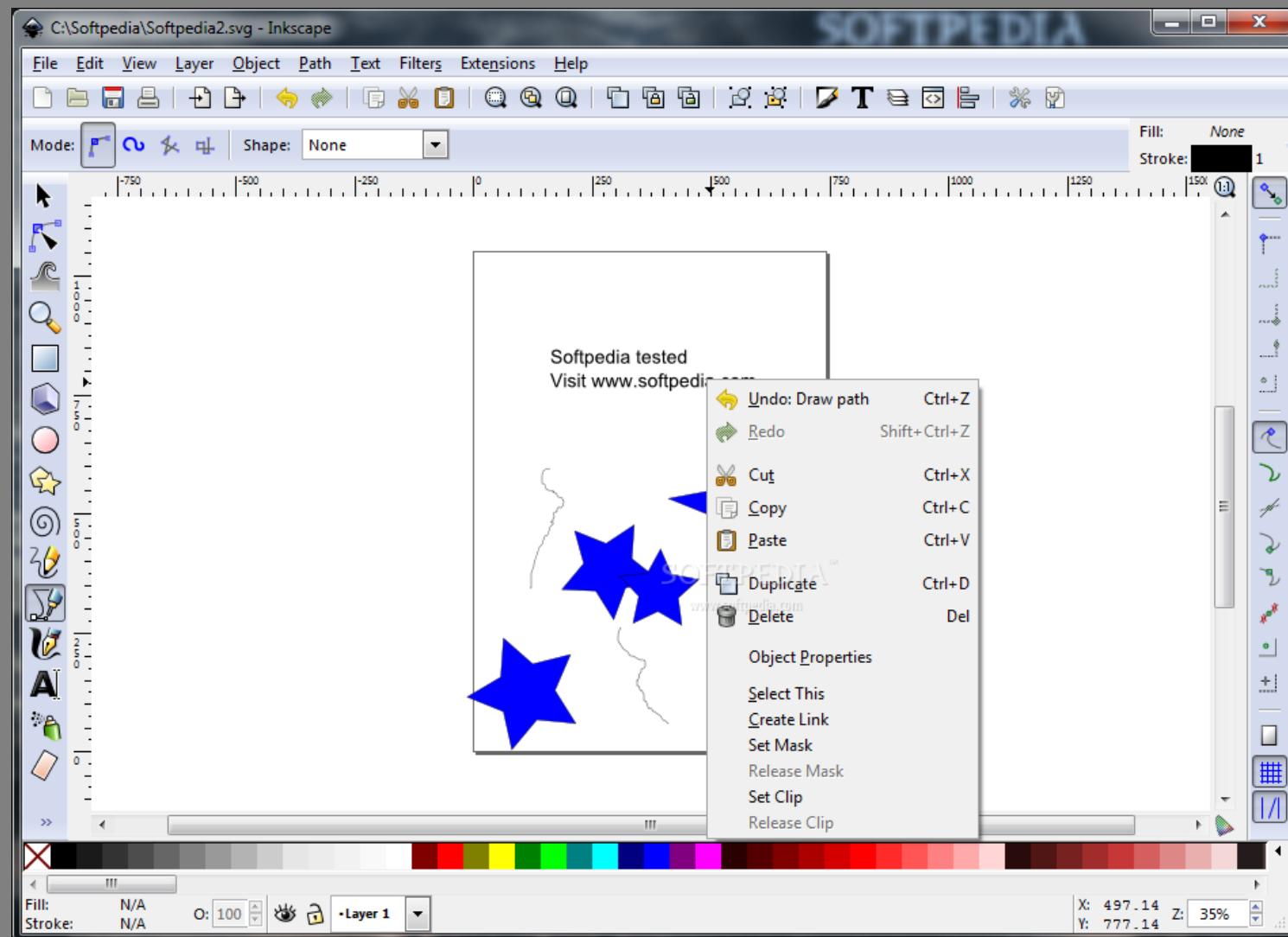
Toolbox

Properties

Source Changes Blame Log Merge

Test Results Tasks Errors





C: el problema



Primera aproximación: MONO/.NET



Segunda aproximación: Vala

```
/* defining a class */
class Track : GLib.Object {
    public double mass;
    public double name { get; set; }
    private bool terminated = false;
    public signal void sig_1(int a);
    public void terminate() {
        terminated = true;
    }
}
```

Problemas

Difícil de depurar

Leaks de memoria poco obvios

El compilador no asegura la ABI de los tipos entre versiones

Vala apenas ha recibido mejoras en los últimos 7 años



Y de repente: Rust



- Seguro
- Sin recolector de basura
- Puede consumir y emitir C API/ABI



gtk-rs: Bindings de Gtk+ para Rust

Bindings autogenerados a partir de
GObject introspection

glib-2.0.gir/gtk+-3.0.gir → glib-sys/gtk-
sys

glib-2.0.gir/gtk+-3.0.gir → glib-rs/gtk-rs



Ejemplo gtk-rs

```
fn build_ui(application: &gtk::Application) {
    let window = gtk::ApplicationWindow::new(application);
    window.set_title("First GTK+ Program");
    window.set_application(application);
    window.show_all();
    window.connect_clicked(|_| {
        /* asd */
    });
}

fn main() {
    let application = gtk::Application::new("com.github.basic",
                                             gio::ApplicationFlags::empty()
                                             .expect("Initialization failed..."));
    application.connect_startup(|app| {
        build_ui(app);
    });
    application.connect_activate(|_| {});
    application.run(&args().collect::<Vec<_*>>());
}
```

Entonces, ya
podemos portar
todo a Rust, ¿no?



**I'M NOT
READY!**

memegenerator.net

Problema sin resolver:
Emitir GObjects/GInterfaces/GIR



gobject_gen!()



Usando gobject_gen()!

```
gobject_gen! {
    class Signaler {
        val: Cell<u32>,
    }

    impl Signaler {
        signal fn value_changed(&self);
        signal fn value_changed_to(&self, v: u32);

        pub fn set_value(&self, v: u32) {
            let private = self.get_priv();
            private.val.set(v);
            self.emit_value_changed();
            self.emit_value_changed_to(v);
        }

        pub fn get_value(&self) -> u32 {
            let private = self.get_priv();
            private.val.get()
        }
    }
}
```



Asuntos por resolver

Cubrir toda la API de GLib y Gtk+ en los bindings

Propiedades en gobject_gen!()

Emitir .h

Emitir .gir

Integración de Cargo/crates.io con Meson



B

+

Fractal

Favorites

Fractal

GNOME Design

#gnome-todo

Hammond

Rooms

GNOME Hackers (444)

#inkscape-devel (78)

GTK (229)

Nautilus (Files)

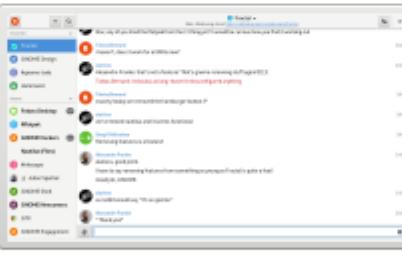
GNOME Builder (5)

GNOME Shell (70)

B Tobias Bernard
danigm: yeah, we should update the matrix page too 19:13

Alexandre Franke
Or you GIMP it but that requires work. 19:13

Alexandre Franke
Julian Sparber, #whileyoureatit can you have a look at <https://gitlab.gnome.org/danigm/fractal/issues/126>? 20:10

B Tobias Bernard
 20:43

just sending a screenshot to show off in the screenshot i'm taking meta screenshot!

0 | 😊

Fractal

Gtk+ Matrix.org client <https://gitlab.gnome.org/danigm/fractal>

👤 X

process_viewer Setting ?

1. process_viewer

process_viewer

Process list System usage

pid	process name	cpu usage	memory usage (in kB)
94524	com.apple.Safari.History	0.0	1216
330	useractivityd	0.0	6240
384	storeassetd	0.0	4464
14773	com.apple.iTunesLibraryService	0.0	2708
17431	Google Chrome Helper	0.0	66368
97767	cloudd	0.0	4992
94590	assistantd	0.0	3140
969	bash	0.0	284
16998	crashpad_handler	0.0	1108
17047	Google Chrome Helper	0.0	14008
17025	Google Chrome Helper	0.0	17956
92587	ContactsAccountsService	0.0	4716
275	UserEventAgent	0.0	7776
110	loginwindow	0.0	59972
17438	Google Chrome Helper	0.0	97604
816	nbagent	0.0	7024
98955	cloudphotosd	0.0	5516
94581	com.apple.CommerceKit.TransactionSen	0.0	812
94572	parsecd	0.0	7104
71157	emacs	0.0	8
17035	Google Chrome Helper	0.0	7416
17024	Google Chrome Helper	0.1	84236
17000	Google Chrome Helper	0.0	197504
808	icdd	0.0	3972
14763	deleted	0.0	2980
309	askpermissiond	0.0	1760
98952	ScopedBookmarkAgent	0.0	2952
17003	VTDecoderXPCService	0.0	2572
94462	soagent	0.0	2700
98951	photolibraryd	0.0	2848
4918	iTerm2	0.0	356
92603	callservicesd	0.0	8488
833	Android File Transfer Agent	0.0	2584
17039	Google Chrome Helper	0.0	11284

More information

End task

Killing target/release/process_viewer

(process:17443): Gtk-WARNING **: 15:01:31.296: Locale not supported by C library.
Using the fallback 'C' locale. Milestone

No milestone

0 ops, 79 total

Other Bookmarks

- KoKoKiwi
- Levans
- pnkfelix
- SimonSpin
- Velociraptor
- adjivas
- Aeradriel
- Aerath
- bgIm-M
- BlackYoup
- Bonstra
- booya
- brundleticks
- Calinou
- chelfi
- cods
- cp
- daimrod
- davidcl
- dex
- Doc
- eijebong
- ekleog
- elcroco-M
- eval
- Exaone313
- fabric
- frdeso
- ub.com/rust-lang/crates.io-index
- Freyskeyd
- gagbo
- geal
- genpaku
- grange_c
- hein
- Guest2378
- havelock
- ia0
- imperio
- ithinuel

GRACIAS

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