Xlivebg

Live Wallpapers for the X·window System

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Xlivebg

Live Wallpapers ?

- Animated desktop wallpapers as opposed to static pictures
- Inspired from android

$\hookrightarrow$

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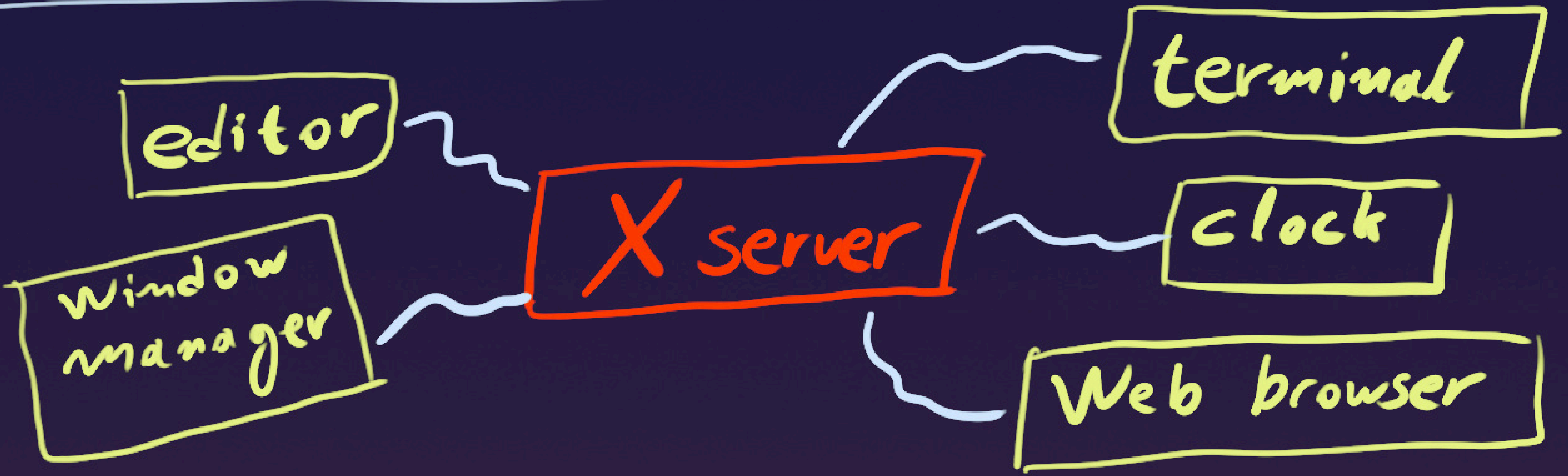
X window System



- Window Managers are regular X clients
  no special priviledges

- WM conventions
  - ICCCM
  - Motif WM Hints
  - NetWM protocols

Inter-Client Communications Conventions Manual

Animated desktop ?

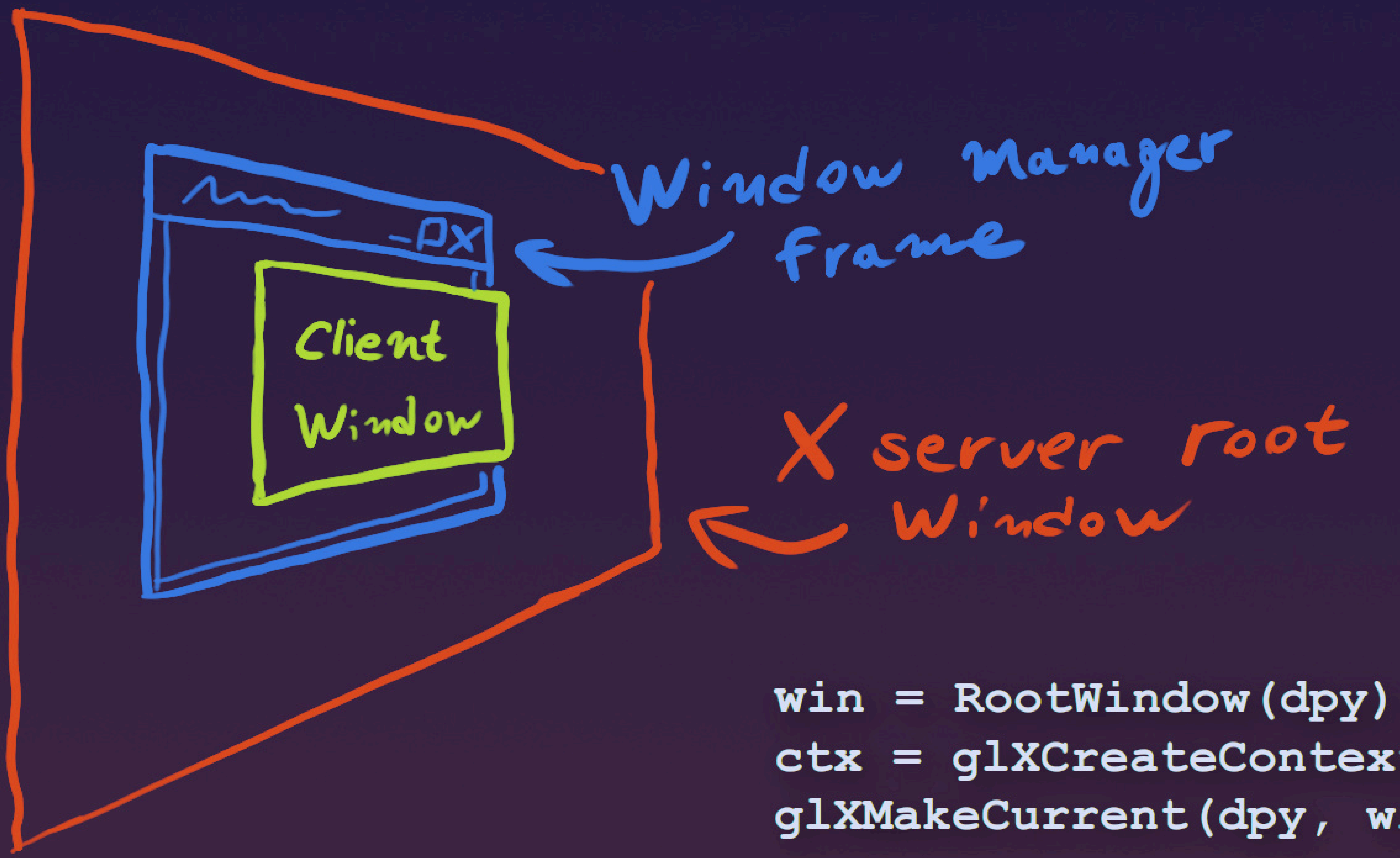
- X client drawing continuously on the desktop ?
  - Needs to be fast & efficient
  - Must keep redraw rate to a minimum

- OpenGL context bound to the desktop ?

What is the desktop though ?

Finding the desktop ...

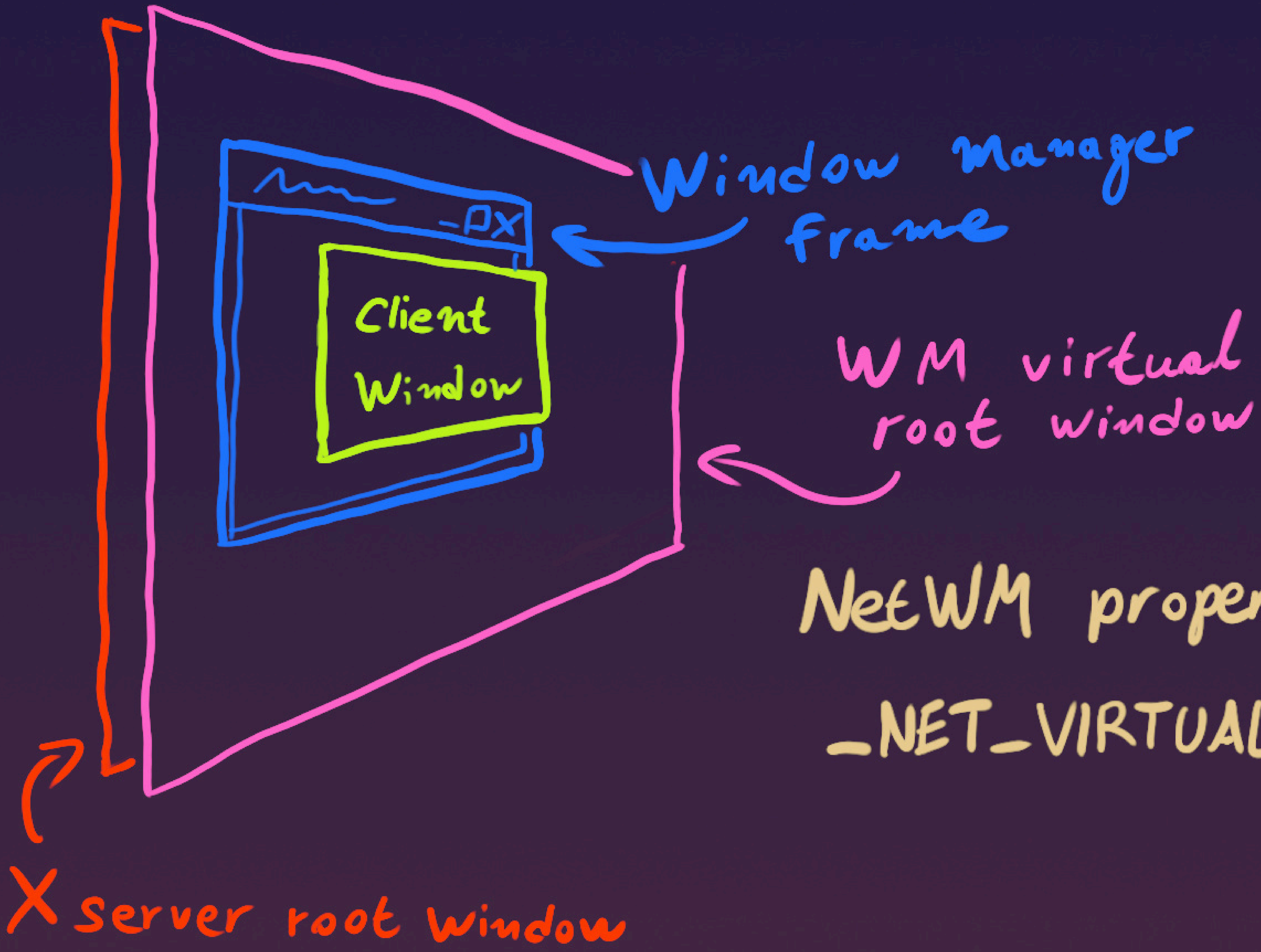
Attempt #1 : Root window



```
win = RootWindow(dpy);
ctx = glXCreateContext(dpy, ...);
glXMakeCurrent(dpy, win, ctx);
```

Finding the desktop ......

Attempt #2: Virtual root window



NetWM property:

_NET_VIRTUAL_ROOTS

Finding the desktop ......

~~Dennis Ritchie~~

Window manager

~~NetWM property: _NET_VIRTUAL_ROOTS~~

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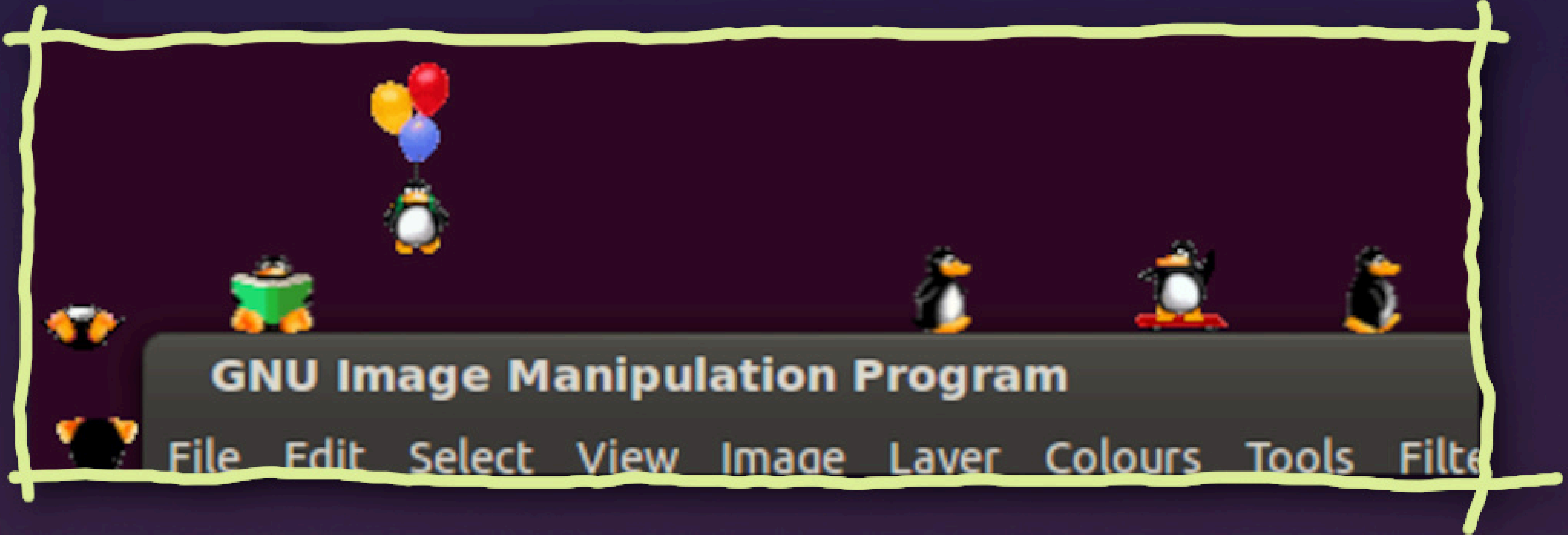
Finding the desktop ....

Attempt #3: give up...

xpenguins already did this

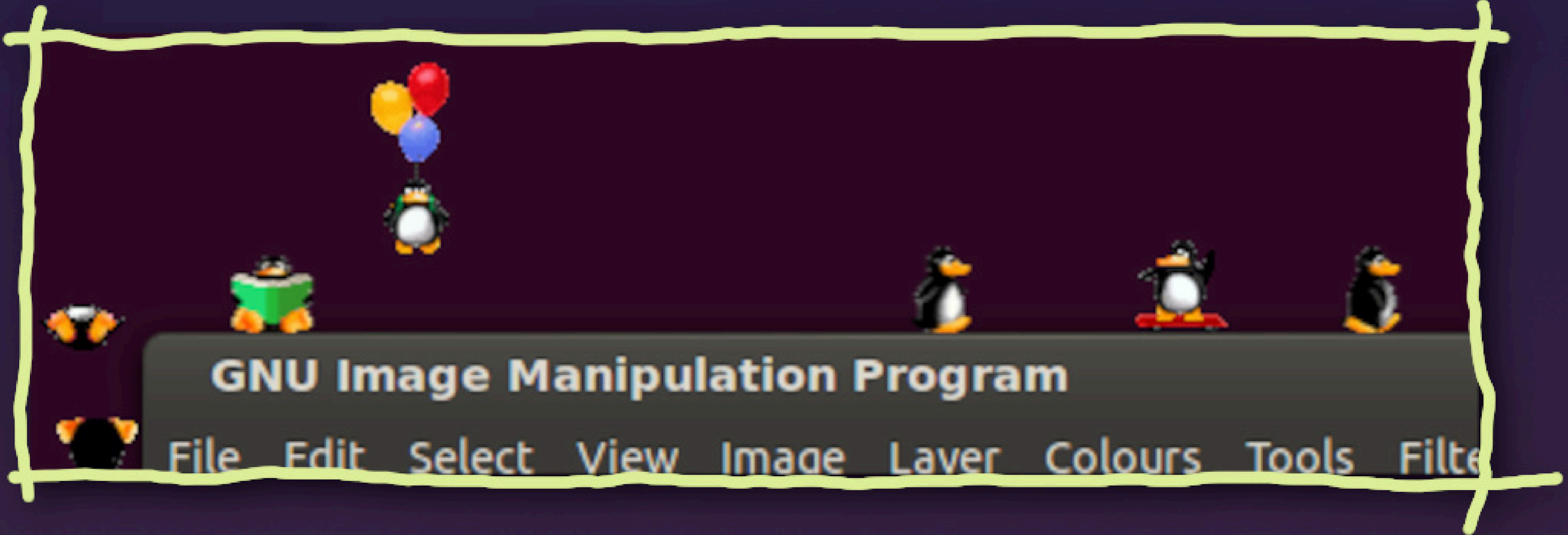

GNU Image Manipulation Program
File Edit Select View Image Layer Colours Tools Filte

win = ToonGetRootWindow(dpy, ...);

Finding the desktop ....

Attempt #3: give up...

xpenguins already did this


GNU Image Manipulation Program
File Edit Select View Image Layer Colours Tools Filte

win = ToonGetRootWindow(dpy, ...);

Sadly still not enough...

~~Finding~~ the desktop .... ______

```
$ xlivebg -n
```

- Create new window
- set the property: _NET_WM_WINDOW_TYPE

  _NET_WM_WINDOW_TYPE_DESKTOP

Xlivebg project

like xscreensaver
but for live wallpapers

Goal: framework for 3rd party live wallpapers

↳ Must make it really simple to implement live wallpapers, by handling:

- All interactions with the X window system
- OpenGL context creation and setup
- Configuration and options managment
- Providing helpers for common tasks
- Background images loading & managment

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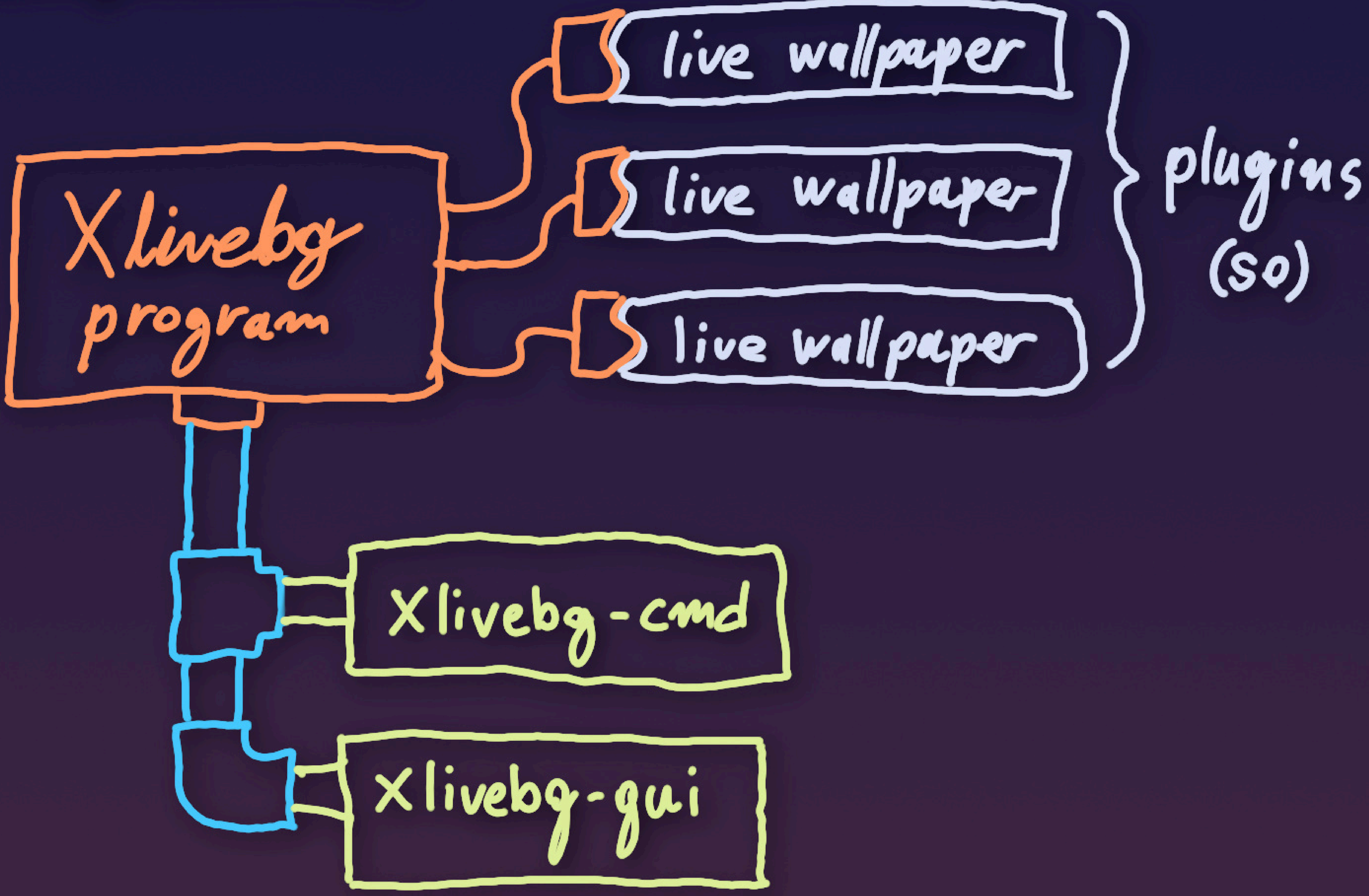
Xlive bg parts



Configuration files

~/.xlivebg/config
~/.config/xlivebg.conf
/etc/xlivebg.conf

search paths

```
xlivebg {
    active = "ripple"

    # background image
    image = "bgimage.jpg"
    fit = "stretch"

    # --- plugin-specific configuration ---
    distort {
        amplitude = 0.025
        frequency = 8.0
    }

    ripple {
        raindrops = 0
    }
}
```

global settings

settings for the "distort" wallpaper

settings for the "ripple" wallpaper

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Interactive Configuration

- AF_UNIX socket : /tmp/xlivebg.sock
- Command-line client : xlivebg-cmd
- plugin property description

```
proplist {
    prop {
        id = "count"
        desc = "number of foo"
        type = "integer"
        range = [500, 5000]
    }
    prop {
        id = "size"
        desc = "foo size"
        type = "number"
        range = [0.25, 4.0]
    }
    prop {
        id = "video"
        desc = "background video file"
        type = "filename"
    }
}
```

wallpaper plugins provide a list of tweakable parameters they support

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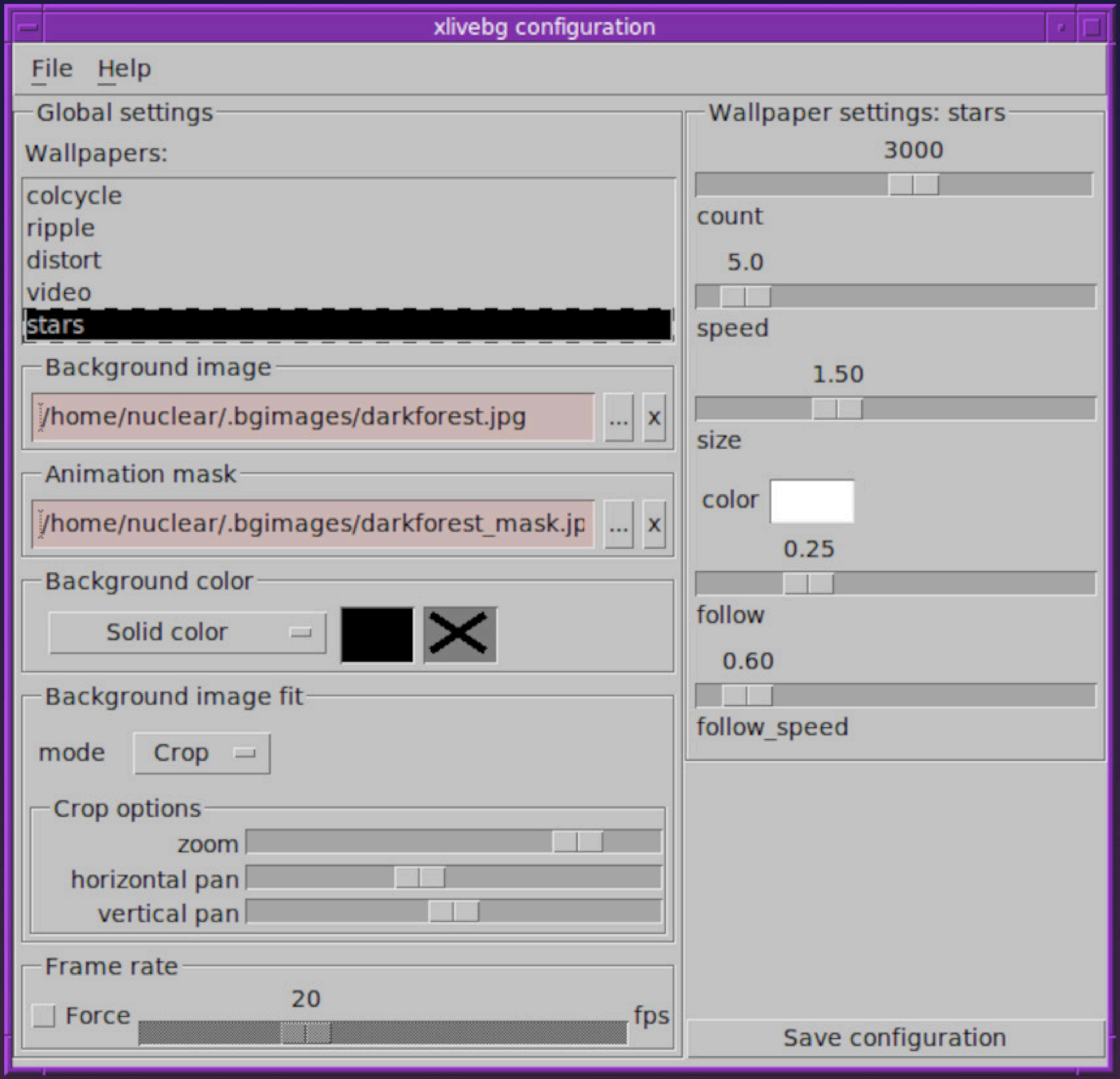
Interactive configuration GUI



xlivebg configuration

File Help

Global settings

Wallpapers:

colcycle
ripple
distort
video
stars

Background image: /home/nuclear/.bgimages/darkforest.jpg

Animation mask: /home/nuclear/.bgimages/darkforest_mask.jp

Background color: Solid color

Background image fit: mode Crop

Crop options: zoom, horizontal pan, vertical pan

Frame rate: Force 20 fps

Wallpaper settings: stars

count 3000
speed 5.0
size 1.50
color
follow 0.25
follow_speed 0.60

Save configuration

- Communicates through the socket
- Left pane: general settings
- Right pane: auto-generated active plugin prop. UI

save to config file

global settings

plugin properties

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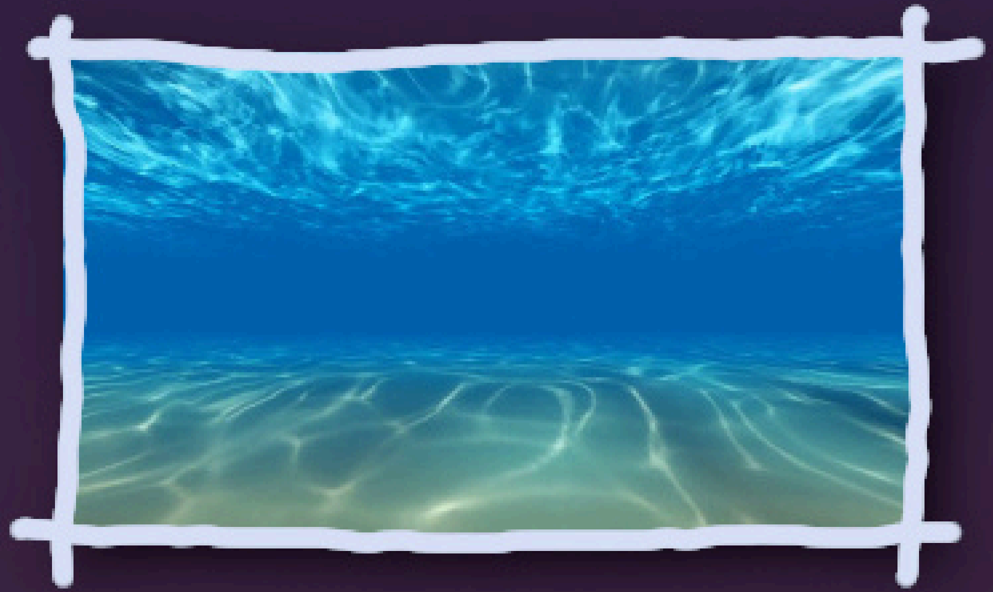
Bundled live wallpapers (v1.0)

Color cycling

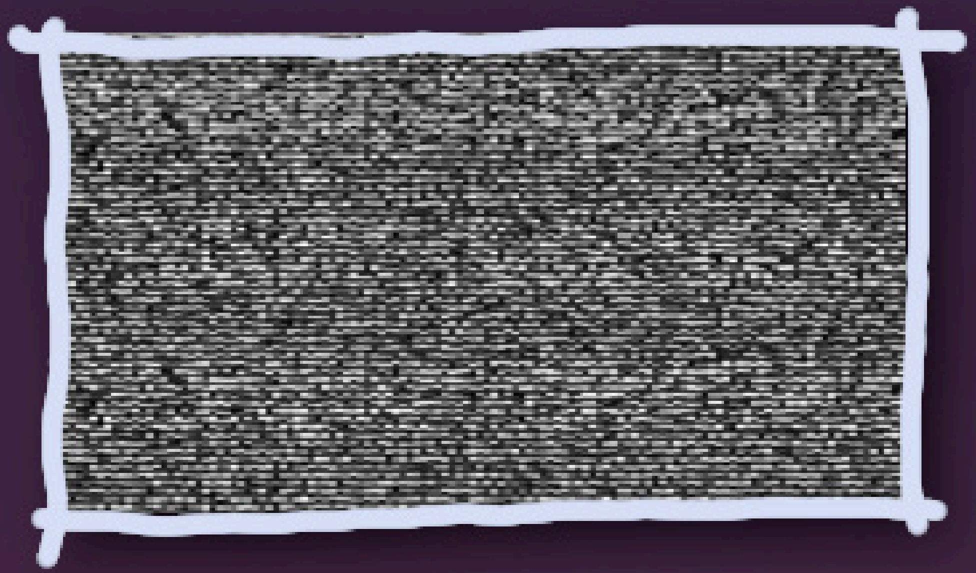
ripple effect

Starfield



distortion

video playback



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plugin example (1/2)

```c
struct xlivebg_plugin {
    char *name, *desc;
    char *props;
    long upd_interval;
    xlivebg_init_func init;
    xlivebg_cleanup_func cleanup;
    xlivebg_start_func start;
    xlivebg_stop_func stop;
    xlivebg_draw_func draw;
    xlivebg_prop_func prop;
    void *data, *so;
};
```

in *xlivebg.h*

```c
#define PROPLIST     \
    "proplist {\n" \
    "    prop {\n" \
    "        id = \"speed\"\n" \
    "        desc = \"animation speed\"\n" \
    "        type = \"number\"\n" \
    "        range = [0, 10]\n" \
    "    }\n" \
    "}\n"

static struct xlivebg_plugin plugin = {
    "minimal",
    "Minimal live wallpaper example",
    PROPLIST,
    XLIVEBG_20FPS,
    init, 0,
    start, 0,
    draw,
    prop,
    0, 0
};
static float speed;

int register_plugin(void)
{
    return xlivebg_register_plugin(&plugin);
}
```

property list

requested redraw rate

callbacks

plugin init

```
so = dlopen("foo.so", ...);
reg = dlsym(so, "register_plugin");
reg();
```

plugin example (2/2)

Callbacks

```
static int init(void *cls)
{
    xlivebg_defcfg_num("xlivebg.minimal.speed", 1.0f);
    return 0;
}

static void start(long tmsec, void *cls)
{
    prop("speed", 0);
}

static void prop(const char *prop, void *cls)
{
    if(strcmp(prop, "speed") == 0) {
        speed = xlivebg_getcfg_num("xlivebg.minimal.speed", 1.0f);
    }
}

static void draw(long tmsec, void *cls)
{
    int i, num_scr = xlivebg_screen_count();

    xlivebg_clear(GL_COLOR_BUFFER_BIT);

    /* for every screen ... */
    for(i=0; i<num_scr; i++) {
        xlivebg_gl_viewport(i);
        /* ... draw using OpenGL ... */
    }
}
```

default value if not configured

Called on plugin activation

Called when a property is modified

Called continuously to redraw

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Links

- web site:
  http://nuclear.mutantstargoat.com/sw/xlivebg
- github repo:
  https://github.com/jtsiomb/xlivebg
- Setup & demo video:
  https://www.youtube.com/watch?v=JZ_RX0BWPD8

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Links

Thanks for watching!

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