# Операционные системы

# Графический интерфейс в ОС Unix. Система X Window
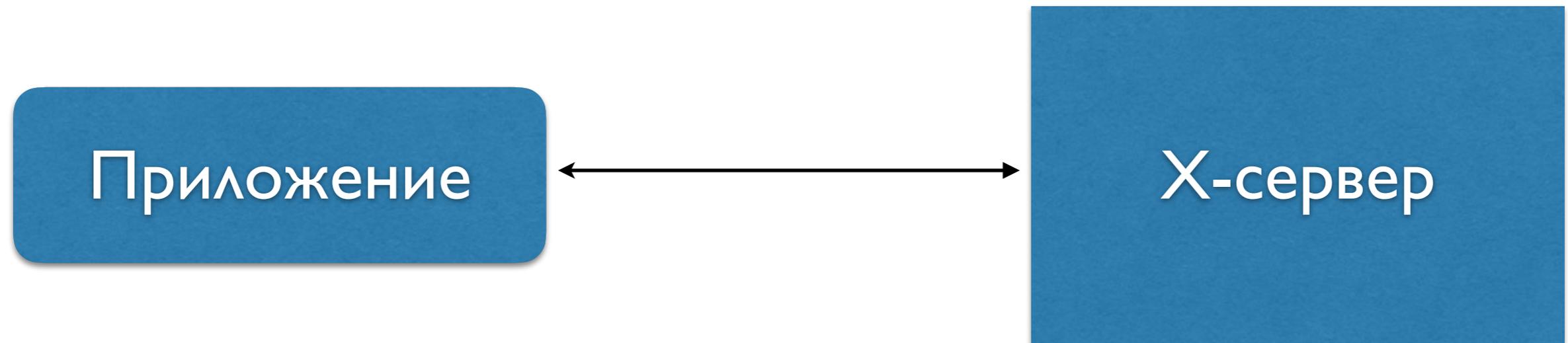
Олег Французов
2017

# X Window

- Графическое приложение – обычный процесс Unix

- X-протокол

- Приложение – X-клиент, общается с X-сервером

  - Сервис: нарисовать объект

  - Сообщает о нажатиях клавиш etc.

# X Window

- Соединение через потоковый сокет

- Работа по сети, X-терминалы

- X-сервер — обычный процесс, не часть ядра

# X Window

Приложение ←——————————→ X-сервер

# X Window

- Реализации: <u>X.Org</u>

- X может отсутствовать

- X-сервер под Win32

# Оконные менеджеры

**NAME**

      9wm - 8-1/2-like Window Manager for X

**SYNOPSIS**

      **9wm** [ **-grey** ] [ **-version** ] [ **-font** fname ] [ **-term** termprog ] [
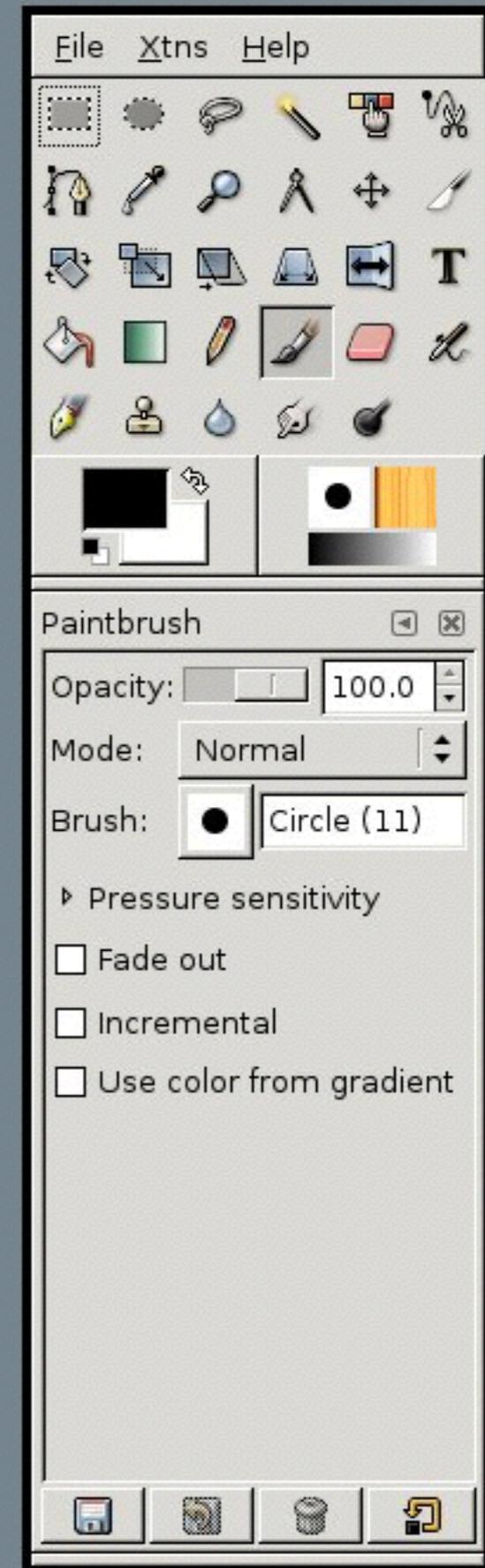      **exit|restart** ]

**DESCRIPTION**

      9wm is a window manager for X which attempts to emulate the window man-
      agement policies of Plan 9's 8-1/2 window manager.

      The  **-grey**  option makes the background light grey, as does 8-1/2.  Use
      this option for maximum authenticity.  **-font** fname  sets  the  font  in
      9wm's  menu to fname, overriding the default.  **-term** termprog specifies
      an alternative program to run when  the  New  menu  item  is  selected.
      **-version** prints the current version on standard error, then exits.

      To  make 9wm exit, you have to run **9wm exit** on the command line.  There
      is no ''exit'' menu item.

      9wm is click-to-type: it has a notion of the current window,  which  is

Manual page 9wm(1) line 1

---

File  Xtns  Help

Paintbrush

Opacity:  100.0

Mode:  Normal

Brush:  Circle (11)

▷ Pressure sensitivity

☐ Fade out

☐ Incremental

☐ Use color from gradient

---

Brushes

*Circle (11) (11 x 11)*

Spacing:  20.0

bertha
Sun 24 Jun
6:34 PM
0%
CPU0
0%
CPU1
187 procs
9 users
Proc
0
sda
0
md0
0
md1
70K
eth0
Mem
Swap
-/6
11d 21:32

rxvt

```
        if(result) {
            DestroyImage(result);
        }

        jpeg_destroy_decompress(&cinfo);

        return NULL;

    }

    /* Prepare to load the file. */
    jpeg_create_decompress(&cinfo);
    jpeg_stdio_src(&cinfo, fd);

    /* Check the header. */
    jpeg_read_header(&cinfo, TRUE);

    /* Start decompression. */
    jpeg_start_decompress(&cinfo);
    rowStride = cinfo.output_width * cinfo.output_components;
    buffer = (*cinfo.mem->alloc_sarray)((j_common_ptr)&cinfo,
        JPOOL_IMAGE, rowStride, 1);

    result = Allocate(sizeof(ImageNode));
    result->width = cinfo.image_width;
    result->height = cinfo.image_height;
    result->data = Allocate(4 * result->width * result->height);

    /* Read lines. */
    outIndex = 0;
    while(cinfo.output_scanline < cinfo.output_height) {
        jpeg_read_scanlines(&cinfo, buffer, 1);
        inIndex = 0;
        for(x = 0; x < result->width; x++) {
            switch(cinfo.output_components) {
            case 1:   /* Grayscale. */
                result->data[outIndex + 1] = GETJSAMPLE(buffer[0][inIndex]);
                result->data[outIndex + 2] = GETJSAMPLE(buffer[0][inIndex]);
                result->data[outIndex + 3] = GETJSAMPLE(buffer[0][inIndex]);
                inIndex += 1;
                break;
            default: /* RGB */
                result->data[outIndex + 1] = GETJSAMPLE(buffer[0][inIndex + 0]);
                result->data[outIndex + 2] = GETJSAMPLE(buffer[0][inIndex + 1]);
                result->data[outIndex + 3] = GETJSAMPLE(buffer[0][inIndex + 2]);
                inIndex += 3;
                break;
            }
            result->data[outIndex + 0] = 0xFF;
            outIndex += 4;
        }
    }

    /* Clean up. */
    jpeg_destroy_decompress(&cinfo);
    fclose(fd);
```

Menu:
- Terminal
- Applications ▶
  - Audacious
  - Dia
  - Firefox
  - Pidgin
  - Gimp
  - gtk-gnutella
  - gxine
  - Open Office
- Utilities ▶
- Restart
- Exit

rxvt

```
DEBUG: main.c[203]: debug mode stopped
DEBUG: MEMORY: no memory leaks
joewing@bertha ~> devel/c/jwm/src/jwm
   G: main.c[108]: debug mode started
   G: shape extension enabled
   G: render extension enabled
   G: main.c[203]: debug mode stopped
   G: MEMORY: no memory leaks
ing@bertha ~> devel/c/jwm/src/jwm
```

```
          cursor.c   group.c    main.c     place.c    taskbar.c
          cursor.h   group.h    main.h     place.h    taskbar.h
          cursor.o   group.o    main.o     place.o    taskbar.o
          debug.c    help.c     match.c    popup.c    timing.c
          debug.h    help.h     match.h    popup.h    timing.h
          debug.o    help.o     match.o    popup.o    timing.o
          desktop.c  hint.c     menu.c     render.c   tray.c
          desktop.h  hint.h     menu.h     render.h
          desktop.o  hint.o     menu.o     render.o
    st.c  dock.c     icon.c     misc.c     resize.c
    st.h  dock.h     icon.h     misc.h     resize.h
    st.o  dock.o     icon.o     misc.o     resize.o
          error.c    image.c    move.c     root.c
          error.h    image.h    move.h     root.h
clock.o   error.o    image.o    move.o     root.o
color.c   event.c    jwm*       outline.c  screen.c
color.h   event.h    jwm.h      outline.h  screen.h
color.o   event.o    jxlib.h    outline.o  screen.o
joewing@bertha src> vi resize.h
joewing@bertha src> vi border.h
joewing@bertha src> make
gcc -c -g -O2 -DPNG_NO_MMX_CODE -I/usr/include/libpng12
pe2      -Wall -g -DDEBUG event.c
gcc -o jwm background.o border.o button.o client.o clien
command.o confirm.o cursor.o debug.o desktop.o dock.o ew
dient.o group.o help.o hint.o icon.o image.o key.o lex.o
isc.o move.o outline.o pager.o parse.o place.o popup.o r
screen.o status.o swallow.o taskbar.o timing.o tray.o tra
11 -lpng12   -ljpeg -lXft -lXrender -lfontconfig -lfreety
r -lX11   -lXpm -lXext -lXinerama -g
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screen.o status.o swallow.o taskbar.o timing.o tray.o tra
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r -lX11   -lXpm -lXext -lXinerama -g
joewing@bertha src>
```

The GIMP
File   Xtns   Help

Paintbrush
Opacity: 100.0
Mode: Normal
Brush: Circle (11)
▶ Pressure sensitivity
☐ Fade out
☐ Incremental
☐ Use color from gradient

```
swapUp = modify Empty $ \c -> case c of
    Node _ []        [] -> c
    Node t (l:ls) rs -> Node t ls (l:rs)
    Node t []        rs -> Node t (reverse rs) []

swapDown = modify Empty $ \c -> case c of
    Node _ []        [] -> c
    Node t ls (r:rs) -> Node t (r:ls) rs
    Node t ls        [] -> Node t [] (reverse ls)

--
-- | /O(1) on current window, O(n) in general/. Focus the window 'w',
-- and set its workspace as current.
--
focusWindow :: (Integral i, Eq s, Eq a) => a -> StackSet i a s -> StackSet i a s
focusWindow w s | Just w == peek s = s
                | otherwise        = maybe s id $ do
```

282,25                                                     72%

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State
Page
Portrait
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y842x595

<< >>

1
2
3

e of a Regular Type is its Type of One-Hole Contexts

Extended Abstract

Conor McBride*

subtraction, an operation inherently troubled by the need to subtract only smaller things from larger, but as the inversion of a kind of addition (see figure 1).

pes are tree-like datatypes generate expressions over a set of free ler least fixed point. The 'equal- be expressed in this form. Given ' with x free, this paper shows a -hole contexts for elements of x gether with an operation which e into the hole of such a context. iven as inhabitants of a regular erically from the syntactic struc- m better known as partial differ- otion of containment is shown to erized in terms of derivatives and logy is then exploited to give the b-elements of recursive types in a s 'zippers'[Hue97].
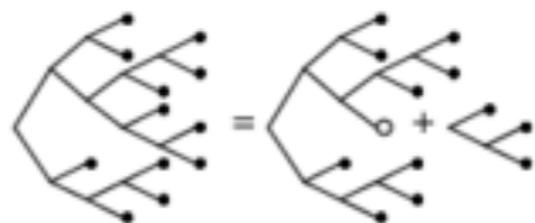


Figure 1: a tree as a one-hole context 'plus' a subtree

This paper exhibits a similar technique, defined more formally, which is generic for a large class of tree-like data structures—the 'regular datatypes'. These are essentially the 'equality types' of core ML, presented as polynomial

The National : Bo...   mpeg 1.0 320kbit/s 44kHz
1:27                                          -2:05
85% (194 dirs, 2250 files)play  0:13 hmp3 1.1p12
The_Herd-An_Ele...   05 Urban Lady Saloon.mp3
                     06 77%.mp3
                     07 Hunter's Theme.mp3
                     08 The Afterparty Brigade.m...
                     09 The World Keeps Turning....
                     10 Hell.mp3
                     11 When You Thought Nothing...
                     12 Croissant Para Zwei Na C...
                     13 High Seas.mp3
                     14 LG.mp3
                     15 Taki Taki.mp3
                     16 Ray Of Sun.mp3
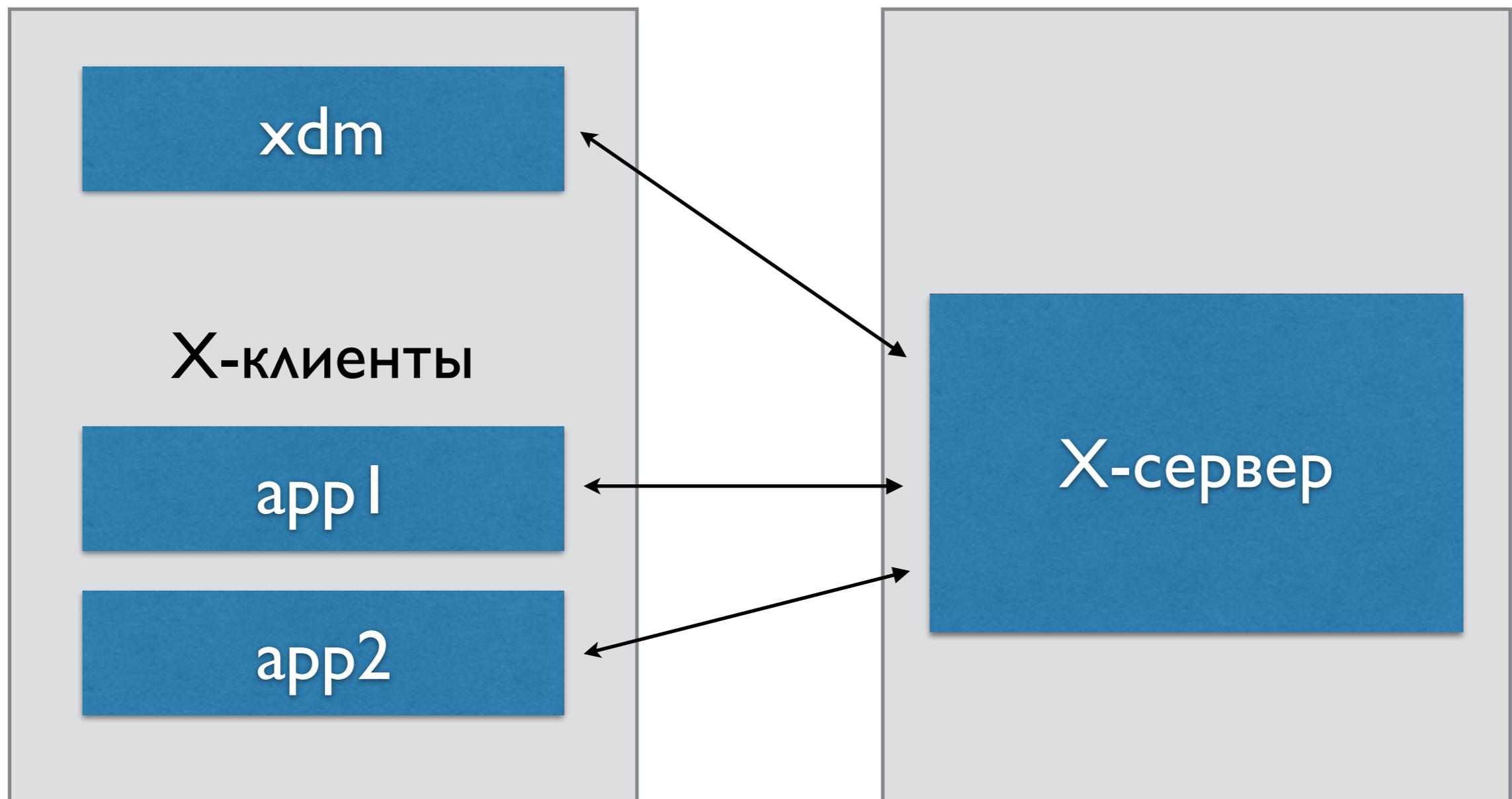The_National         Mistaken For Strangers.mp3
                     thenational_fakeempire.mp3

# Q & A