### **XCWM:** The X11 Composite Window Manager Library

Jess VanDerwalker

# Background

- Portland State University Capstone project
  - Original team:
    - Ben Carr, Ben Huddle, Aaron Skomra,
    - Braden Wooley, Jess VanDerwalker
  - Sponsors:
    - Jamey Sharp Josh Triplett - XCB development Jeremy Huddleston Sequoia - XQuartz

# **XCWM Goals**

- API that allows display of X11 clients in non-X environments
- Increase code reuse and improve maintainability
- Lead to deprecation of specific DDX's in server code base
- XCB as interface to X protocol
- DAMAGE and Composite extensions

### XtoQ



### Where we are...

- Basic window manager functionality
- Support for a subset of ICCCM and EWMH protocols
- Functional mouse and keyboard input
- Support for override-redirect windows

# **Basic functionality**

#### XCWM:

- Create and maintain data structures
- Catch and process X events, pass to WM code
- Catch and process WM events, pass to X
- Provide access to data

#### Window Manager:

- Render X client pixmaps with native decorations
- Respond to XCWM events, update windows accordingly
- Pass local window events to XCWM

# **Basic window management**

KtoQ Applications

#### dummy driver

Manual Browser Options S	Sections Xman Help
Help Quit	
Manual Page	
Type string to search for:	is an X Window System manual browsing tool.
Manual Page Apropos	ING STARTED
Cancel	
"but butt crea	default, xman starts by creating a small window that tons" (places on which to click a pointer button). cons, Help and Quit, are self-explanatory. The third stes a new manual page browser window; you may use th n a new manual page any time xman is running.
manu menu Dire This bein curr info list To u When of t	aw manual page starts up displaying this help informa tal page contains three sections. In the upper left t buttons. When the mouse is clicked on either of the is popped up. The contents of these menus is descr ectly to the right of the menu buttons is an informat s display usually contains the name of the directory ng displayed. It is also used to display warning mes- rent version of xman. The last and largest section i croft manual pages to choose from or the text of a mar- use xman pull down the Sections menu to select a manual the section is displayed, click the left pointer bu- the manual page that you would like to see. Xman will ectory listing with the manual page you selected.
basi the	z should be enough to get you started. Once you unde les of how to use xman, take a look at the rest of th advanced features that are available to make using x icient.

#### XtoQ

#### 0 0 0 xmar Manual Page Manual Browser Options Sections Xman Help Help Quit Manual Page 😝 🔿 🔿 search is an X Window System manual browsing tool. Type string to search for: Manual Page Apropos NG STARTED Cancel By default, xman starts by creating a small window that c "buttons" (places on which to click a pointer button). buttons, Help and Quit, are self-explanatory. The third, creates a new manual page browser window; you may use thi bash-3.2\$ 🛛 open a new manual page any time xman is running. A new manual page starts up displaying this help informat manual page contains three sections. In the upper left c menu buttons. When the mouse is clicked on either of the menu is popped up. The contents of these menus is descri Directly to the right of the menu buttons is an informati This display usually contains the name of the directory of being displayed. It is also used to display warning mess current version of xman. The last and largest section is information display. This section of the application con list of manual pages to choose from or the text of a manu To use xman pull down the Sections menu to select a manua When the section is displayed, click the left pointer but of the manual page that you would like to see. Xman will directory listing with the manual page you selected. That should be enough to get you started. Once you under basics of how to use xman, take a look at the rest of thi the advanced features that are available to make using xm efficient

# **Event handling**

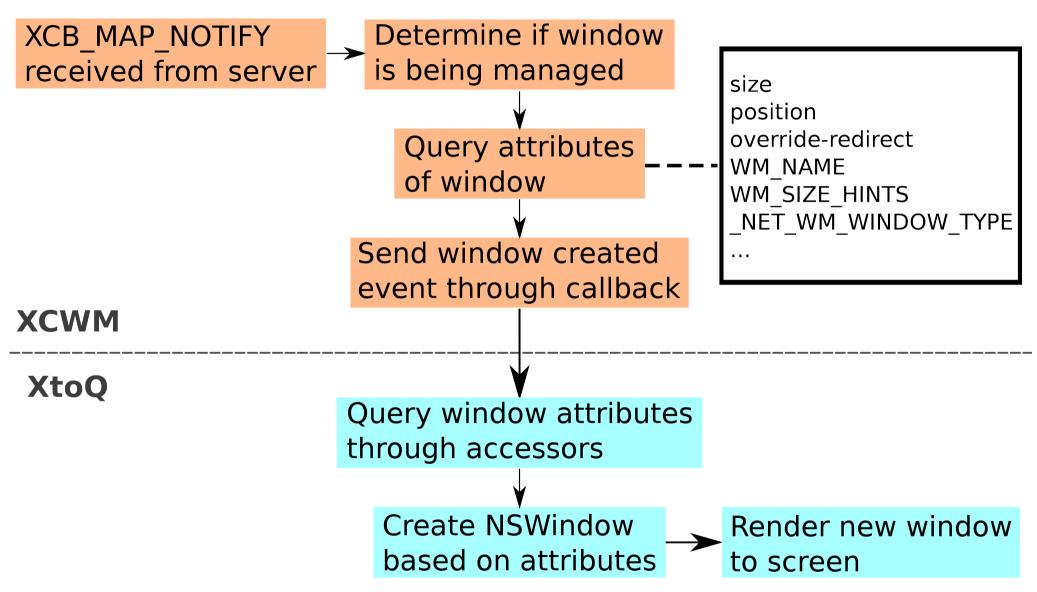
### From X:

- while loop with xcb\_wait\_for\_event() running in separate thread
- Events passed to WM through WM provided callback function

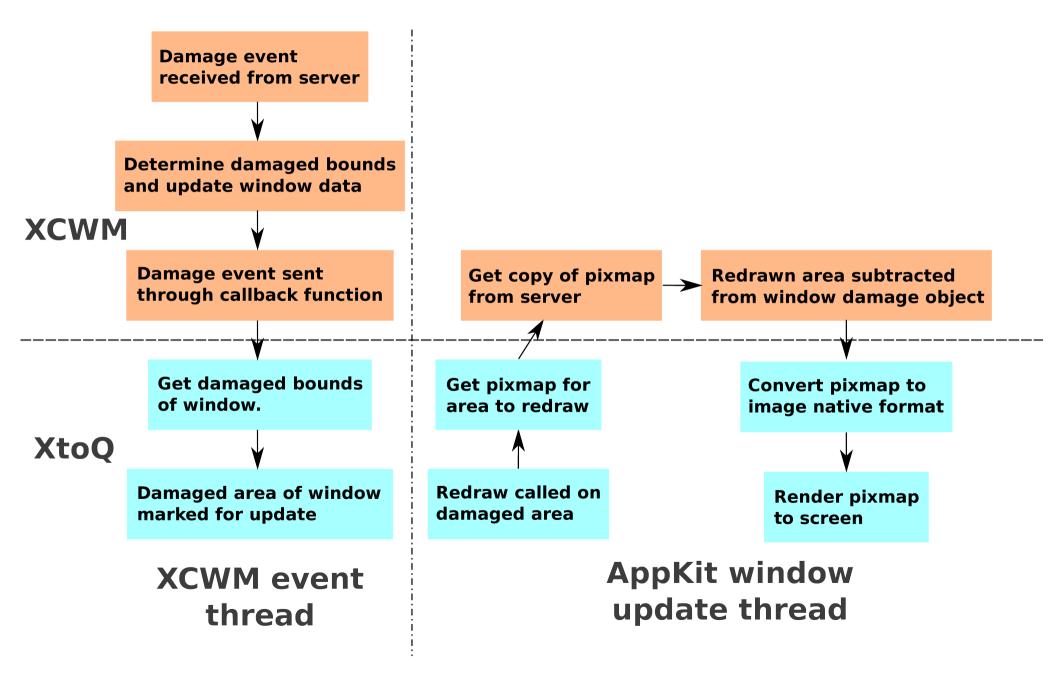
#### From WM:

- Passed to X through XCWM function calls
- WM provides asynchronous dispatching if necessary

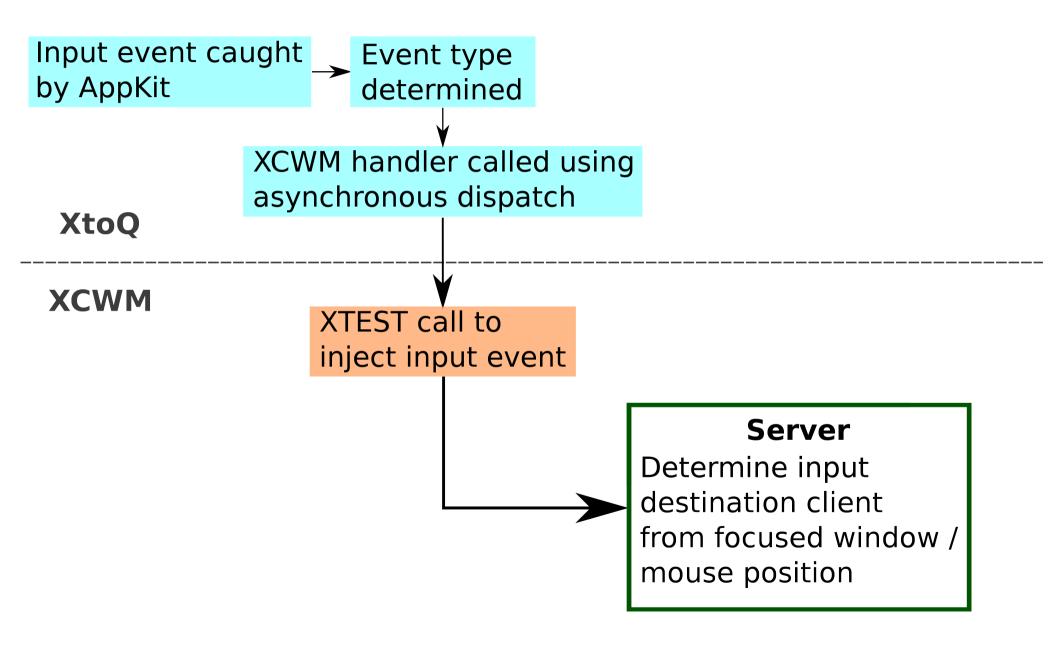
### **Client window mapped**



#### Damage event and window update path



### **Keyboard and mouse input**



### **Future work**

- More ICCCM / EWMH protocol support
- Rethink event loop
- XtoSomethingElse
- Replace XTEST

### Want to contribute?

#### **XCWM git repository:**

http://cgit.freedesktop.org/xorg/lib/libxcwm/

#### **Contact:**

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