Wayland driver for Wine: The story so far

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Wine

- winex11.drv
- winemac.drv
- wineandroid.drv
- winewayland.drv

X server

Xwayland

Wayland compositor
Why do we want a Wayland driver?
Why do we want a Wayland driver?

- Avoid maintenance cost of Xwayland integration
- Avoid double API translation
- Improve performance
- Use new features
The journey begins
Wayland event model
Win32 message model

Thread 1
message queue

Thread 2
message queue

ProcessEvent(mask)

Wine USER Driver
Event integration: 1st attempt

Thread 1

message queue
ProcessEvent(mask)
wl_event_queue

Thread 2

message queue
ProcessEvent(mask)
wl_event_queue
Event integration: 1st attempt

Thread 1

message queue

ProcessEvent(mask)

wl_event_queue

Thread 2

message queue

ProcessEvent(mask)

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?
Event integration: 1st attempt

Thread 1
message queue
ProcessEvent(mask)
wl_event_queue

Thread 2
message queue
ProcessEvent(mask)
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Event integration: 1st attempt
Event integration: 1st attempt

Thread 1

message queue
ProcessEvent(mask)
wl_event_queue

Thread 2

message queue
ProcessEvent(mask)
wl_event_queue

Per-process thread
wl_event_queue
Event integration: 2nd attempt
Outputs

Win32 virtual screen
Wayland

Win32 virtual screen

Outputs
Outputs (scaling)

Wayland (logical space)

\[ x^2 \]

Win32 virtual screen
Outputs (scaling)

Wayland (logical space)

Win32 virtual screen

x2
Display mode change (exp.)

- Win32 virtual screen
  - 1024x768
  - Mode Change
    - 1920x1080

- Wayland
  - 1920x1080
  - 1440x1080
  - wp_viewport
Window management

Win32 Prescriptive vs Wayland Descriptive
Win32 toplevel windows

- Backed by `xdg_toplevel`
- Interactive move and resize actions are forwarded to compositor
- State and size synchronization
- Coarse position synchronization (exp.)
Wayland

Driver

Compositor

1. Maximize

2. `xdg_toplevel.set_maximized`

3. `xdg_toplevel.configure`

4. Update size/state

5. Final size/state

Window management

Wine initiated change
Window management

Compositor initiated change

3. Final size/state
2. Update size/state
1. xdg_toplevel. configure(maximized)

Wayland Driver

Compositor
Window management

Wayland

Win32 virtual screen
Window management

Win32 transient windows (exp.)

• Backed by wl_subsurface
• Positioned relatively to their parent surface
• Heuristics to select windows in this category and parent surface
Window management

Wayland

Win32 virtual screen
Mouse
- Translate surface-local to virtual screen coordinates
- Cursors from bitmap data or theme (exp.)
- Relative motion (exp.)
Mouse

• Translate surface-local to virtual screen coordinates
• Cursors from bitmap data or theme (exp.)
• Relative motion (exp.)
Keyboard (exp.)

- Keymap mapping to win32.
Translate between WSIs
Subsurface for GL/Vulkan content
GL front buffer rendering
- Translate between WSIs
- Subsurface for GL/Vulkan content
- GL front buffer rendering
Cross-process rendering (exp.)

Process 1
- SwapBuffers
- SwapchainPresent
- offscreen buffer

Process 2
- attach
- message queue
- PostMessage
- cross-process handle

Cross-process rendering (exp.)
The journey continues...
Thanks

- Contributors and brave experimental testers
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- Google