Replacing AGL WindowManager

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Hi, I'm Daniel

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Outline and agenda

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- Current WindowManager and HomeScreen APIs
- Comparison with Wayland protocols
- Plan to merge WindowManager into compositor
- Open questions and support

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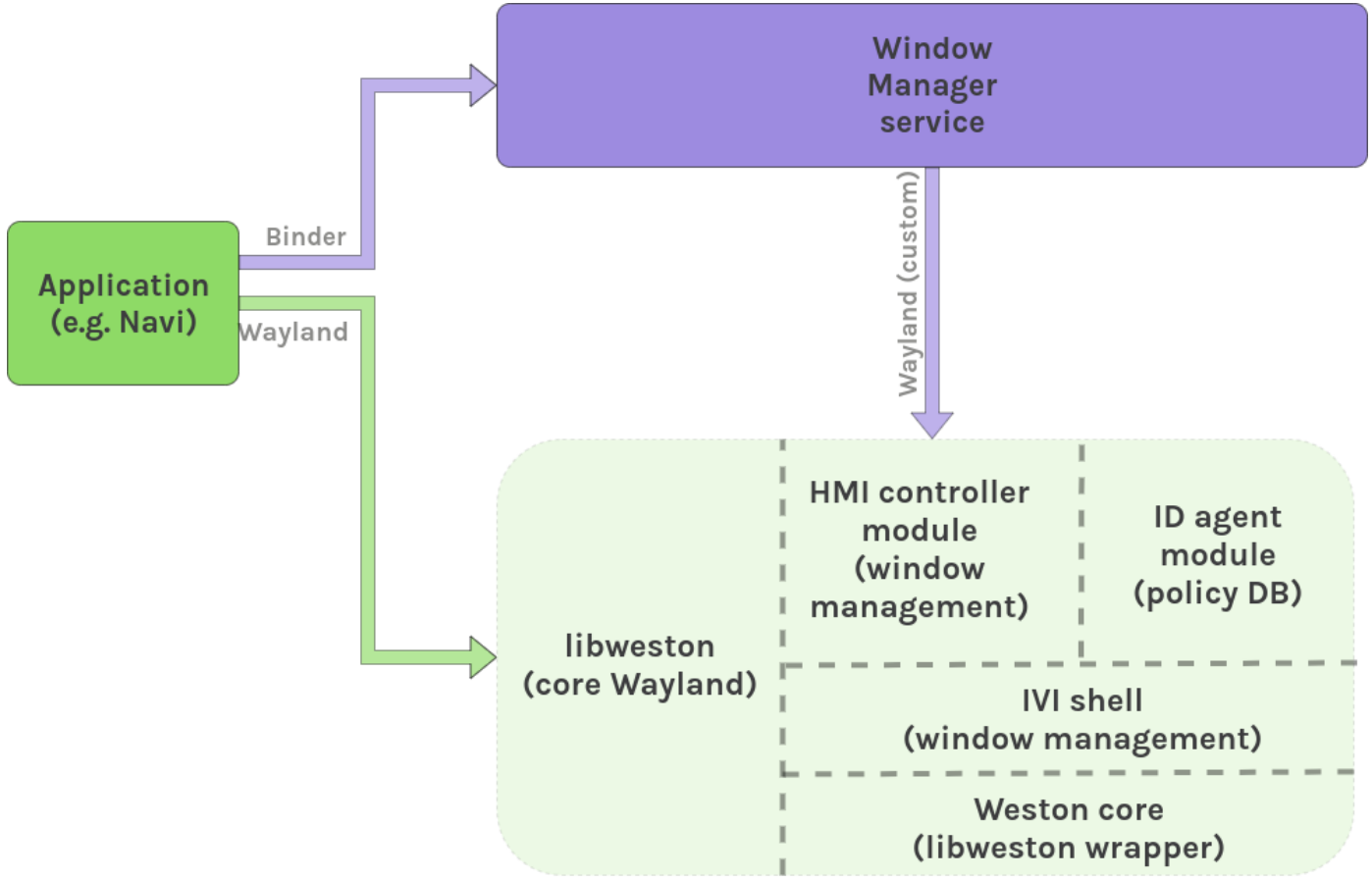
WindowManager API

WindowManager overview

- WindowManager system service allows external process to control window positioning and policy
- Acts as 'proxy' between app and Wayland server
- Provides mapping between AGL app and Wayland IVI protocol
- Applies OEM WM/UI policy and tells Wayland server what to display
- **WM is a critical system process: if it crashes, no new content will be shown!**

Current WindowManager design



Issues with WindowManager

- WindowManager uses separate protocol (Binder)
- Synchronisation between two protocols required
  - create surface with WM surface, get surface ID, give surface ID to Wayland server
- **Custom integration means it is more difficult to write AGL apps!**
- Integration of app FW & Wayland main loops required

Issues with WindowManager

- WM API duplicates many features available in Wayland protocol
- Possible for app/toolkit to receive conflicting messages
  - example: *active* state in *xdg_toplevel* Wayland interface

    plus WM *activated* signal
  - WM does not control Wayland server: cannot synchronise
  - application and toolkit may 'fight' on conflict

Issues with WindowManager

- Many duplicated APIs:
- WM *setRole* vs. XDG *set_app_id*
- WM *area* vs. XDG *configure*
- WM *activateWindow* vs. XDG *activated*
- WM *syncDraw* vs. wl_surface *frame*
- WM *focus* vs. wl_touch *focus*
- WM *Screen* vs. *wl_output/xdg_output*
- WM *setRenderOrder* vs. *wl_subcompositor*

Issues with WindowManager

- Most duplicated APIs are deficient compared to Wayland
- Wayland APIs allow for dynamic and hotplug situations
- WindowManager APIs are not atomic: does not allow to wait until all UI ready, reconfigure & show together

Issues with WindowManager

- Unclear definition of multiple window manager co-operation (remoting/multi-ECU case)
- Dynamic output and streaming management not possible
- **Security: policy DB can be overridden by client app!**
- More difficult to debug: multiple processes, multiple protocols

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Suggested changes

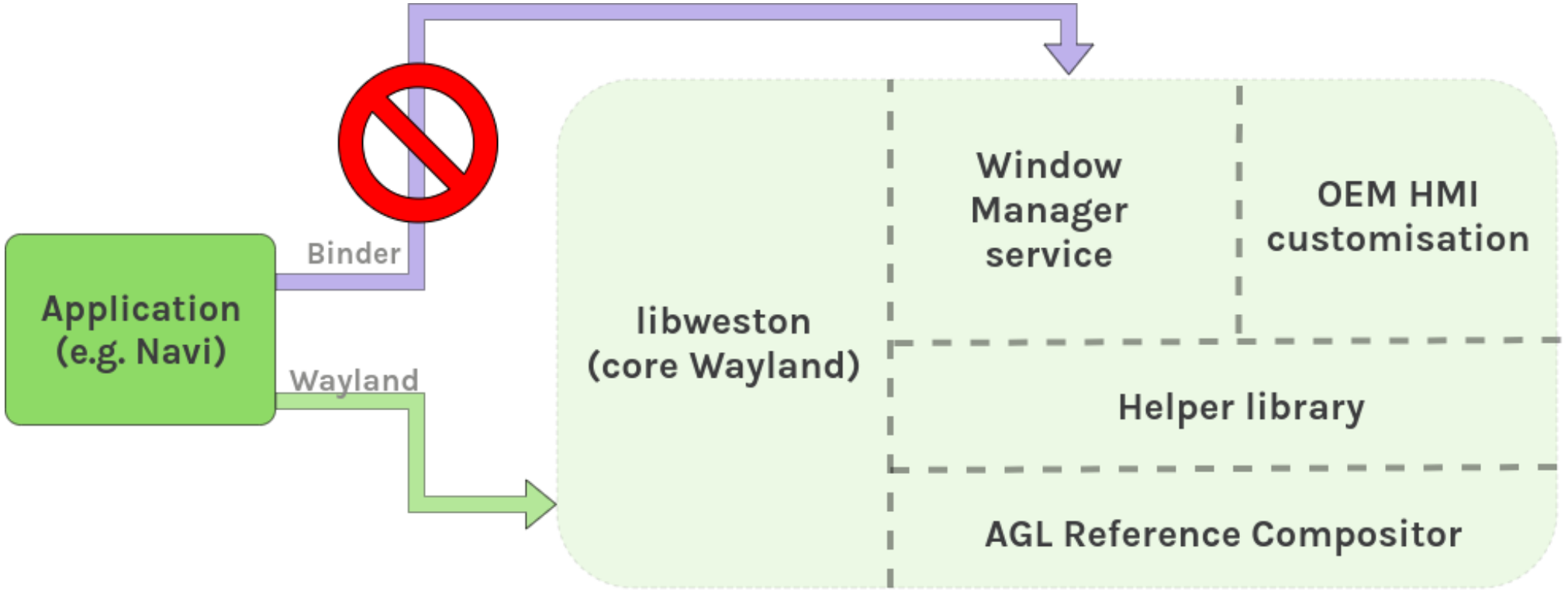
Summary of suggested changes

- Remove WindowManager API: replace with Wayland core
- Replace HomeScreen API with integrated Wayland 'shell' design
  - compositor plugin: policy (e.g. restriction), integrated with WM
  - client process: UI rendering (e.g. home screen)
  - **possible to launch HS service securely!**

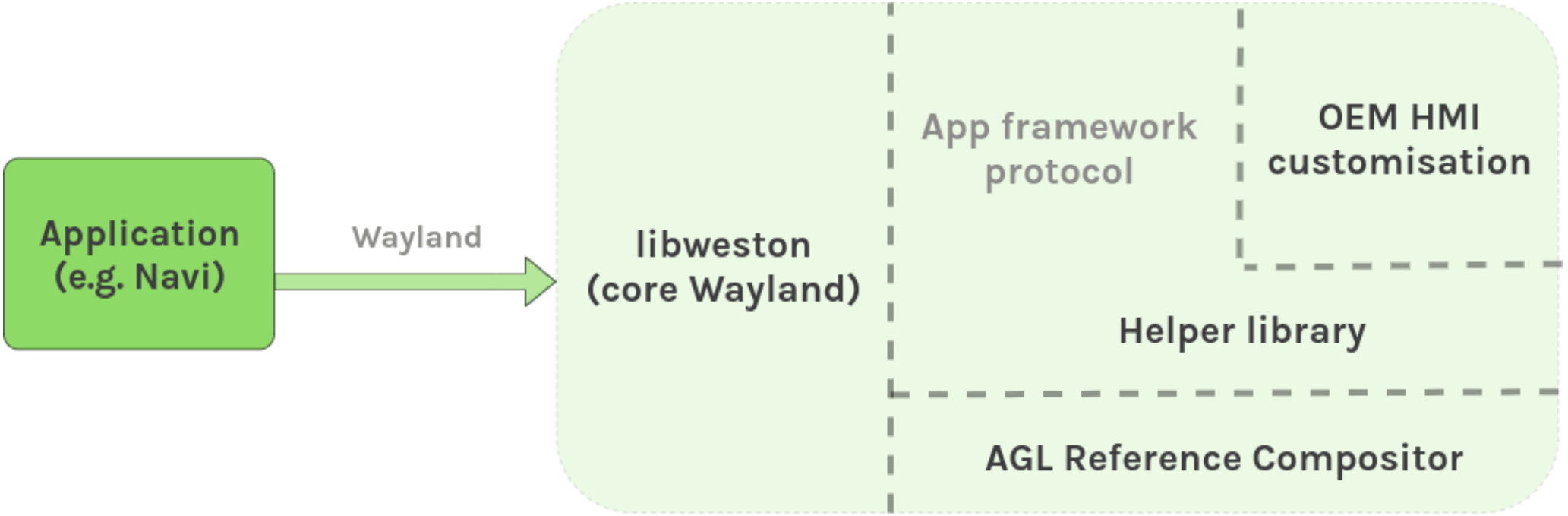
Summary of suggested changes

- Implement new *agl_xdg_extension* Wayland protocol
- Replace HomeScreen API with integrated Wayland 'shell' design
  - compositor plugin: policy (e.g. restriction), integrated with WM
  - client process: UI rendering (e.g. home screen)
  - **possible to launch HS service securely!**

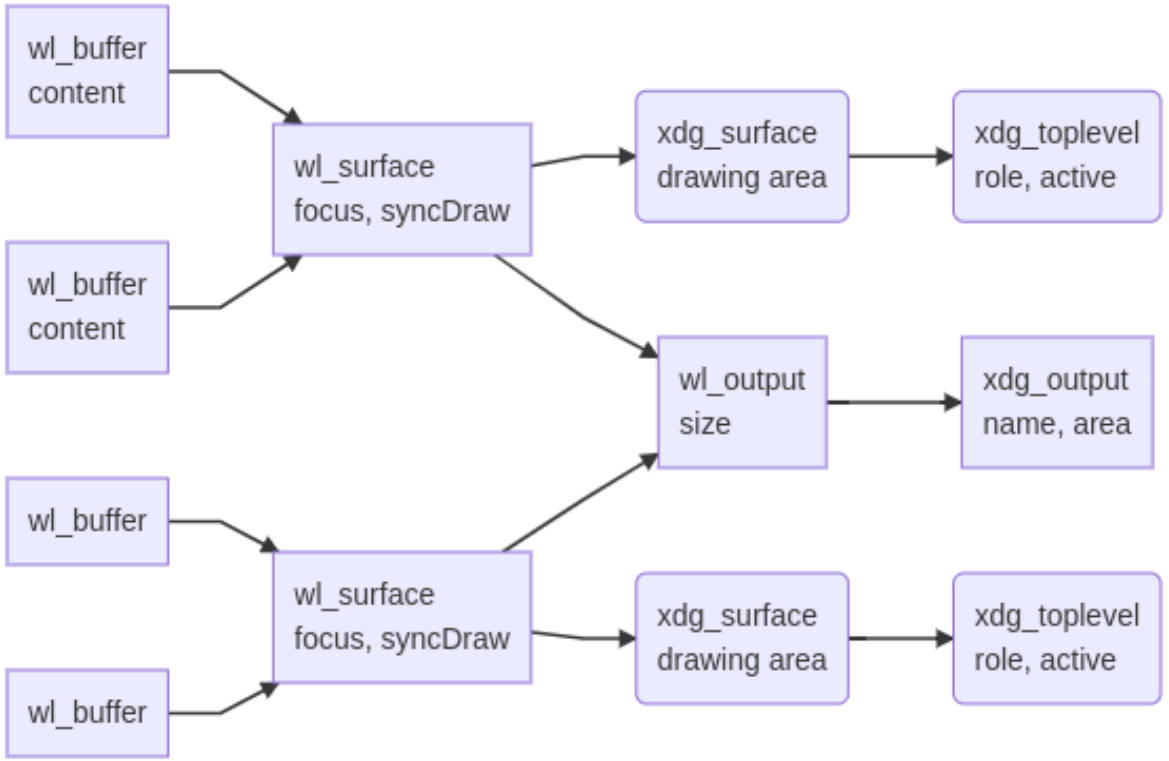
WindowManager changes #1



WindowManager changes #2



Layering of Wayland protocols



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Open questions

Open questions: window manager

- Is there an example case for split-application UI?
  - e.g. Navi UI provided by process #1, Navi content provided by process #2
  - some extension of XDG Wayland protocols required to realise this
  - upstream community should be happy to receive change
- Is there an example implementation of window manager 'policy DB'?
  - documented in HMI/WM spec but not present in code

Open questions: home screen

- How should the home screen API be designed?
- Current HomeScreen and WindowManager APIs are very separate, but depend on each other
- What home screen implementations do we have today?
- Who could help with porting current AGL home screen architecture to new design?

Open questions: home screen

- HomeScreen architecture appears to duplicate core app-framework functionality
- Should launching applications and services be part of core App FW? (Launching can be required for other uses.)
- Home screen transitions must take care of global vehicle state (stop video when gear engaged)

Open questions: timeline

- Deprecating WindowManager/HomeScreen apps requires change in AGL UCB core, AGL demo UI/HS, AGL demo apps, ISV apps ...
- What timeline is realistic to make these changes?
- Do OEMs have a requirement for old APIs to remain?
  - implementing two services together is technically difficult

Open questions: support

- Changing WM/HS API requires support from UI and app developers, OEMs shipping AGL
  - do we have this support?
- Changing compositor requires support from reference-platform BSP

Next steps

- Continue gathering usecases from OEMs and ISVs
- Publish document listing AGL required Wayland extensions
  - XDG shell for clients, Wayland alpha-compositing protocol for blending, etc
- Develop homescreen UI architecture with input from OEMs
- Port reference AGL apps (homescreen, mixer, Navi, etc) to new architecture

Thankyou!

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