Waltham in practice

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Harsha Mallikarjun

ADIT, GENIVI Alliance

Introduction

- Advanced Driver Information Technology GmbH

Advanced Driver
Information Technology

  - Joint venture between BOSCH and DENSO.
  - Platform development for IVI systems.
  - Maintainer of wayland-ivi-extension, DLT.

- About Me:
  - Graphics architect at Robert Bosch Engineering and Business Solutions Private Ltd.
  - Working for ADIT since 8 years in the Graphics domain.

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Waltham overview

- What is Waltham?
  - https://github.com/waltham/waltham
    - Waltham is a network IPC library designed to resemble Wayland, both protocol and protocol-API wise. Protocol is described in XML files. A generator translates XML into C code at build time. One designs Waltham protocols exactly the same way as Wayland extensions, you just miss the file descriptor argument type.
  - Waltham implements IPC and standardization to realize functionality, to remotely control a graphical application running on another OS/ECU.
- Developed by Wayland Community.
- BOSCH and DENSO are driving Waltham project with Collabora.

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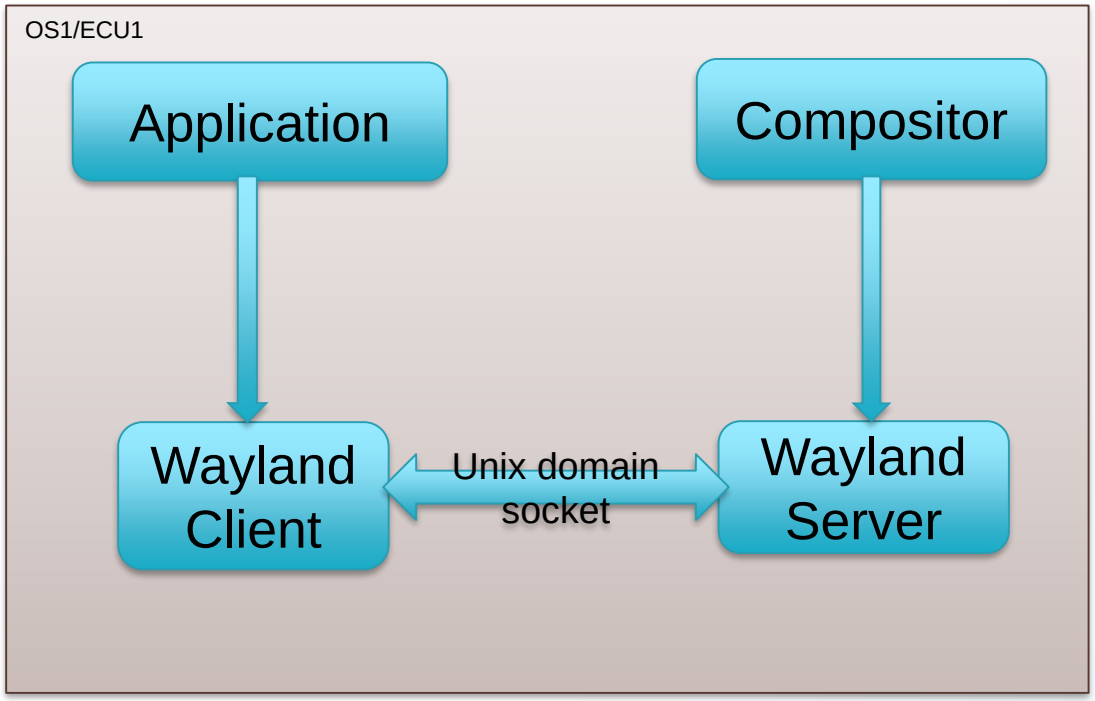
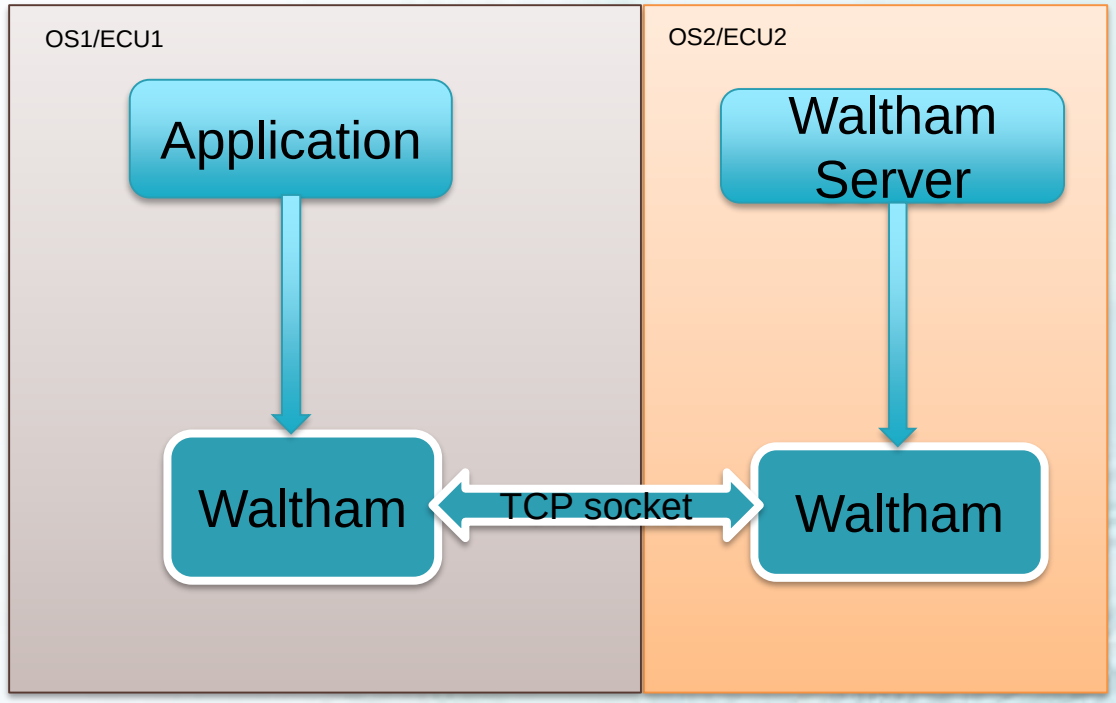
Differences between Wayland and Waltham





- Uses unix domain socket
- File descriptor can be passed
- ...

- TCP socket
- File descriptor cannot be passed
- ...

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Waltham key points

- Resembles wayland and uses similar tooling to generate protocol sources from an xml file.
- Uses TCP sockets for communication.
- It is not possible to pass file descriptors using Waltham.
- Waltham is a single library and a symmetric api for server and client. This is not the case with Wayland.
- No multi-threading support.

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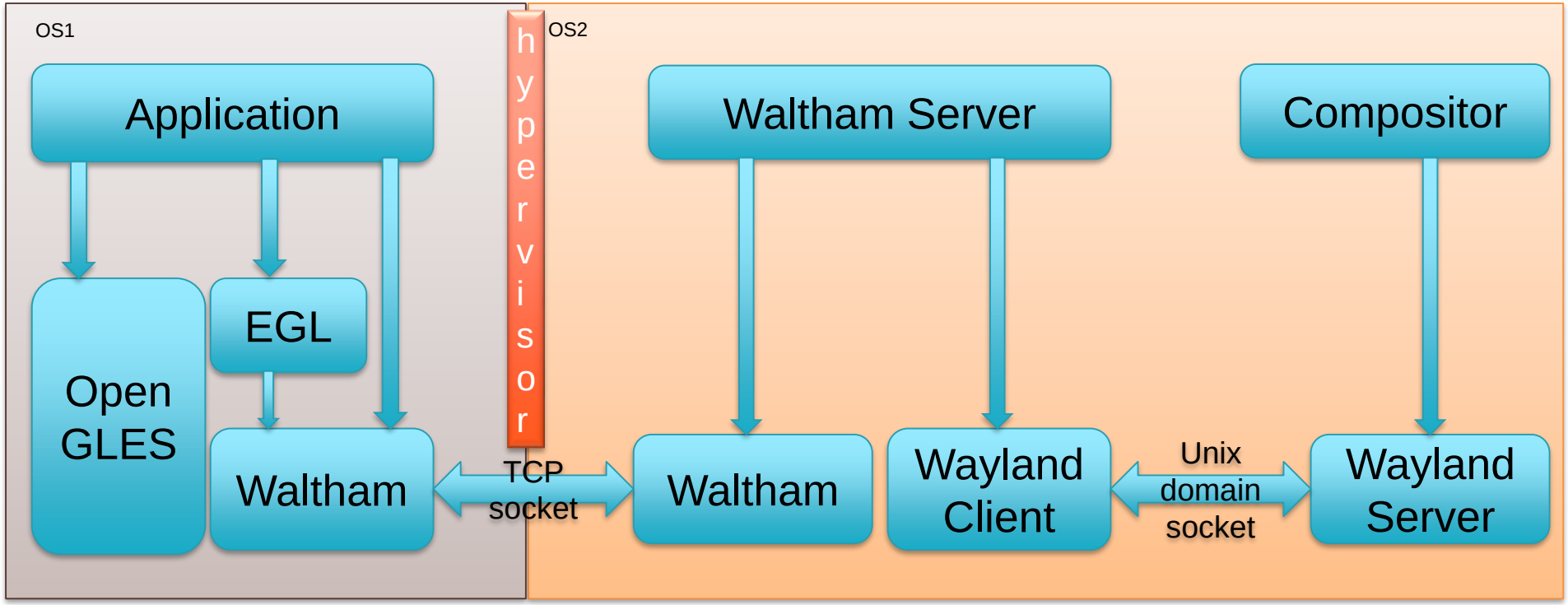
Waltham usage possibilities

- As an EGL backend (only a theoretical possibility).



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Waltham usage possibilities

- Similar to wayland backend for EGL, a Waltham backend can be implemented which sends the buffers to receiver on another domain.
- For good performance, a generic surface sharing mechanism is needed in hypervisor environment.
- Applications need to adapt to Waltham.
- Waltham is not designed with this use in mind. This usage is just a theoretical possibility.

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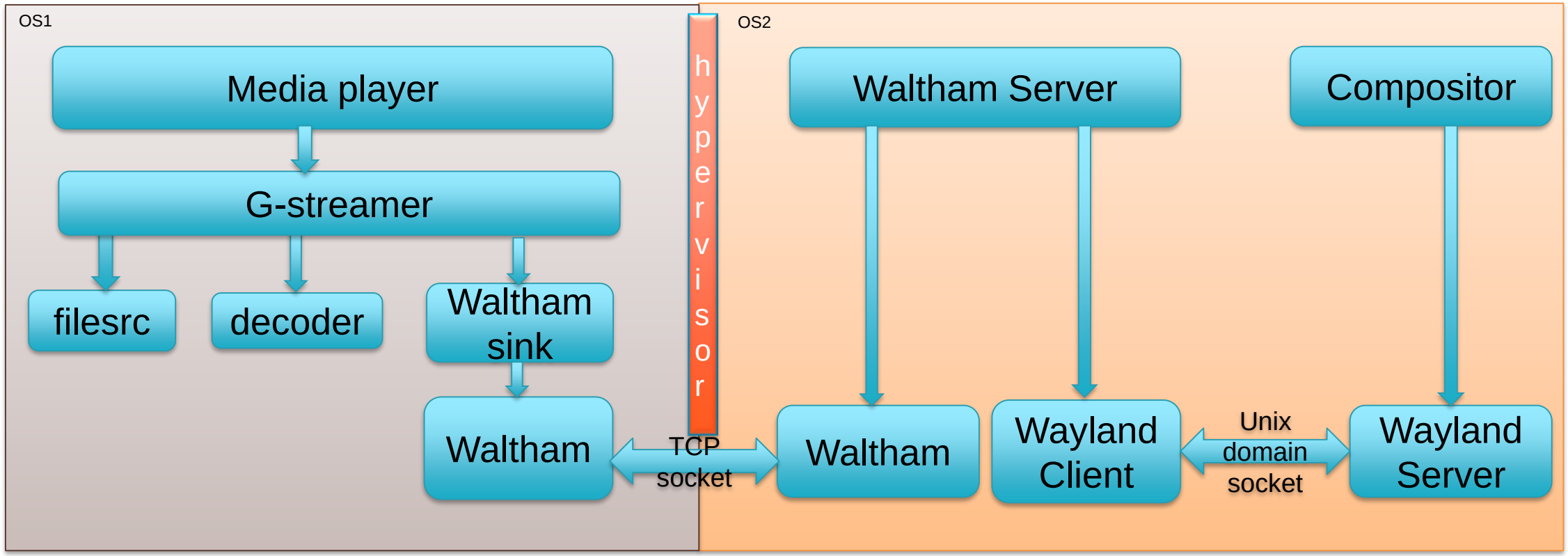
Waltham usage possibilities

- As a g-streamer sink (a theoretical possibility)



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Waltham usage possibilities

- Similar to Wayland-sink, Waltham-sink g-streamer plugin can be implemented which sends the buffers to Receiver on another domain/OS.
- Waltham sink can utilize frame sync and presentation feedback protocols for video synchronization.
- For good performance, a generic surface sharing mechanism is needed in hypervisor environment.
- Waltham is not designed with this use in mind. This usage is just a theoretical possibility.

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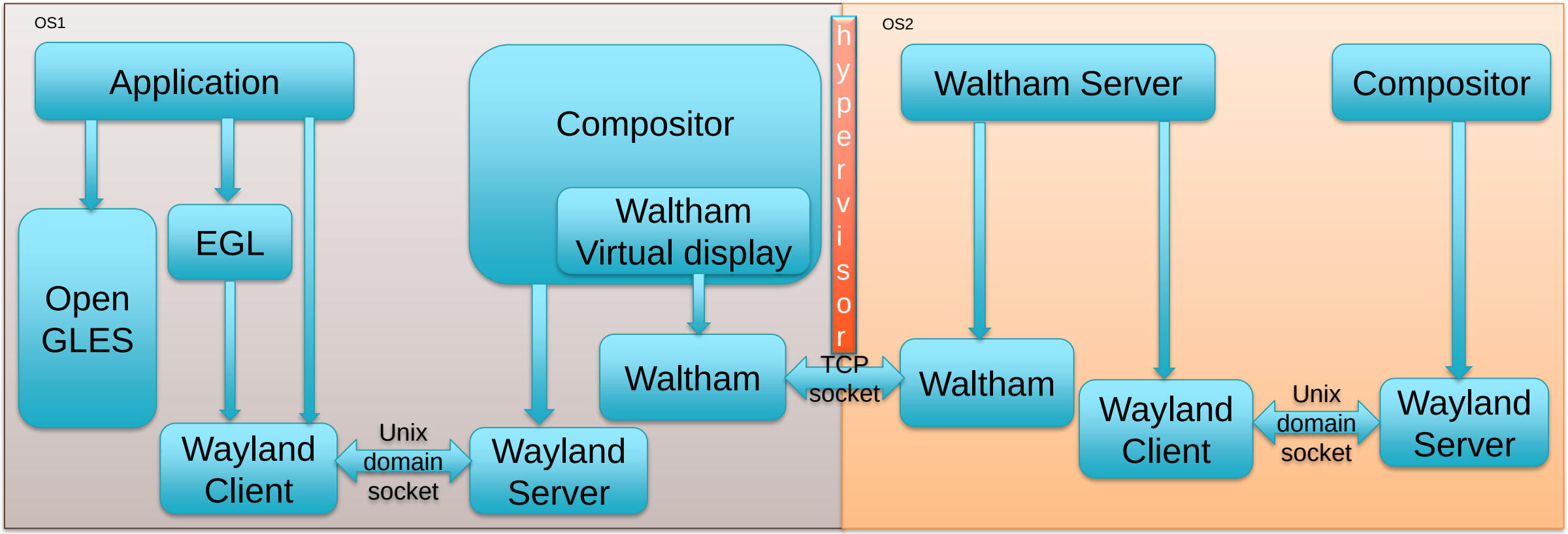
Waltham usage possibilities

- As a virtual display in compositor



Waltham usage possibilities

- A virtual display plugin can be implemented in compositor. This plugin sends client buffers to Waltham server in another domain.
- No changes to applications.
- For good performance, a generic surface sharing mechanism is needed in hypervisor environment.
- This is the intended use in mind during design.

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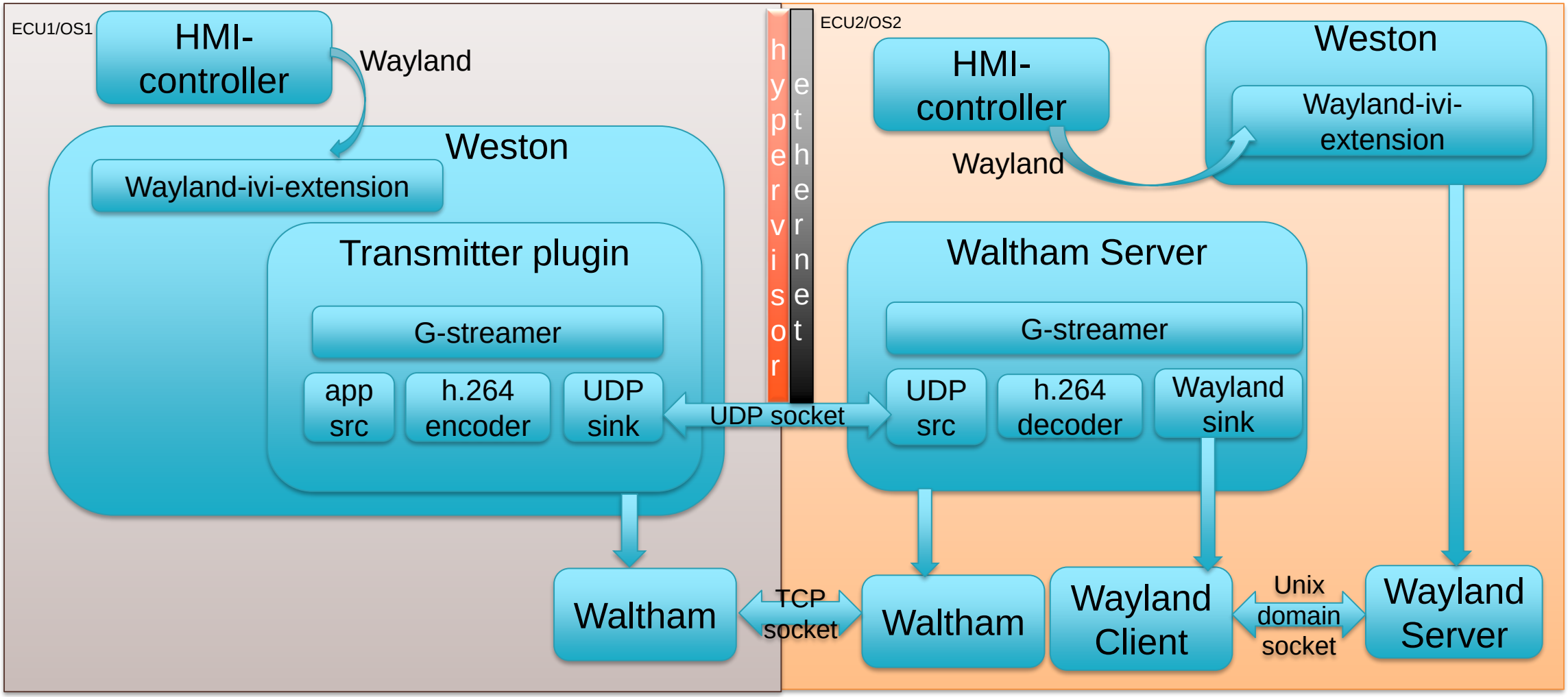
Waltham in practice at ADIT



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Waltham in practice at ADIT

- Weston is used as the wayland compositor.
- Transmitter plugin is implemented for weston which acts as a Waltham based virtual display.
- Application surface which should be sent to other ECU/OS is assigned to Waltham virtual display by HMI-controller. HMI-controller uses wayland-ivi-extenstions to acheive this.
- Pixel data of the surface is sent via g-streamer to another ECU/OS as the raw pixel data transfer over Waltham is inefficient.
- Control data and input events (pointer, keyboard, touch) for the surface, are handled via Waltham.

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Advantages of Transmitter plugin

- Provides a virtual display which perfectly fits the routing of surface contents using Wayland-ivi-extensions.
- Wayland based applications are unaffected.
- A central component (HMI-controller) controls application surface which can be assigned to Waltham display. Thus providing control at system level.

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References

- https://people.collabora.com/~pq/Adit/Weston-IVI-remoting.pdf
- https://github.com/waltham/waltham
- https://gerrit.automotivelinux.org/gerrit/#/q/project:AGL/meta-agl
- https://wiki.automotivelinux.org/_media/eg-ui-graphics/20170209_ui_and_graphics_eg_waltham.pdf

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Waltham working session

- What to look forward for?
  - Gst-record and transmitter plugin.
  - Waltham on android.
  - Additional use cases for transmitter plugin.
  - Challenges.

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Thank you!

Visit GENIVI at http://www.genivi.org or http://projects.genivi.org

Contact us: help@genivi.org

harsha.manjulamallikarjun@in.bosch.com