Introduction to AGL Architecture

AGL Training Class
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Intro

• This intended to be a brief intro to the AGL Architecture with links to other resources
• For a general AGL introduction view [https://www.youtube.com/watch?v=bzAar7PwWOk](https://www.youtube.com/watch?v=bzAar7PwWOk)
• All of today’s training sessions address Needlefish release and later
AGL Distro “Unified Code Base”

- Fourteen major releases!
- Unifying the best of Open Source into a single code base for the entire industry!
- Reduce fragmentation, focus on innovation and new features!
- Production ready! Now in Toyota and Subaru vehicles!
Code First/ Upstream First

• AGL has invested in automotive software components not available anywhere else
• Continually evaluating open source technologies to find best in class for automotive use cases
• AGL has invested (provided developers and upstreamed code) for open source projects such as Pipewire, Yocto, Lava, and others.
AGL Transformation (Pre-Lamprey)

- Initial releases of AGL UCB included carry-over and improvement of Tizen IVI components
AGL Transformation (Lamprey)

- With Lamprey release we had invested in PipeWire, Wire Plumber, AGL Compositor, and Web App Manager and more.
- 2022 sees us transitioning AGL Reference Apps and Service Binders to newer technologies.
- Lamprey final release with Legacy AGL App Framework support.
- YP 3.1.x LTS updates to continue until 2024.
AGL Transformation (Needlefish)

- Replace Qt reference Apps with Flutter and Web Apps
- Replaced Vehicle Signal Manager with kuksa.val
- YP 4.0.x (kirkstone) LTS updates to continue until 2024
- Use Systemd units for app management
## AGL App FW

<table>
<thead>
<tr>
<th>Feature</th>
<th>Lamprey</th>
<th>Needlefish</th>
<th>Pike</th>
</tr>
</thead>
<tbody>
<tr>
<td>App Start/Stop</td>
<td>App Framework Main</td>
<td>Applaunchd</td>
<td>Applaunchd</td>
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<tr>
<td>LSM</td>
<td>SMACK</td>
<td>SELinux</td>
<td>SELinux</td>
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<tr>
<td>Sandboxing</td>
<td>SMACK based</td>
<td>N/A</td>
<td>To be added</td>
</tr>
<tr>
<td>Packaging</td>
<td>W3C Widgets</td>
<td>N/A</td>
<td>TBD</td>
</tr>
<tr>
<td>IPC</td>
<td>Websockets</td>
<td>Not standardized</td>
<td>gRPC</td>
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</tbody>
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- Applaunchd uses systemd units. Less maintenance, more future proof.
- SELinux in permissive mode
Packaging/ Sandboxing

• W3C deprecated widget support so that was not really an option anymore
• Studied flatpack
  • In theory meets most of our requirements
  • Extensive, custom runtime support would be required for AGL
• We do not have resources to build a new custom runtime for packaging without an OEM/ Tier One giving preference and committing to it long-term (i.e. providing resources and support)
IPC

• Standardizing IPC to gRPC and protobufs across UCB
• Replace legacy web socket based AGL service binders with gRPC API

- Easier to add future toolkits.
- No custom code to be maintained per toolkit.

- Standard methodology to add new services
SELinux

• UCB runs SELinux in permissive mode
• Need donation or developer to work on rules for non-permissive SELinux
AGL Compositor

• Invested in creating a Wayland AGL Compositor to replace Qt Compositor used in older versions of the UCB

• See

• IVI Shell still being used. Need to explore how to augment the compositor in 2023 to cover these use cases
AGL Audio

• Significant investment in Pipewire and Wireplumber for audio routing, management and policies
  • For Pipewire see
    • https://www.youtube.com/watch?v=TWvketpgpec
  • WirePlumber
    • https://www.collabora.com/news-and-blog/blog/2020/05/07/wireplumber-the-pipewire-session-manager/
AGL CI

• AGL uses Jenkins and Lava to drive our CI
• See
  • https://www.youtube.com/watch?v=Q-wxPRYS
Ask Questions

• Weekly Developer Call on Tuesdays
  https://wiki.automotivelinux.org/dev-call-info

• IRC channel #automotive on libera.chat

  Discussion about open source software for vehicles. No help for mechanical issues should be accepted from anyone on this channel.

• Dev Community Mail List
  https://lists.automotivelinux.org/g/agl-dev-community
THANK YOU