

# 2021 March F2F

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## IVI EG and Production Ready Discussion

### App Framework in IVI EG

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~~What~~ is the App Framework?

Why is the App Framework?

### Current App Framework in IVI

- App Framework developed by IoT.bzh
- Developed for AGL IVI applications
- Based on JSON + WebSockets
- Communication separated between services in different processes
- Clients and services can be written in any language
- Heavily integrated with SMACK

### App framework: the good

- Communication separated between services in different processes
- Allows common authentication between security domains
- Clients and services can be written in any language
- Portable to multi-ECU solutions

### App framework: the bad

- Communication separated between services in different processes
  - ... but is JSON + WebSockets the best transport mechanism?
  - IoT.bzh proposing to replace JSON with binary serialisation due to performance overhead
  - Not always the best signalling for every usecase
- Allows common authentication between security domains
  - ... but that authentication is heavily based on SMACK
  - Reliant on UNIX process model and privilege inheritance
  - Complex, difficult to get right
  - (to the point it's a FAQ)
  - Still no support for WAM-like usecases
- Clients and services can be written in any language
  - Few helpers and bindings for many languages
  - Lacks rich features compared to other IPC and RPC systems: deeper API integration (FFI, callbacks), service enumeration and discovery
- Portable to multi-ECU solutions
  - ... but, SMACK
  - Enumeration and discovery also undefined

### App framework: the ugly

- Requires bespoke effort and binding for every language and app

- No community support buy-in outside AGL-IVI & IoT.bzh
- AGL app framework is not production ready (lacks features, performance, etc)
- Toyota proposing to replace app framework (?) as part of PR effort
- IC EG proposing to avoid IVI app framework
- ... a lot of effort for little help

### App framework: the ... good, again?

- AGL production-readiness model emphasises tier-1 needs
- AGL IC effort has own clearly defined architecture
- AGL IVI supposed to be 'innovation' area
  - New technology development
  - Emphasis on collaboration with upstream open community
  - Success stories: PipeWire, Wayland, etc

### App framework: getting to good?

- Restart from fundamentals, focus on base requirements
- Activity, lifecycle, lifetime management of services
- Authentication domains
- Inter-service discovery, enumeration, connection (like Android intents and Binder, D-Bus, cloud services)
- Restart from upstream OSS projects
  - Consider systemd sessions and scopes for lifecycle
    - Works with standard UNIX services
    - Works with modern container workloads e.g. CRI
    - Uses cgroups for isolation and separation
    - Monitoring process lifecycle, bidirectional notification
  - Reconsider authorization strategy
    - Investigate alternate authorization mechanisms not based on single LSM
    - Use of privileged sockets (as in Wayland privilege model), network namespaces, to differentiate different services
    - Alternate authorization mechanisms such as OAuth2/JWT or ephemeral certificates (as in Kubernetes) for remote services
  - Strongly reconsider IPC mechanisms
    - Most other IPC services (Binder, D-Bus, gRPC, others) already handle common problems
    - Authorization, performance, tracing: key considerations
    - Service enumeration and discovery: helpful addition on top of existing app FW
    - Investigate domain-specific solutions: like WirePlumber for audio, Wayland for window management, etc
- Accept limitations of current resourcing and funding
- We do not have enough engineering time to produce a complete app framework from scratch
- AGL should be close to open upstream communities
- Focus on the glue: reuse, improve, integrate, iterate!

### App framework: when will we be good?

Detailed time estimates for new app framework:

...

Please discuss! :)

## Virt-EG

Collaboration between Virt, IVI and IC EG's , gathering needs and requirements.