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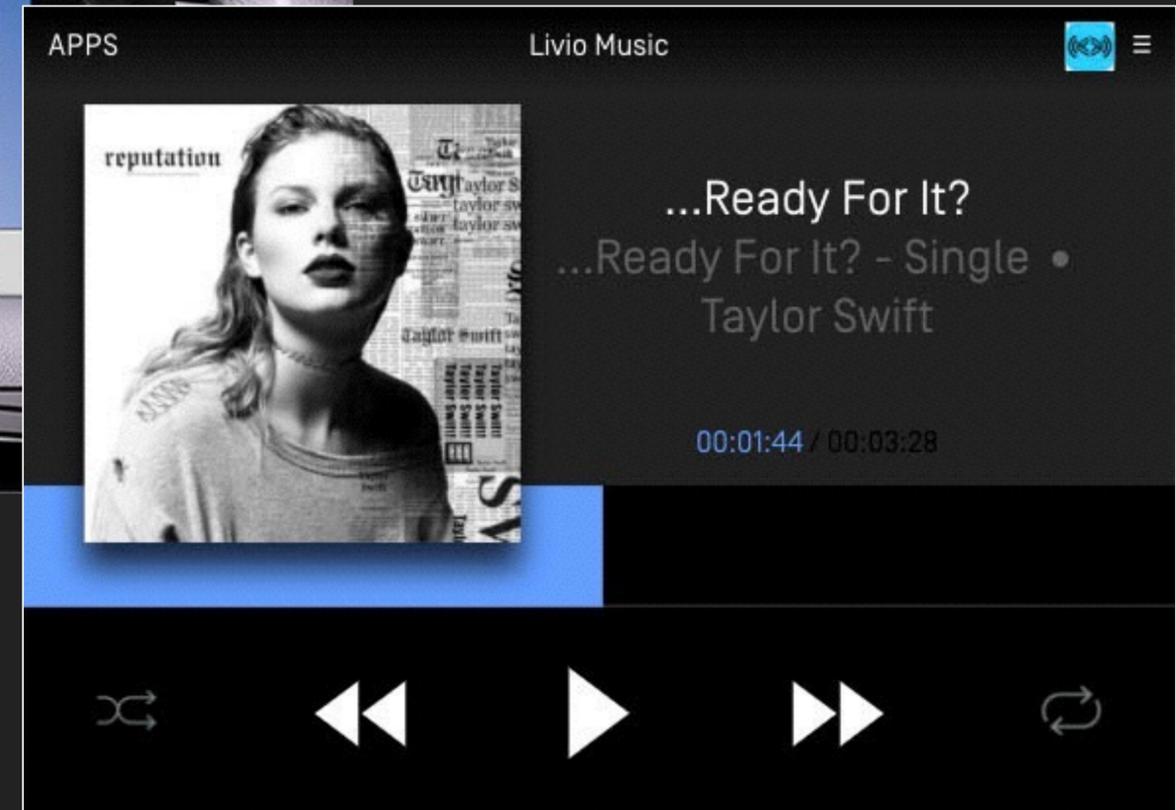
THE FUTURE OF SDL



ANDROID WEAR 1.0

ANDROID WEAR 2.0





GOALS FOR SDL

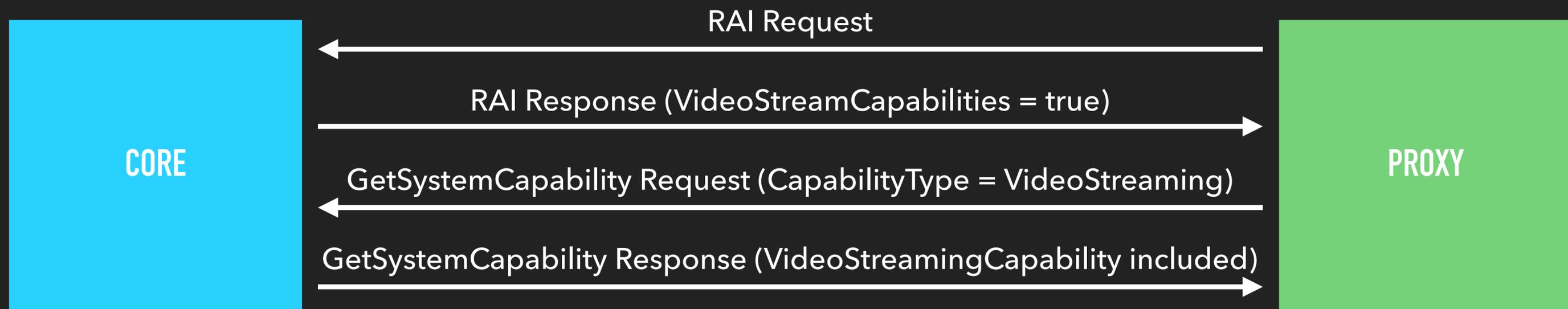
1. Compelling features for consumers
2. Friendly and comprehensive APIs for developers
3. Customizable and secure for automotive companies

NEAR-TERM FEATURES

- ▶ System Capability Query
- ▶ Constructed Payloads
- ▶ Metadata Tags
- ▶ Remote Control
- ▶ HID Spatial Data
- ▶ RTP Video Streaming

SYSTEM CAPABILITIES

- ▶ RegisterAppInterface response RPC was bloated and only getting worse
- ▶ Introduce a new mechanism to simply add a parameter to HmiCapabilities element in the RAI response to signal capability exists
- ▶ Proxy libraries can query for more information on included capabilities

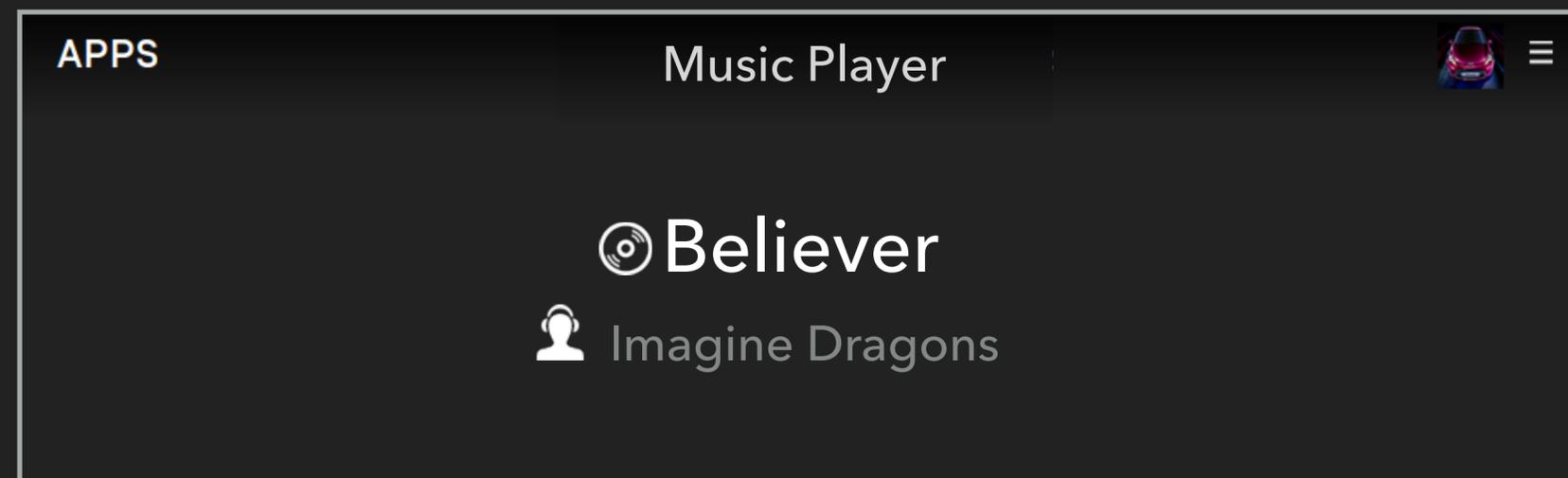


CONSTRUCTED PAYLOADS

- ▶ Control frames have previously included payload data as raw byte arrays that would have to be parsed on a frame type basis as well as version
- ▶ Constructed payloads feature introduces a structured way to add payload data to control frames
- ▶ Utilizes BSON which is essentially a way to represent JSON structure using bytes and reducing size of the payload over JSON.
- ▶ All parameters are optional and flat leveled to reduce complexity as well as to encourage limiting params to only what is necessary
- ▶ Examples: Sending dynamic MTU from core to proxy, handshaking on video streaming settings

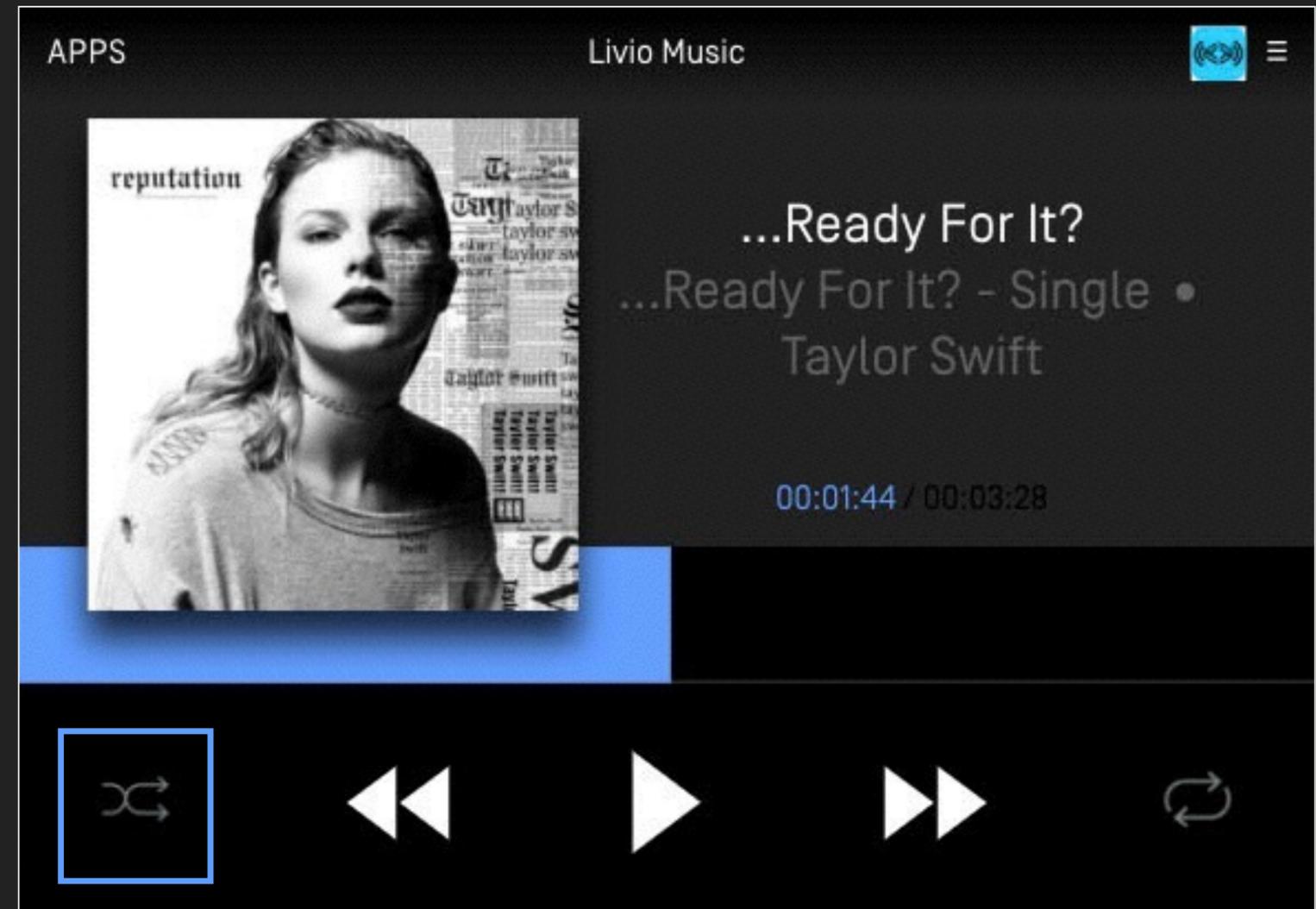
METADATA TAGS

- ▶ Show messages have lacked any context to what is included in their text updates
- ▶ Metadata tags have been added to each of the main field lines that apps can add
- ▶ Core can now add icons next to lines, or possible descriptors next to the line
- ▶ Possible for Core to even grab these lines, combine, and display them elsewhere on the module



HID SPATIAL DATA

- ▶ RPCs that allow apps to send UI spatial data to Core
- ▶ Core can use this data to draw rectangles around focusable UI elements during video projection
- ▶ Allows for user selection of highlighted item
- ▶ Necessary to support other input devices than touch
 - ▶ Click Wheel
 - ▶ Touch pad



REAL-TIME TRANSPORT PROTOCOL (RTP) STREAMING

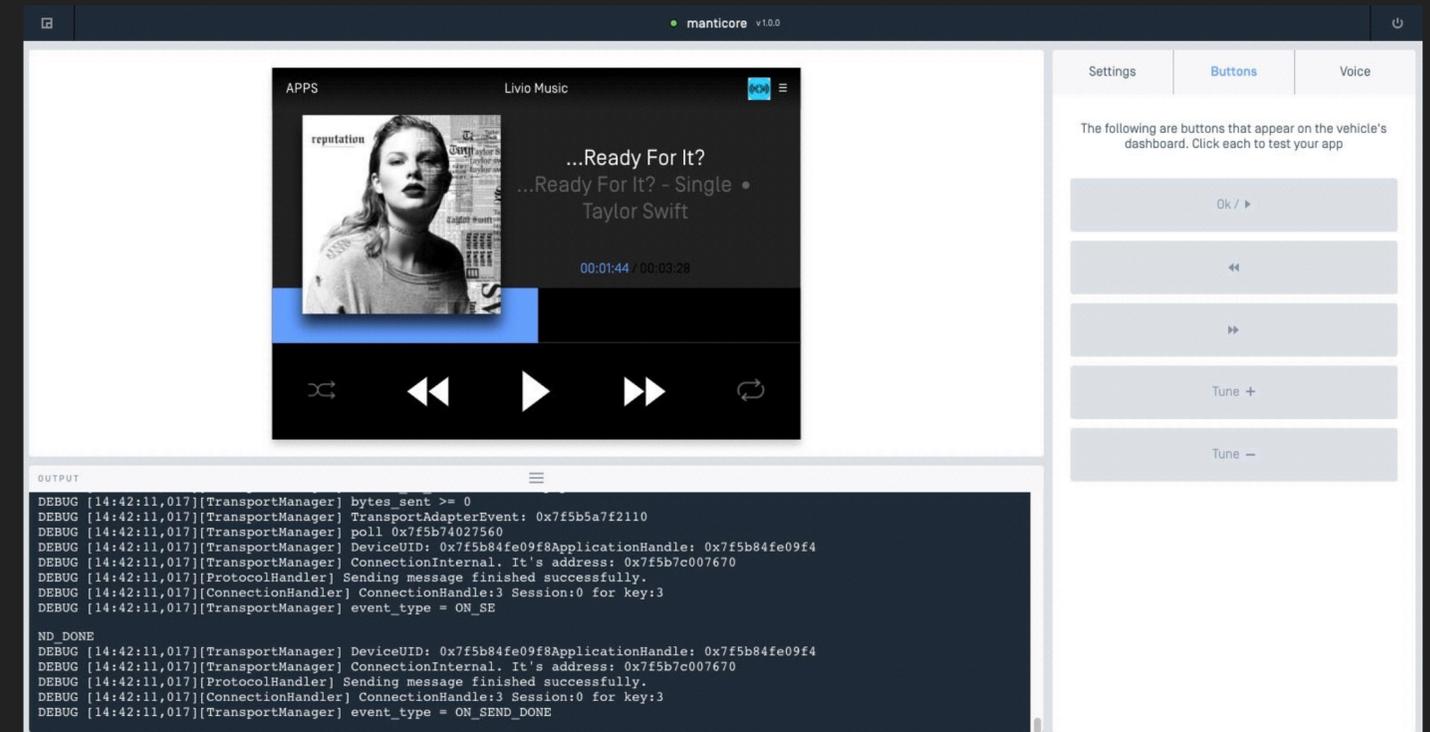
- ▶ First implementation of SDL video streaming used strictly raw h.264 data
 - ▶ Simple, but very poor performance
 - ▶ Core must consume all frames it is sent
- ▶ RTP encoding of h.264 data gives the core module important video streaming information (timestamps) to improve performance
 - ▶ More complex, but much better performance
- ▶ Core can throw away frames based on timestamp
- ▶ Each proxy contains a custom RTP packetizer

REMOTE CONTROL (BASELINE)

- ▶ Remote control allows certain apps to control safe modules in the vehicle
 - ▶ Radio Tuner
 - ▶ Climate Control
- ▶ Final version accepted for open is the baseline of the feature stripping away the concept of "zones" and addressable modules
- ▶ First phase only allows for a single module of each type to be controlled

MANTICORE

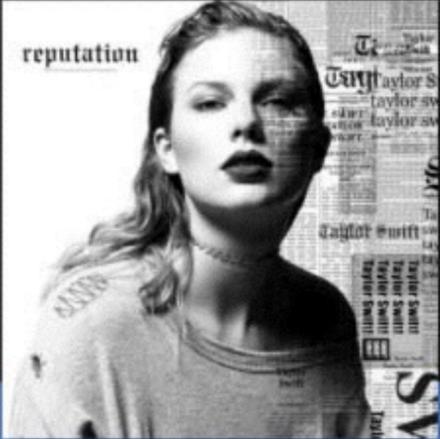
- ▶ Manticore was released on June 15, 2017
- ▶ Manticore gives access to a dedicated instance of SDL Core through a browser



The screenshot displays the Manticore web interface. The top navigation bar includes 'Settings', 'Buttons', and 'Voice'. The main content area is divided into two sections. The left section shows a music player interface with the title 'Livio Music' and a song titled '...Ready For It? - Single • Taylor Swift'. The player includes album art, a progress bar, and playback controls. The right section, titled 'Buttons', contains a list of controls for a vehicle dashboard: 'Ok / ▶', '◀◀', '▶▶', 'Tune +', and 'Tune -'. Below the main content is an 'OUTPUT' section displaying a log of debug messages, including transport manager events, connection status updates, and protocol handler actions.

manticore v1.0.0
⏻

APPS
Livio Music
⌵



...Ready For It?
...Ready For It? - Single •
Taylor Swift

00:01:44 / 00:03:28

⌵
⏮
⏪
⏩
⏭
⌵

Settings
Buttons
Voice

The following are buttons that appear on the vehicle's dashboard. Click each to test your app

Ok / ▶

⏮

⏭

Tune +

Tune -

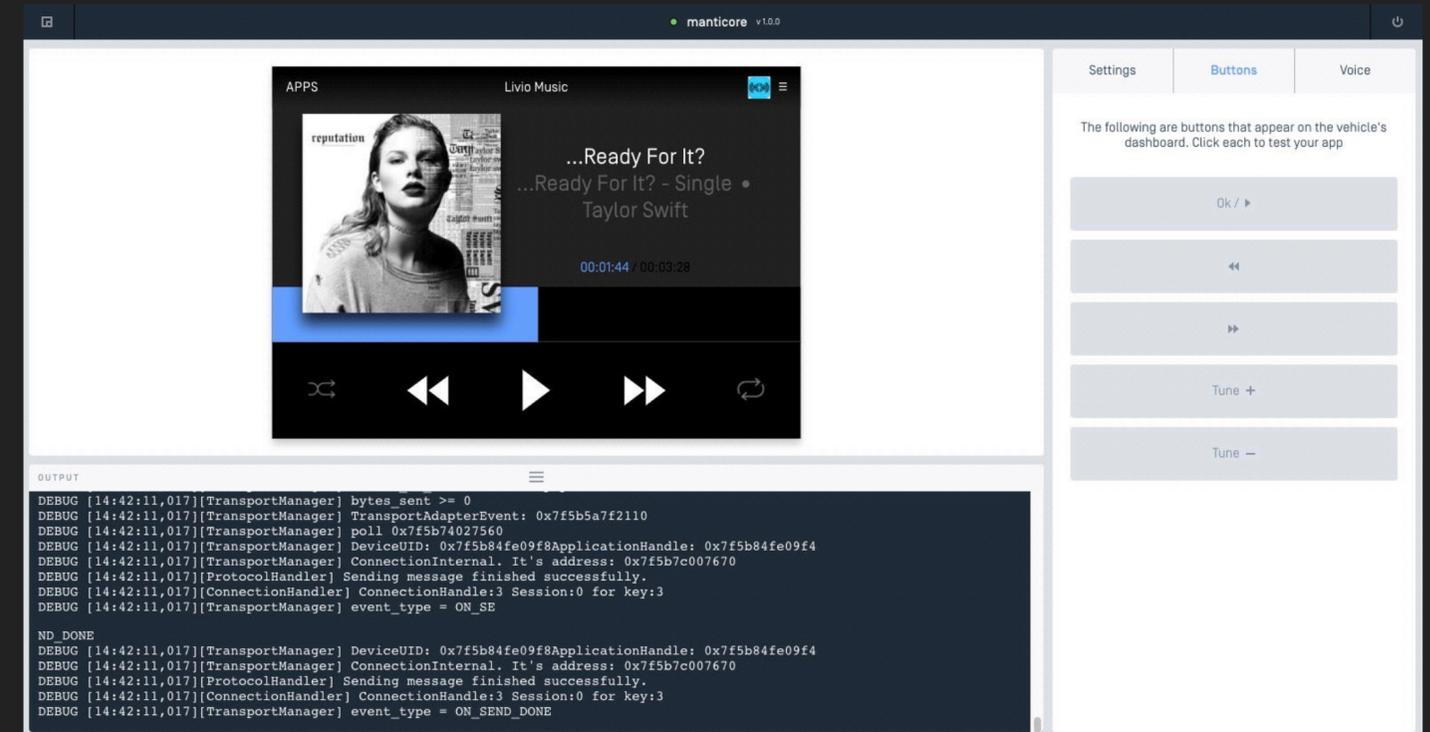
OUTPUT

```

DEBUG [14:42:11,017][TransportManager] bytes_sent >= 0
DEBUG [14:42:11,017][TransportManager] TransportAdapterEvent: 0x7f5b5a7f2110
DEBUG [14:42:11,017][TransportManager] poll 0x7f5b74027560
DEBUG [14:42:11,017][TransportManager] DeviceUID: 0x7f5b84fe09f8ApplicationHandle: 0x7f5b84fe09f4
DEBUG [14:42:11,017][TransportManager] ConnectionInternal. It's address: 0x7f5b7c007670
DEBUG [14:42:11,017][ProtocolHandler] Sending message finished successfully.
DEBUG [14:42:11,017][ConnectionHandler] ConnectionHandle:3 Session:0 for key:3
DEBUG [14:42:11,017][TransportManager] event_type = ON_SE
ND_DONE
DEBUG [14:42:11,017][TransportManager] DeviceUID: 0x7f5b84fe09f8ApplicationHandle: 0x7f5b84fe09f4
DEBUG [14:42:11,017][TransportManager] ConnectionInternal. It's address: 0x7f5b7c007670
DEBUG [14:42:11,017][ProtocolHandler] Sending message finished successfully.
DEBUG [14:42:11,017][ConnectionHandler] ConnectionHandle:3 Session:0 for key:3
DEBUG [14:42:11,017][TransportManager] event_type = ON_SEND_DONE
                
```

MANTICORE - WHATS NEXT?

- ▶ More templates to Generic HMI
- ▶ Build different versions of Core
- ▶ Add more OEM skins



The screenshot displays the Manticore v1.0.0 interface. The main window shows a music player skin for 'Livio Music' with the song '...Ready For It? - Single' by Taylor Swift. The skin includes album art, song title, artist name, and playback controls. Below the main window is an 'OUTPUT' log showing debug messages from the TransportManager and ProtocolHandler. To the right, there is a 'Buttons' panel with a list of controls: 'Ok / ▶', '◀◀', '▶▶', 'Tune +', and 'Tune -'.

```

DEBUG [14:42:11,017][TransportManager] bytes_sent >= 0
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DEBUG [14:42:11,017][TransportManager] event_type = ON_SEND_DONE
    
```

SHAID 2.0

- ▶ Re-architected to suit needs from the ecosystem
- ▶ Considered a database for all app information instead of only app IDs
- ▶ Super Helpful Application ~~ID~~ *Information* Database
- ▶ SHAID database is central hub for all SDL app information Including:
 - ▶ Developer portal
 - ▶ Policy Server
 - ▶ WOPR.JR

SDL POLICY SERVER 2.0

- ▶ The policy server is used by OEMs to control every app's permissions down to RPC and parameters
- ▶ First version only acted as a file distribution server serving up a single hardcoded JSON file.
- ▶ 2.0 creates dynamic policy tables based
- ▶ Also uses SHAID's APIs to obtain information about apps and what permissions they need
- ▶ Goal is to create an easily deployable, production ready policy server for SDLC members

SDL POLICY SERVER – WHAT'S NEXT?

- ▶ OEM Console UI
 - ▶ Javascript UI Framework, Vue.js ([Evolution proposal](#))
- ▶ More granular permission control
- ▶ Simple and possible automatic deployment

Applications 4

Pending Requests

Approved Applications

Denied Applications

View Policy Table

Pending Requests

Livio Music added to "Approved Applications"

Application Name	Latest Version Update	Staging/Production	
Livio Music	v1.0.2 9/1/17	Staging	Approve Deny
Livio Music	v1.0.2 9/1/17	Staging	Approve Deny
Livio Music	v1.0.2 9/1/17	Staging	Approve Deny
Livio Music	v1.0.2 9/1/17	Staging	Approve Deny

Approved Applications

Application Name	Latest Version Update	Staging/Production	
● Livio Music	v1.0.2 9/1/17	Staging	⋮
● Livio Music	v1.0.2 9/1/17	Staging	⋮
● Livio Music	v1.0.2 9/1/17	Staging	⋮
● Livio Music	v1.0.2 9/1/17	Staging	⋮

Denied Applications

Application Name	Latest Version Update	Staging/Production	
● Livio Music	v1.0.2 9/1/17	Staging	⋮

UPCOMING GOALS

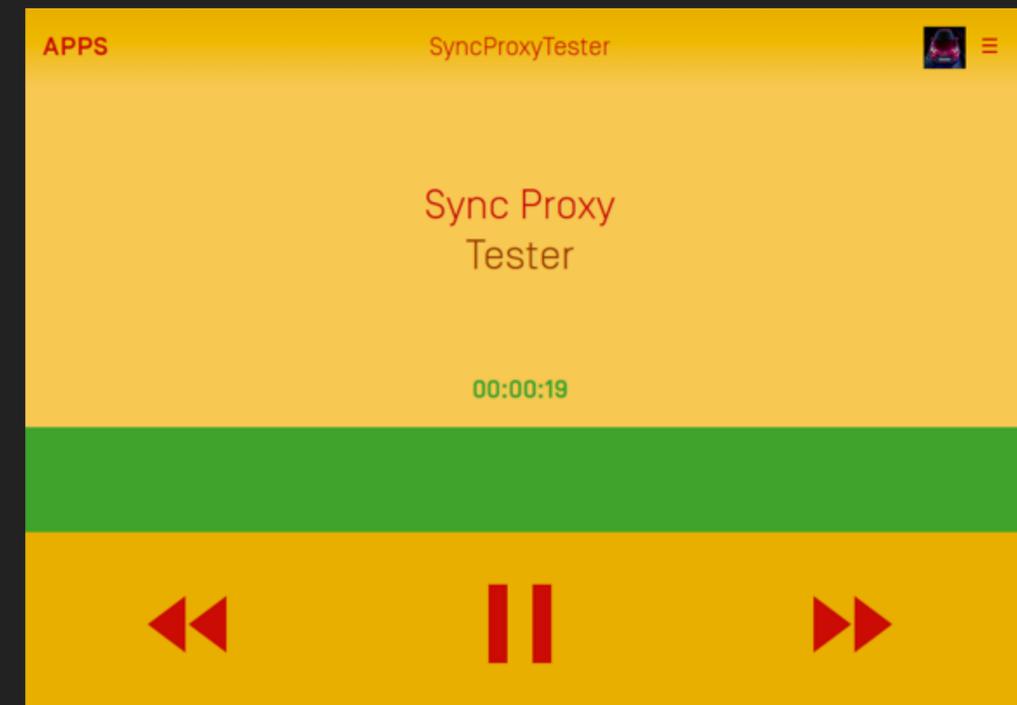
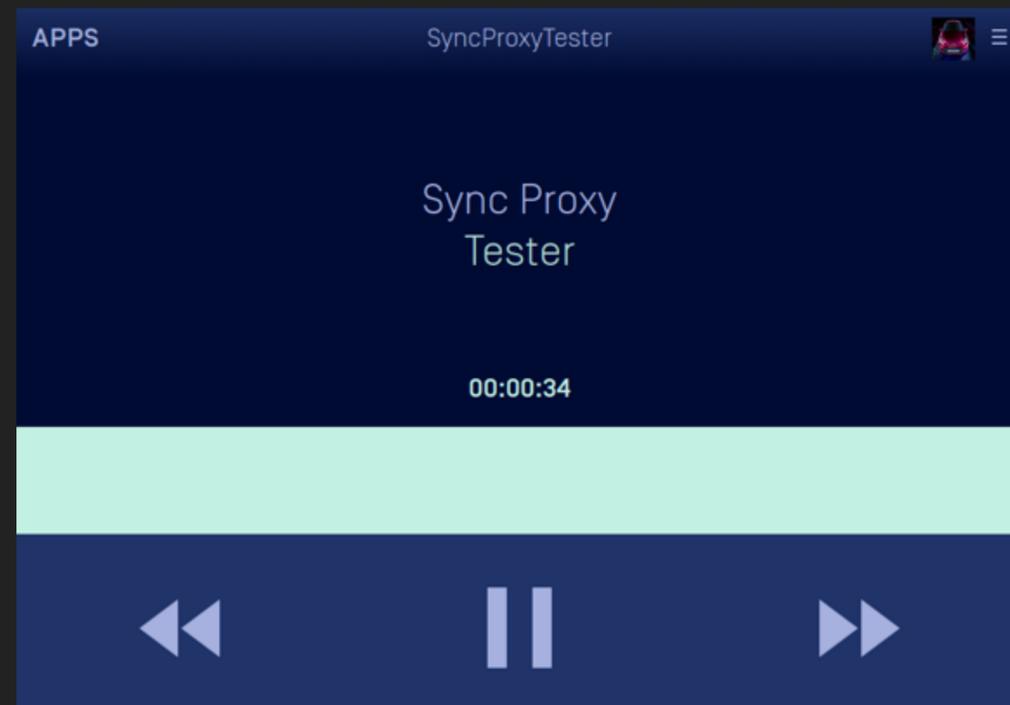
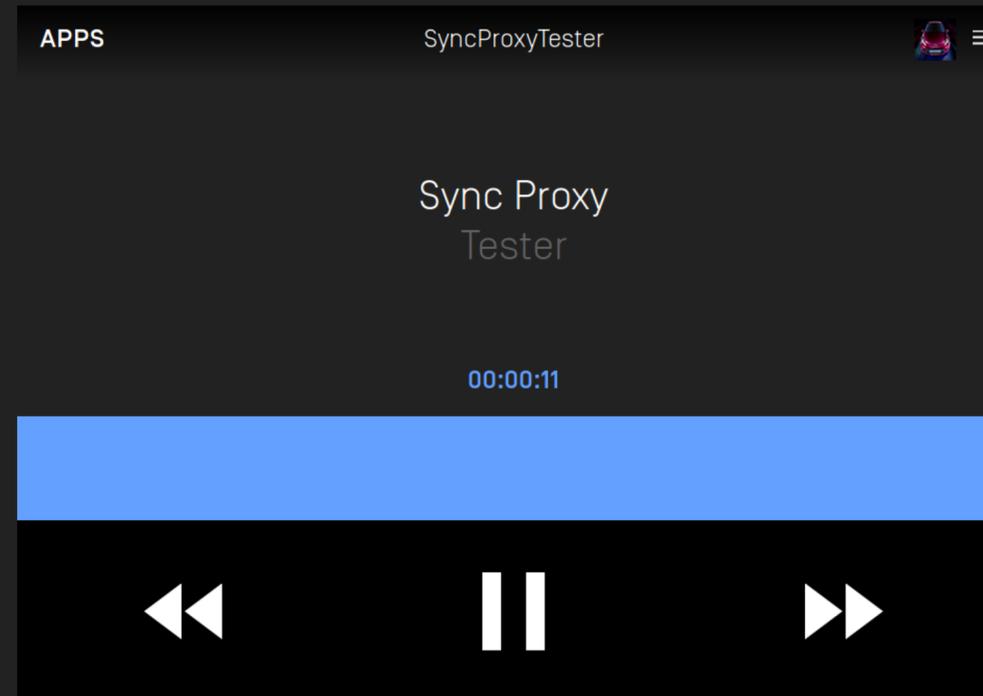
- ▶ Production WiFi transport ([Evolution Proposal](#))
- ▶ Improved Proxy APIs
- ▶ Template Themes
- ▶ App certification for SDL
- ▶ Infotainment certification
 - ▶ Hardware Validator App

IMPROVED PROXY APIS

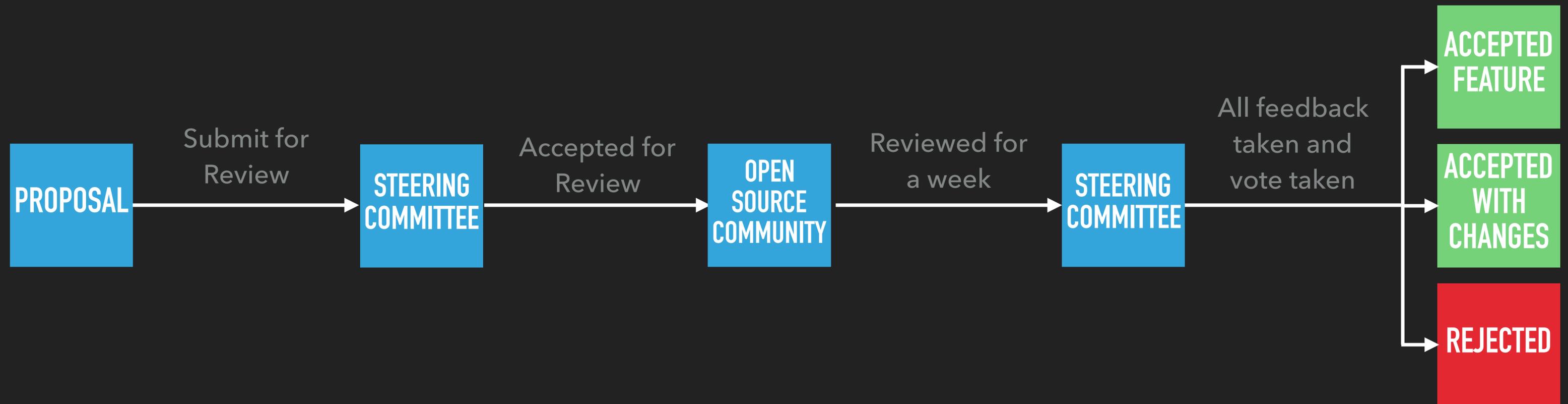
- ▶ Auto set correlation ID for RPCs ([Android](#))
- ▶ System Capability Manager ([Android](#) and [iOS](#))
- ▶ Send Multiple RPCs at once ([Android and iOS](#))
- ▶ Creating a more native experience

TEMPLATE THEMES

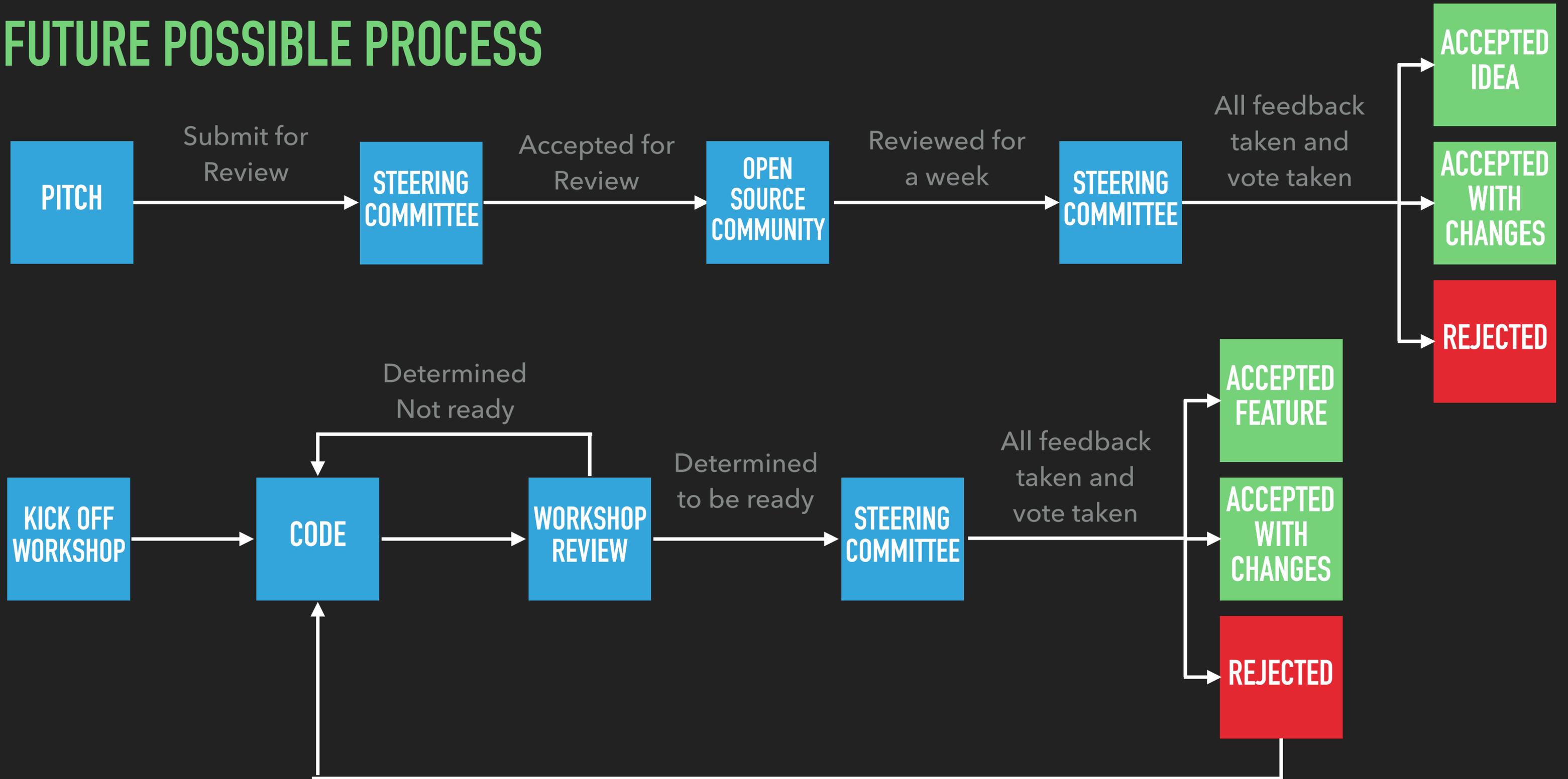
Giving apps a way to keep their branding



EVOLUTION PROCESS



FUTURE POSSIBLE PROCESS





**AUTONOMOUS
VEHICLES WILL
DISRUPT CAR
CONNECTIVITY
TECHNOLOGIES**



QUESTIONS?

**Thank you,
Joey Grover, CTO**

