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# THE FUTURE OF SDL





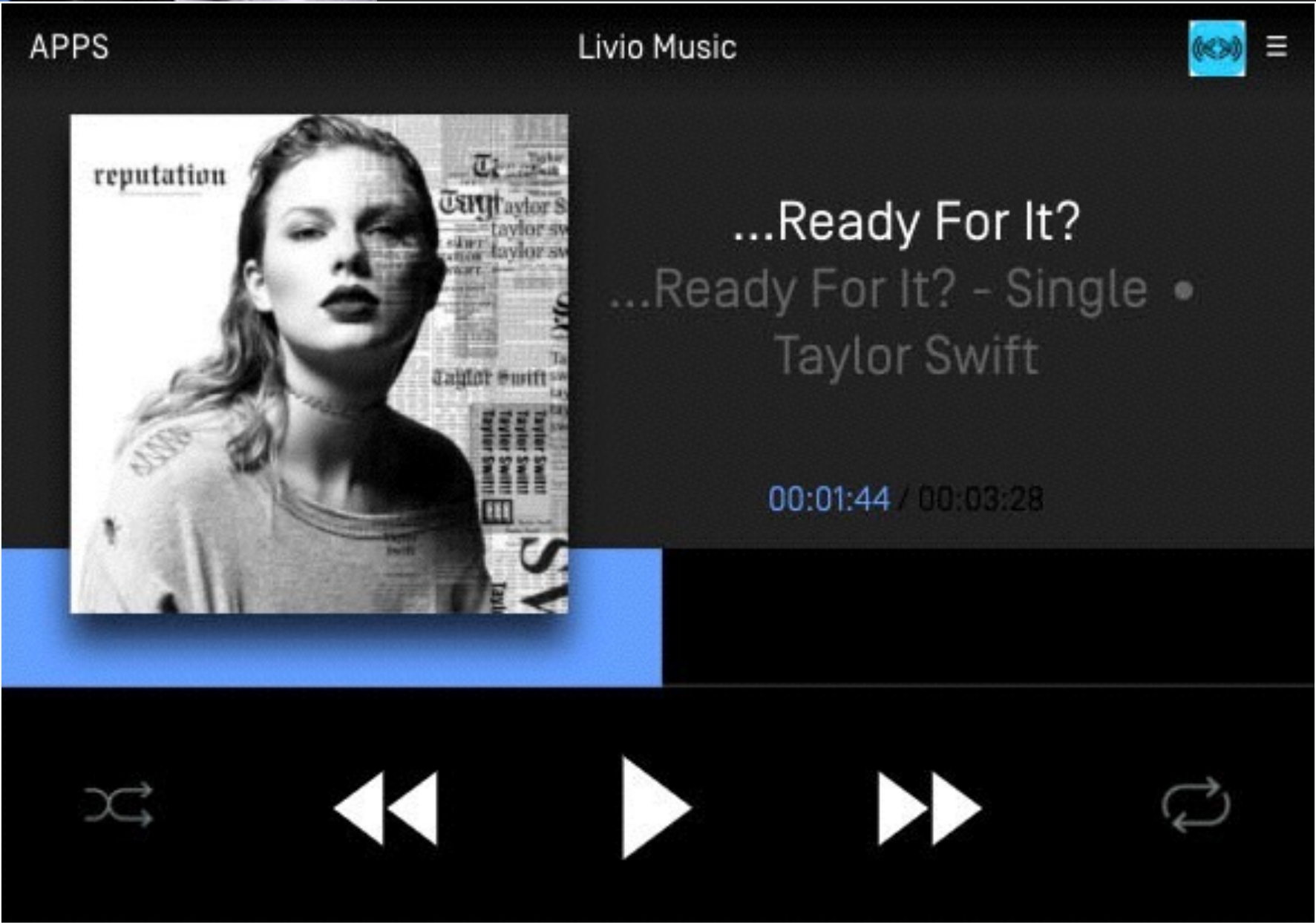
**ANDROID WEAR 1.0**



# ANDROID WEAR 2.0









## GOALS FOR SDL

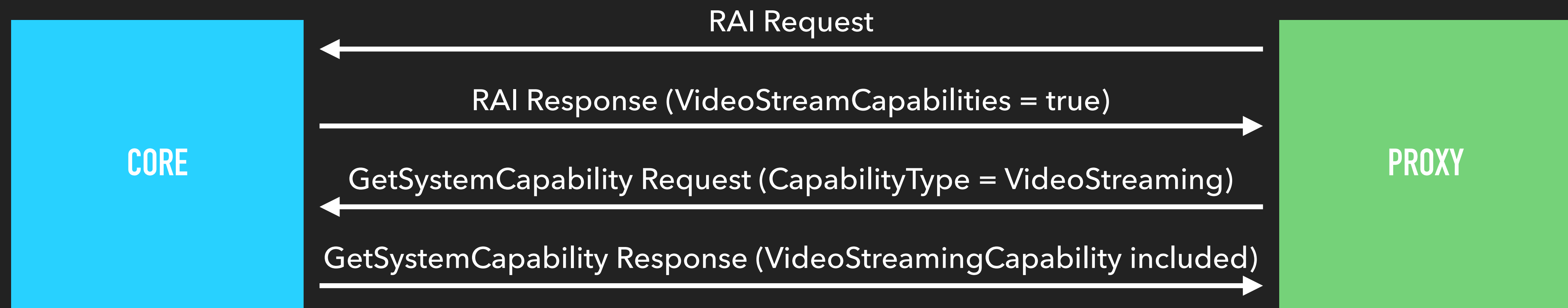
1. Compelling features for consumers
2. Friendly and comprehensive APIs for developers
3. Customizable and secure for automotive companies

## 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



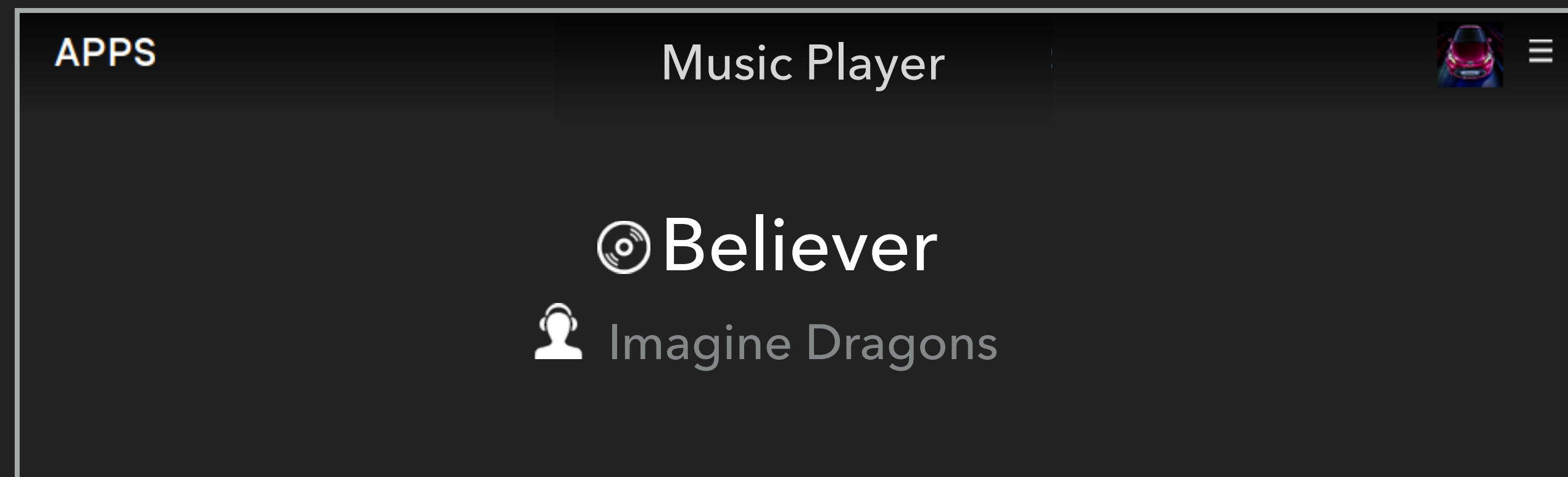
## CONSTRUCTED PAYLOADS

- ▶ 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



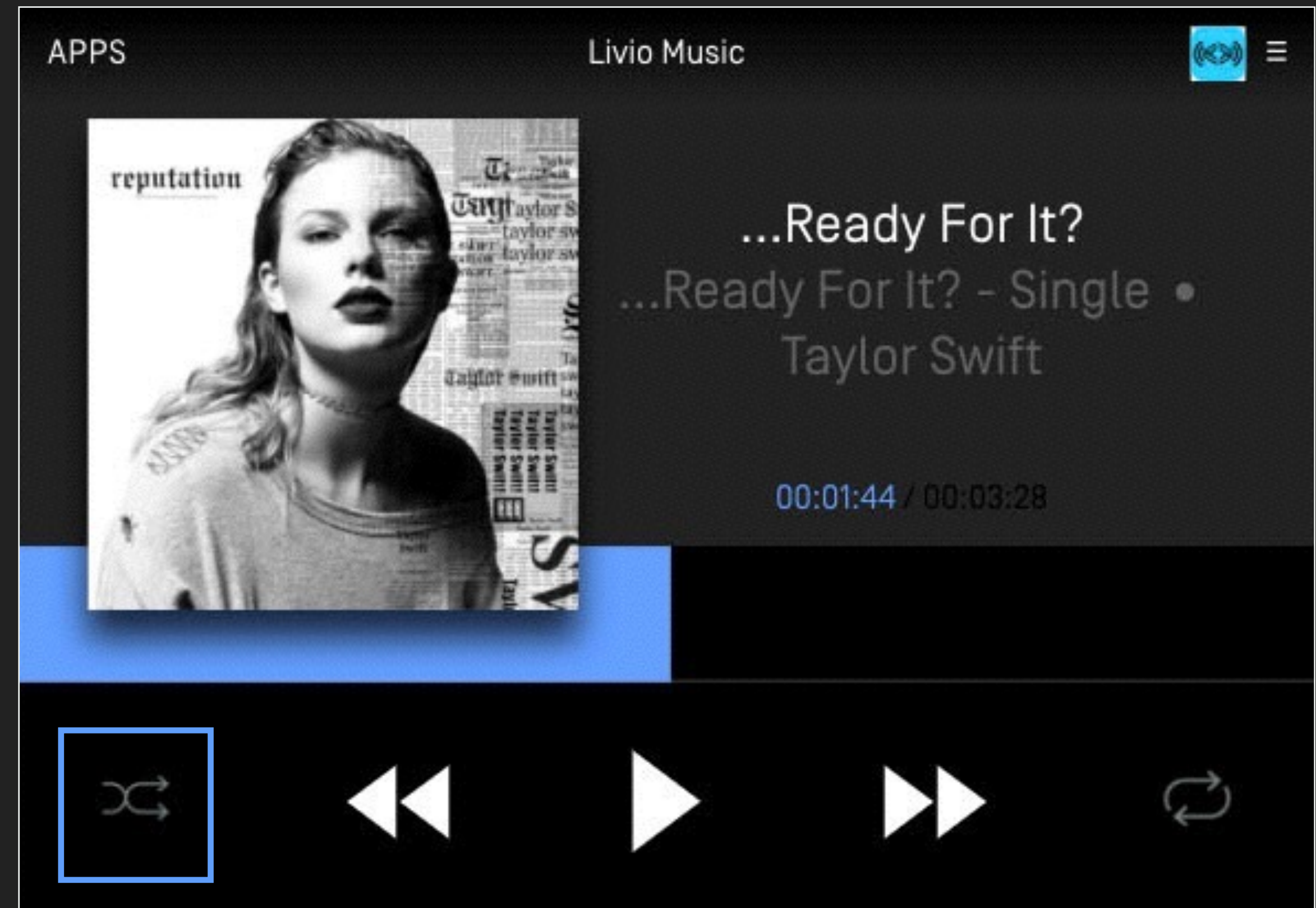
## METADATA TAGS

- ▶ 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

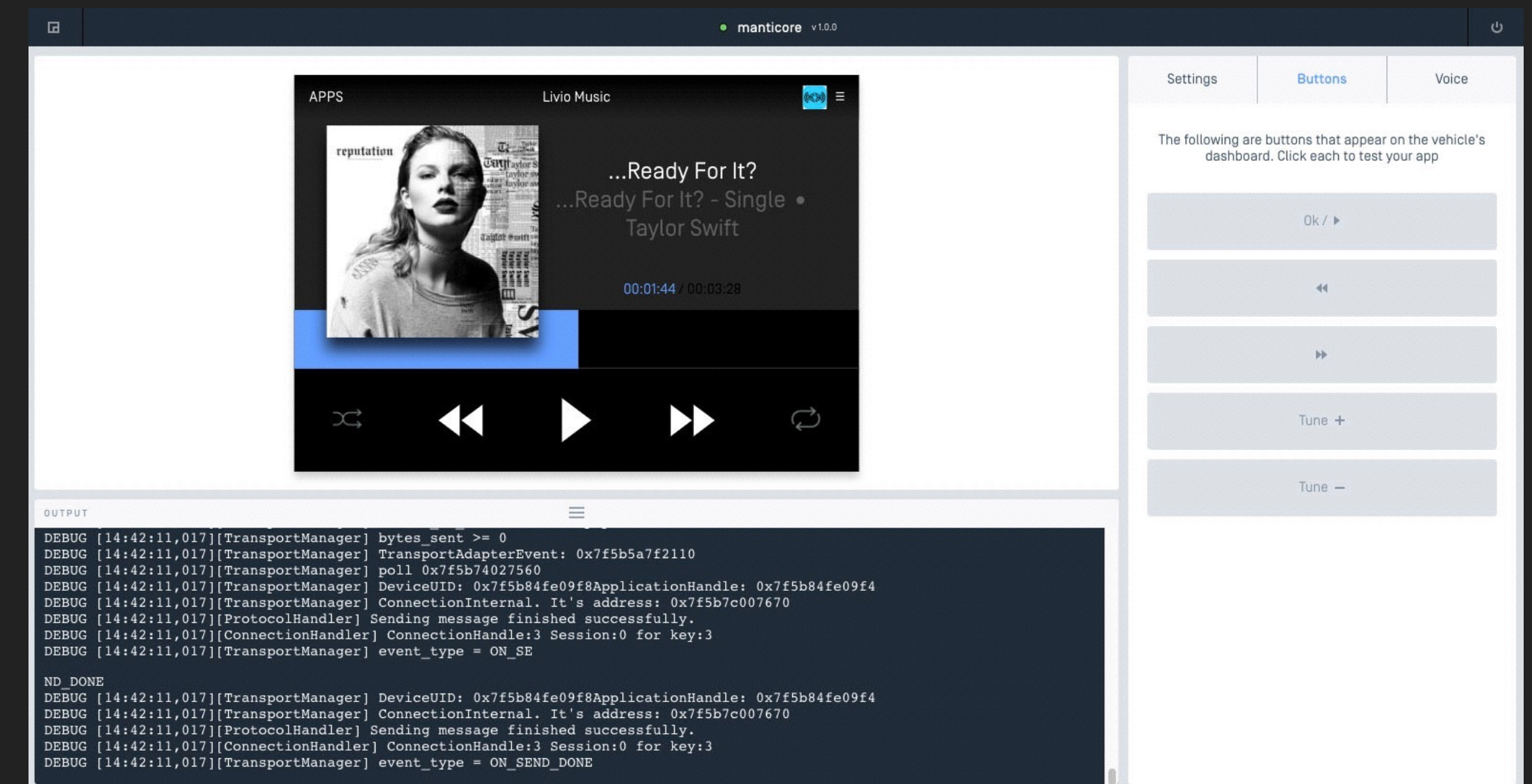
## REMOTE CONTROL (BASELINE)

- ▶ 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





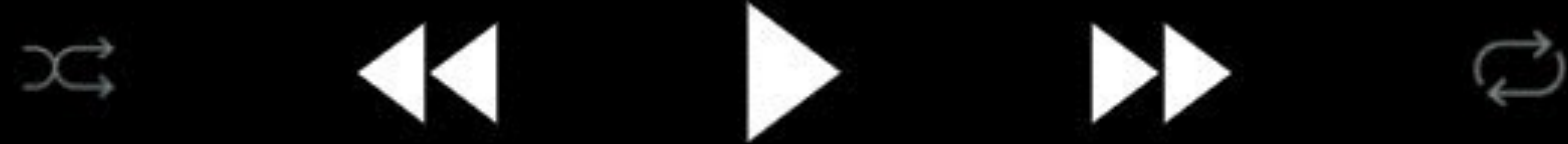
manticore v1.0.0

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

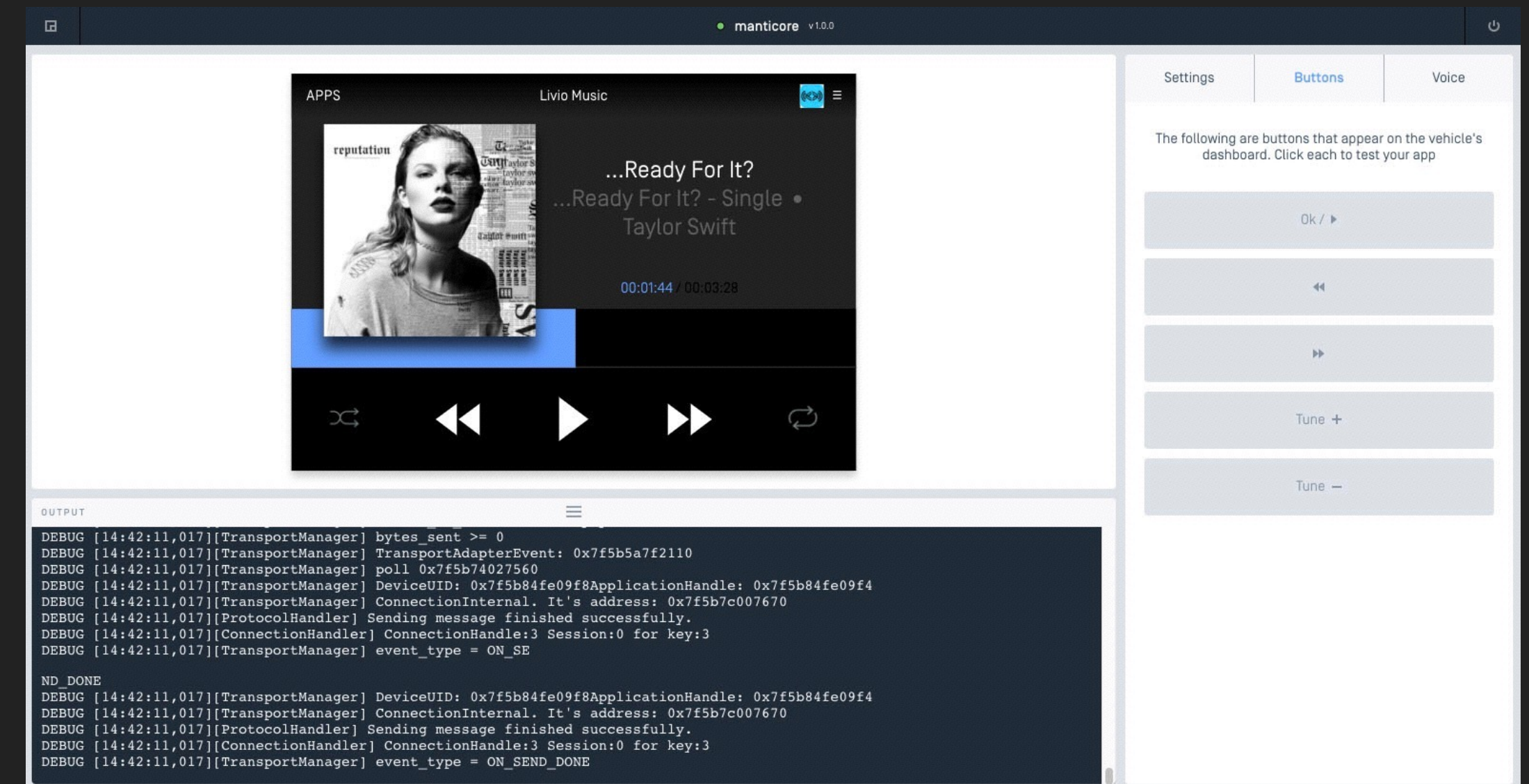
```
DEBUG [14:42:11,017][TransportManager] bytes_sent >= 0
DEBUG [14:42:11,017][TransportManager] TransportAdapterEvent: 0x7f5b5a7f2110
DEBUG [14:42:11,017][TransportManager] poll 0x7f5b74027560
DEBUG [14:42:11,017][TransportManager] DeviceUID: 0x7f5b84fe09f8ApplicationHandle: 0x7f5b84fe09f4
DEBUG [14:42:11,017][TransportManager] 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



## 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	<div>ApproveDeny</div>
Livio Music	v1.0.2   9/1/17	Staging	<div>ApproveDeny</div>
Livio Music	v1.0.2   9/1/17	Staging	<div>ApproveDeny</div>
Livio Music	v1.0.2   9/1/17	Staging	<div>ApproveDeny</div>

Approved Applications

Application Name	Latest Version Update	Staging/Production	
<div><div></div>Livio Music</div>	v1.0.2   9/1/17	Staging	<div></div>
<div><div></div>Livio Music</div>	v1.0.2   9/1/17	Staging	<div></div>
<div><div></div>Livio Music</div>	v1.0.2   9/1/17	Staging	<div></div>
<div><div></div>Livio Music</div>	v1.0.2   9/1/17	Staging	<div></div>

Denied Applications

Application Name	Latest Version Update	Staging/Production	
<div><div></div>Livio Music</div>	v1.0.2   9/1/17	Staging	<div></div>

## UPCOMING GOALS

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

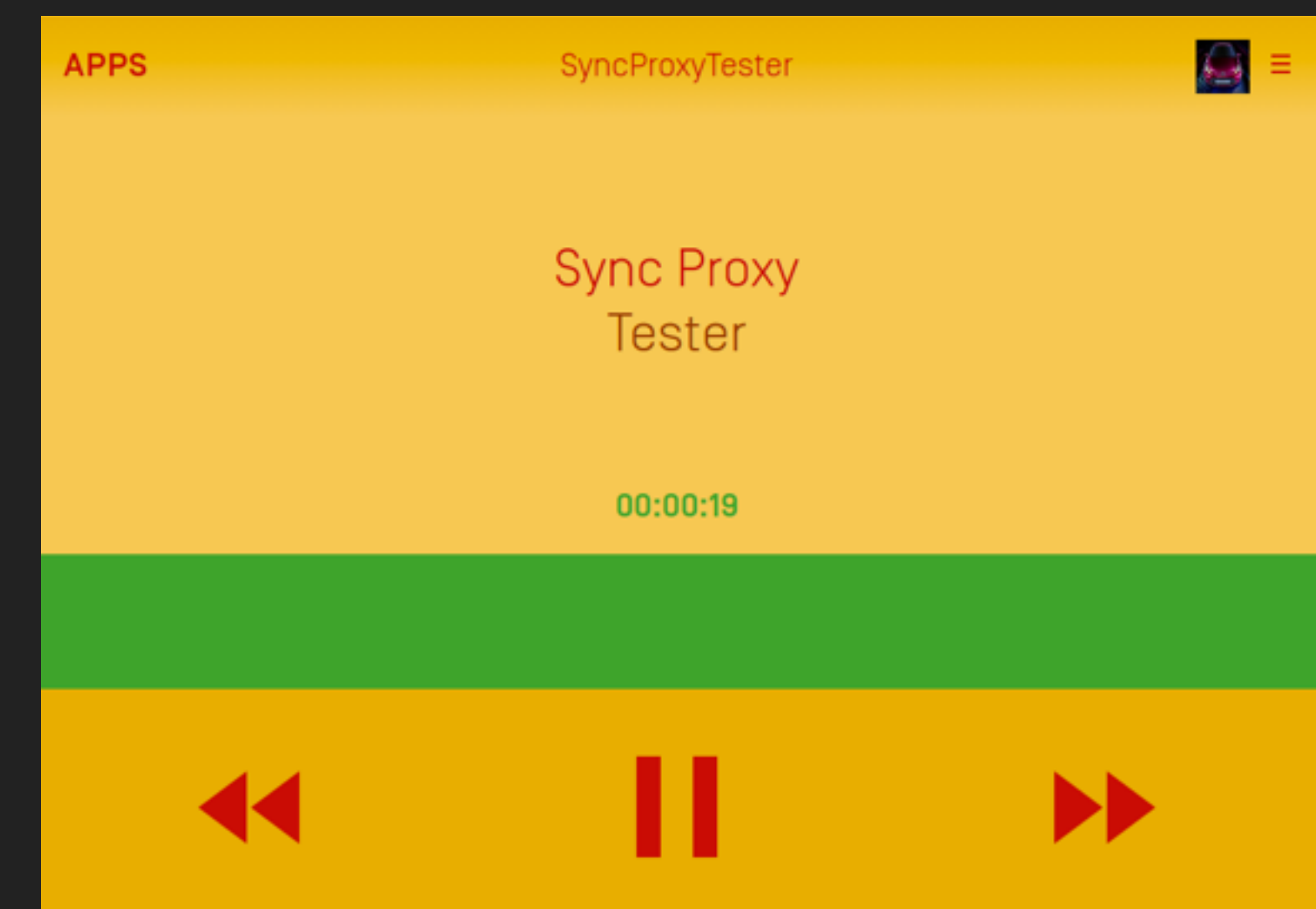
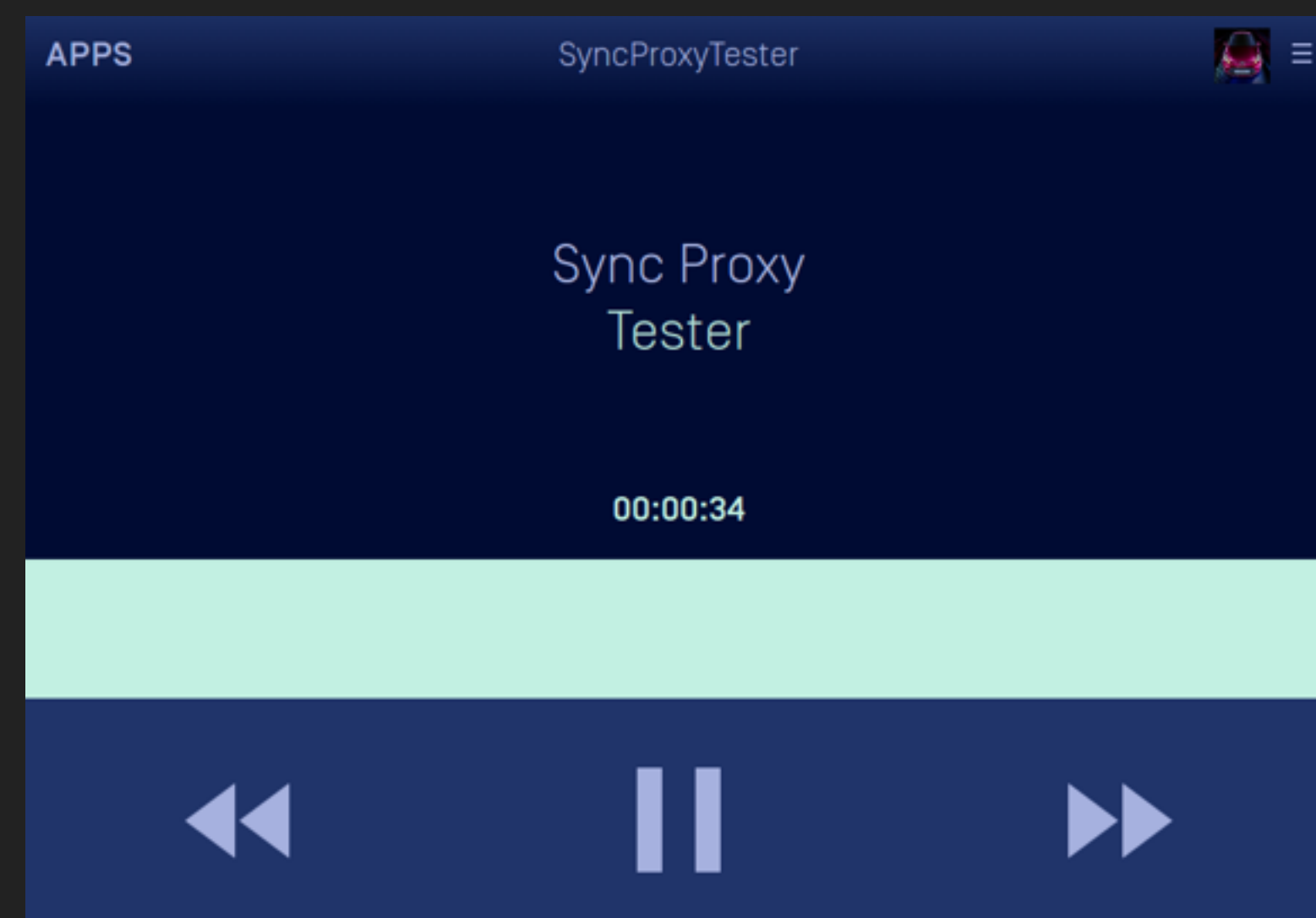
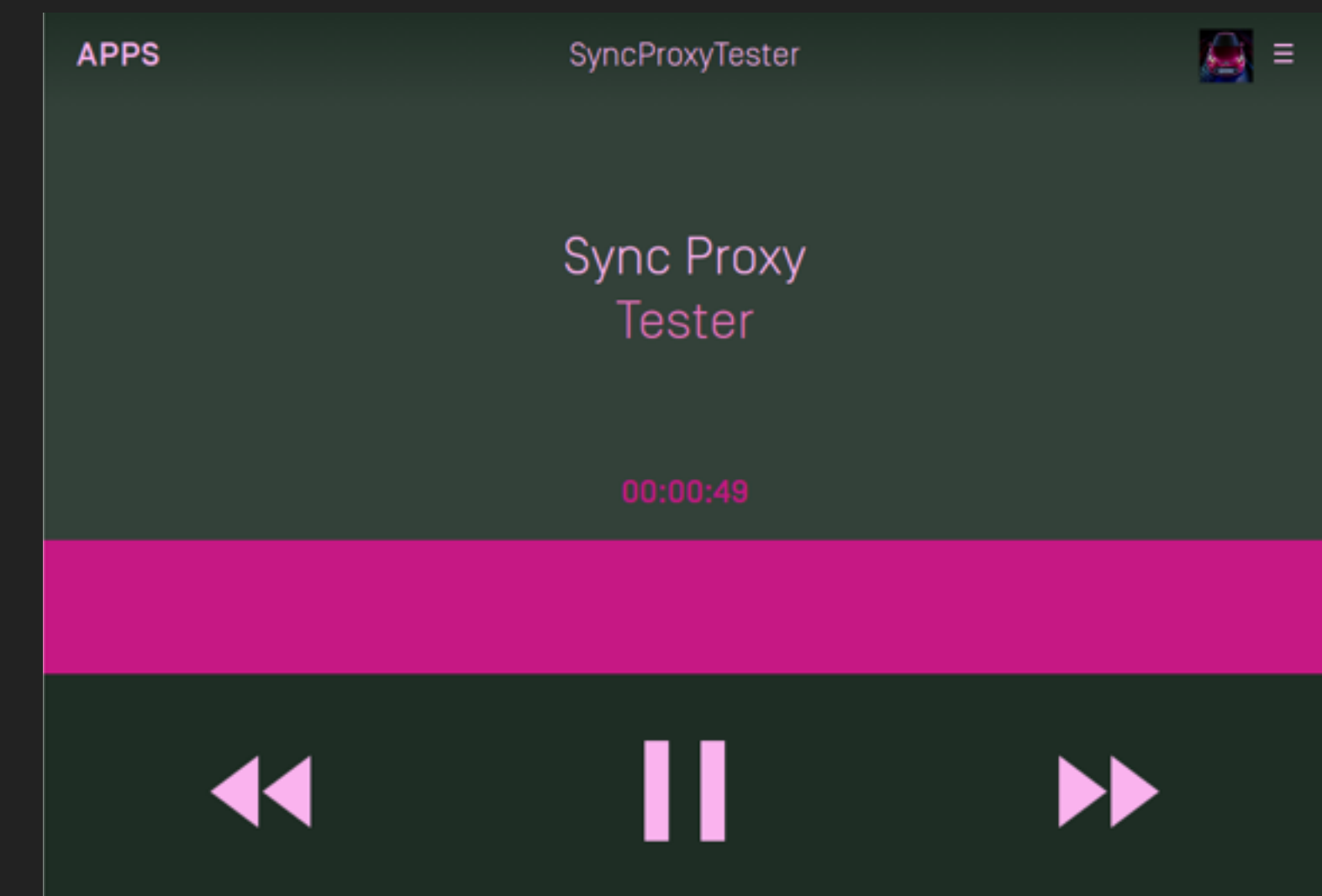
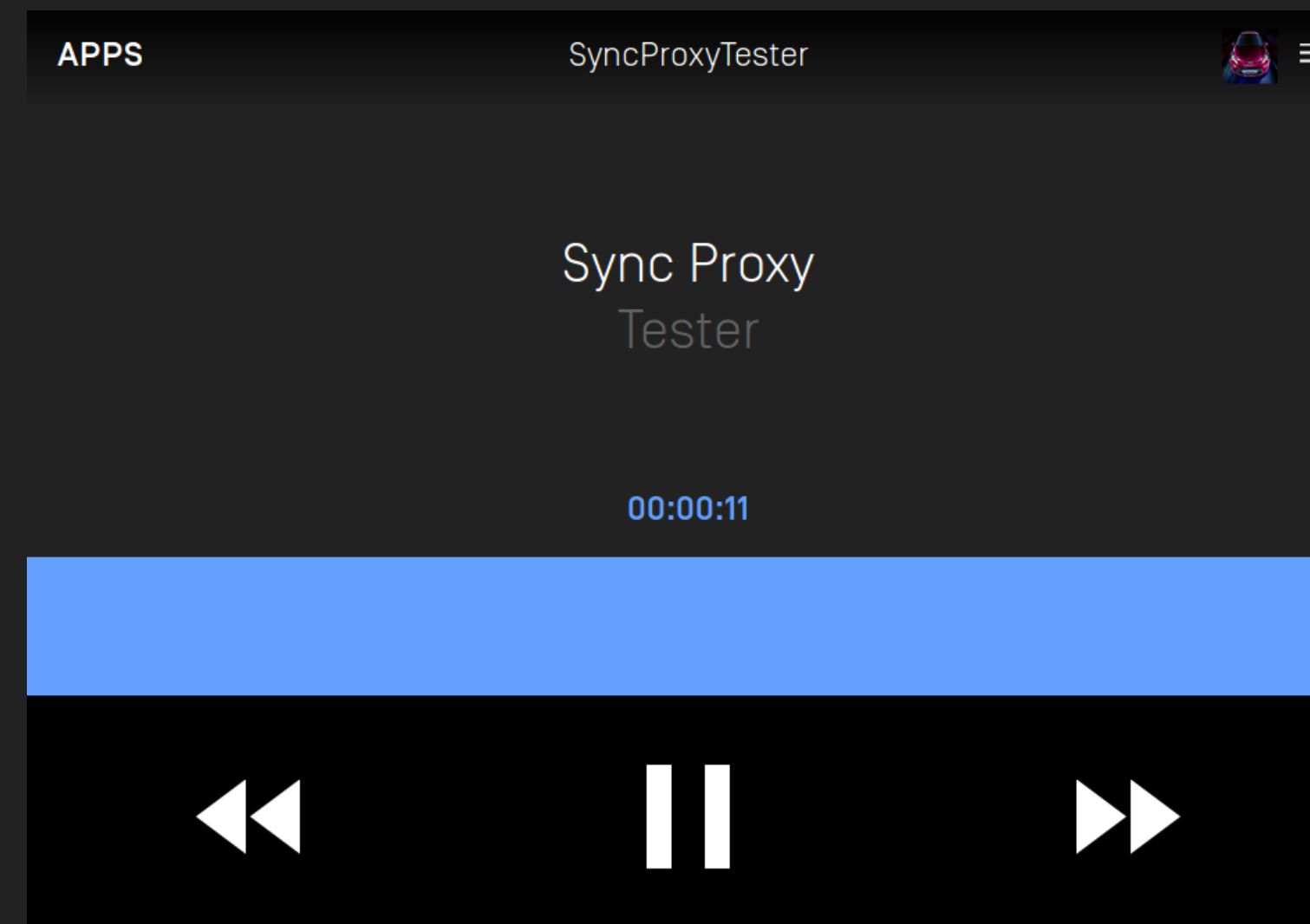
## IMPROVED PROXY APIS

- ▶ 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

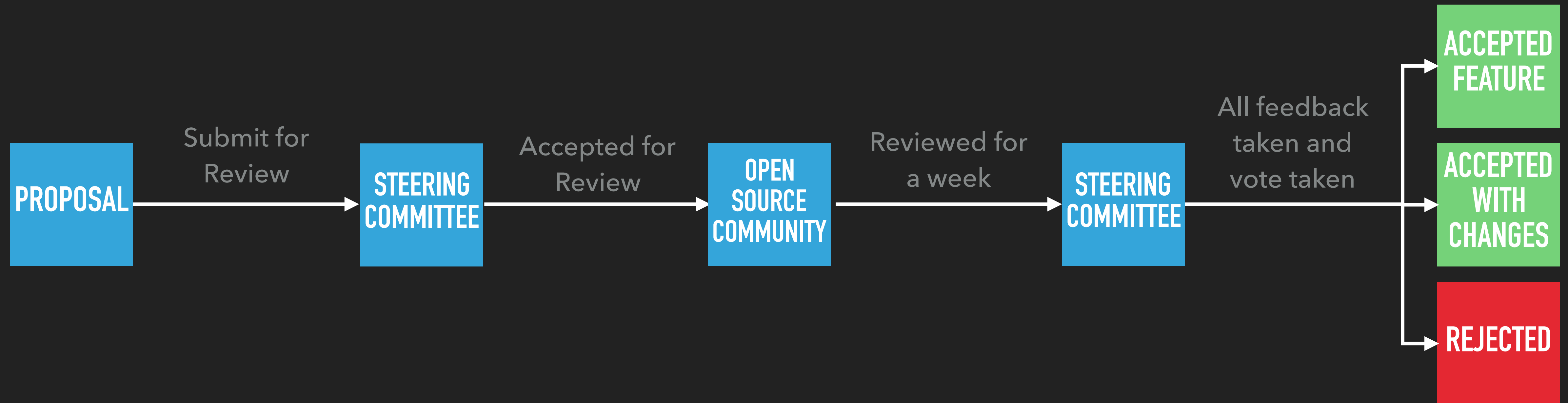


# TEMPLATE THEMES

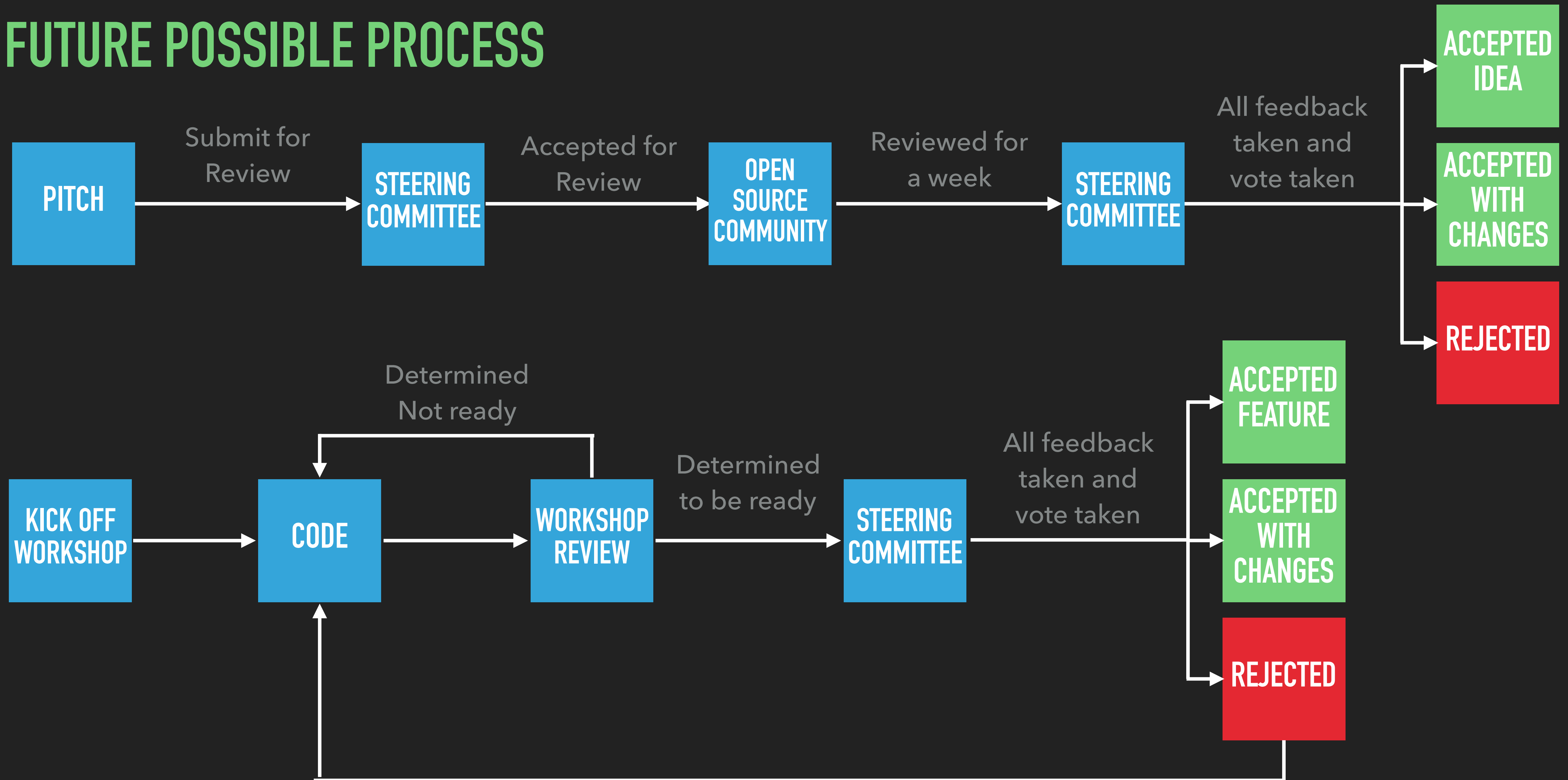
Giving apps a way to keep their branding



# EVOLUTION PROCESS



# FUTURE POSSIBLE PROCESS







**AUTONOMOUS  
VEHICLES WILL  
DISRUPT CAR  
CONNECTIVITY  
TECHNOLOGIES**





# QUESTIONS?

**Thank you,  
Joey Grover, CTO**

