

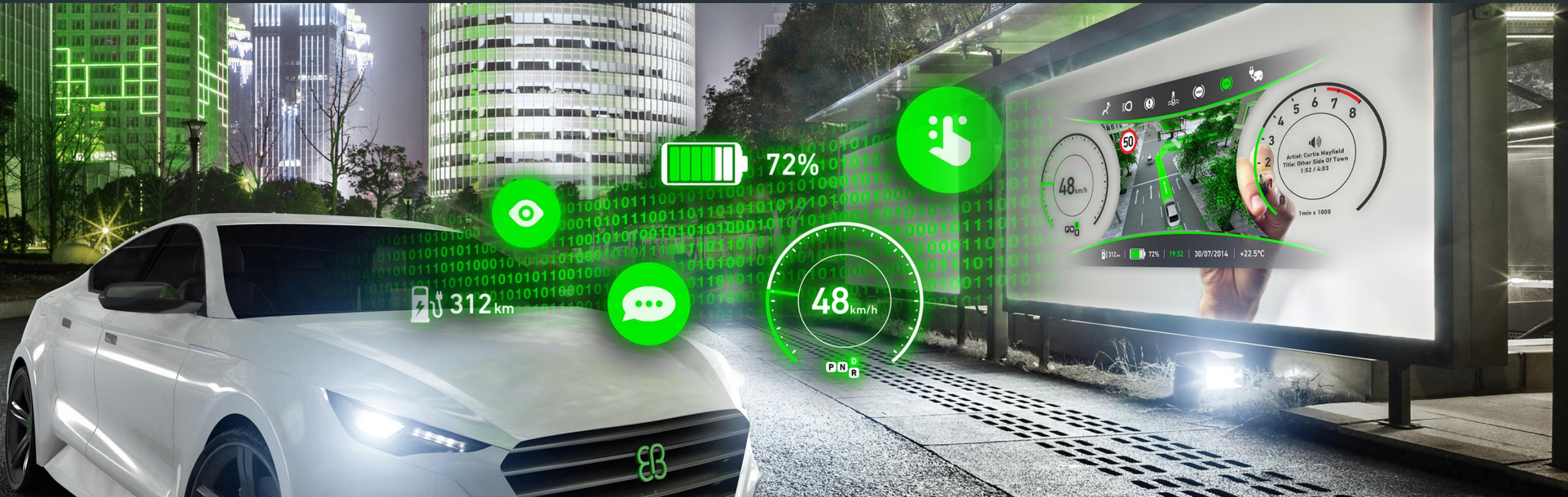
# Smart User Interfaces for Connected Cars

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July 27, 2017



Elektrobit





# Agenda

- User interfaces - Challenges
- EB's Complete UI Package
- The In-Car User Platform (ICUP)  
EB GUIDE Tool
- Augmented Reality Creator
- Summary

# Gradual Evolution



Purely mechanical,  
rudimentary



Infotainment



First phones

© Geoffrey C. Fors 2005;  
<http://www.wb6nvh.com/MTSfiles/Carphone3.htm>



Partially automated,  
touchscreens



# Increasing Complexity of User Interfaces



Multiple technologies,  
disparate systems

Product  
development cycles

Usability and  
personalization

OEM brand image

# Demand for New Technologies

Extendable | Hybrid | Adaptive | Personalized | Smart

**Charlie Wilson**  
+49 (0) 333 444 123 45

118 km/h  
5  
1 min x 1000  
5

400 km 90°C 12:00

Digital cluster instrument + navigation + speech

This panel shows a digital instrument cluster with a speedometer displaying 118 km/h, a tachometer, and a navigation map. A circular profile picture of Charlie Wilson and his phone number are in the top left. A status bar at the bottom shows an ongoing call, fuel level, temperature, and time.

3D cluster instrument + system alerts

This panel displays two views of a 3D instrument cluster with glowing blue and white elements, including speedometer and tachometer dials.

Augmented reality + predictive navigation

12%

This panel shows an augmented reality navigation system overlaid on a road view, with green grid lines and a 12% speed change indicator.

Multiple displays + infotainment

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This panel shows a multi-screen infotainment system with a hand interacting with a touch screen, displaying maps and various data points.



# Our Solution: The Complete Package



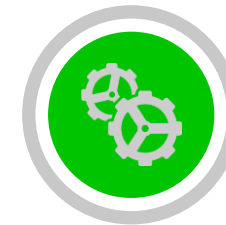
## PLATFORM

Reference UI & apps | Navigation | Self-learning HMI | Smart Voice Assistant



## TOOLS

EB GUIDE Studio | EB GUIDE Speech Extension



## FRAMEWORKS

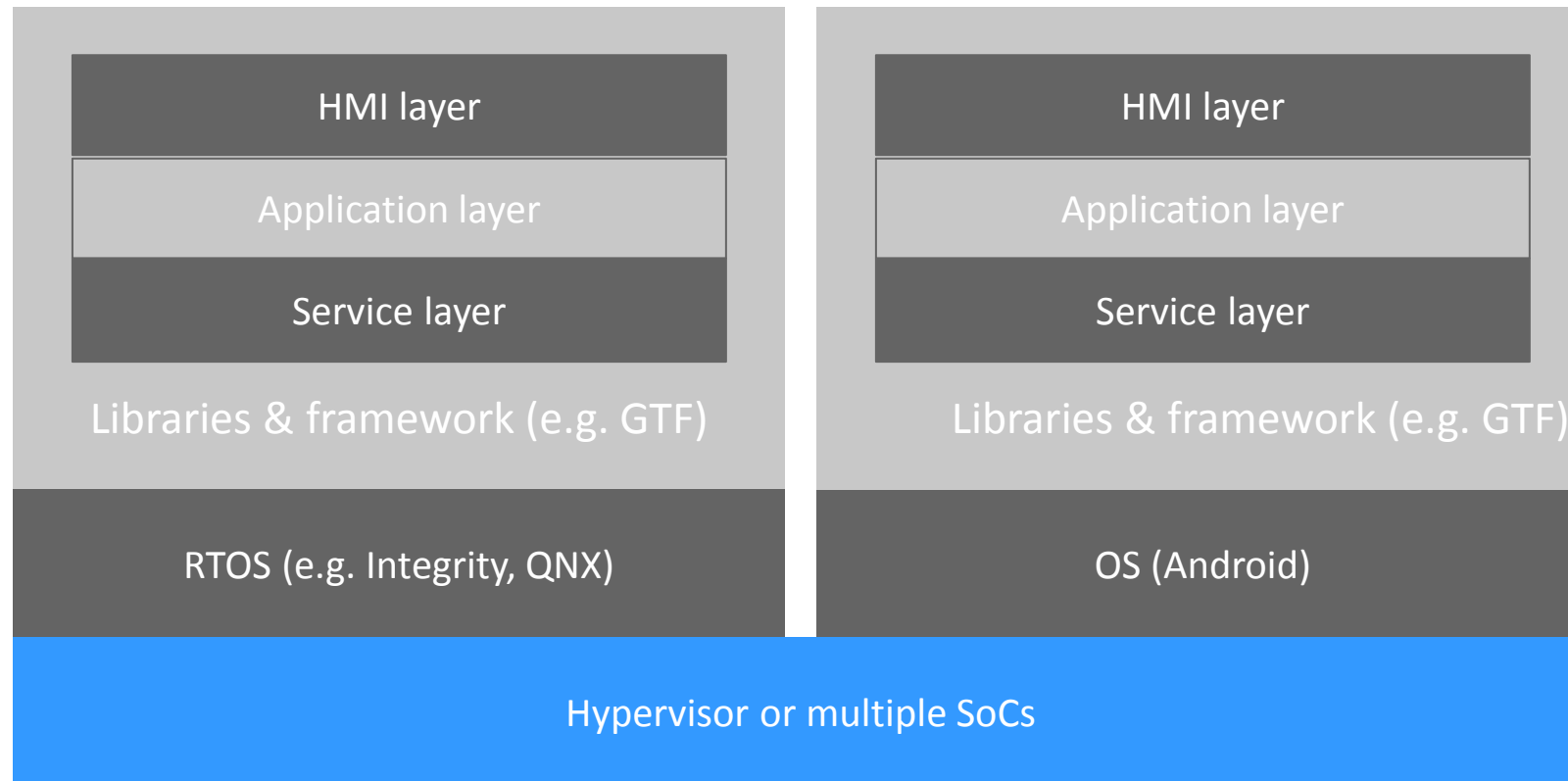
EB GUIDE GTF | EB GUIDE STF | AR Creator

# In-Car User Platform (ICUP)

- Base platform for in-car infotainment and information displays
- Customizable
- Shorter implementation cycles

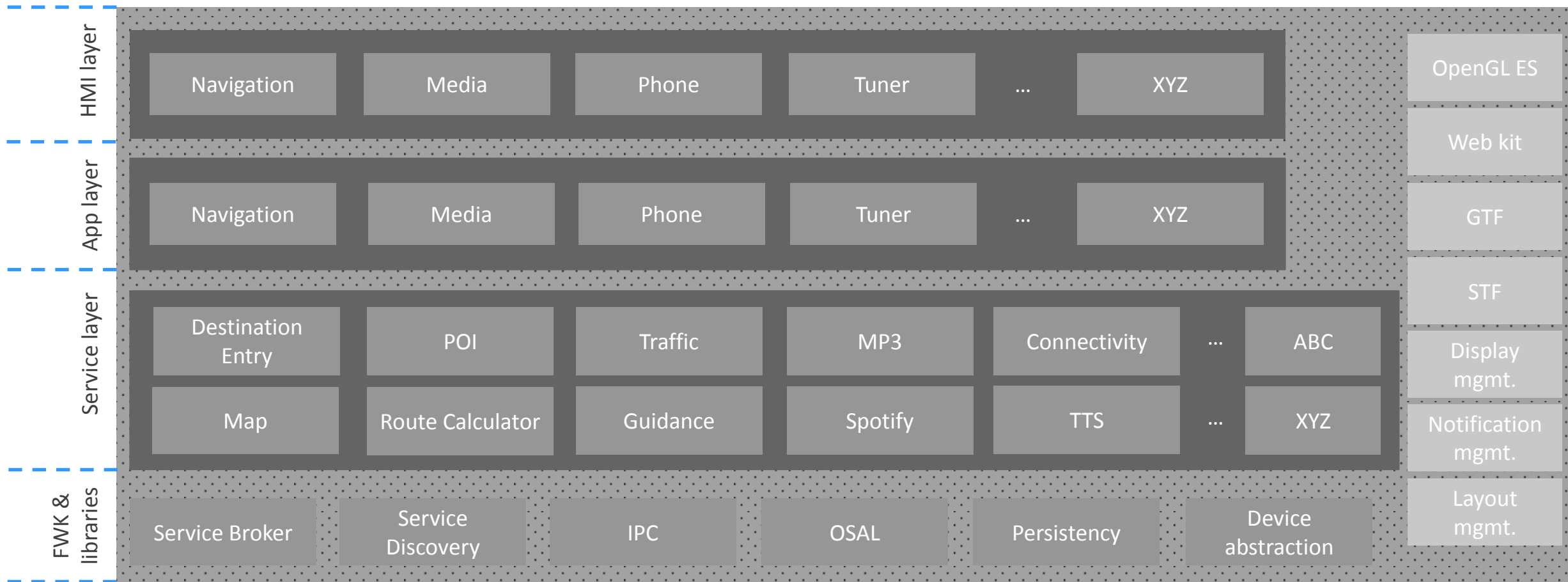


# In-Car User Platform Architecture

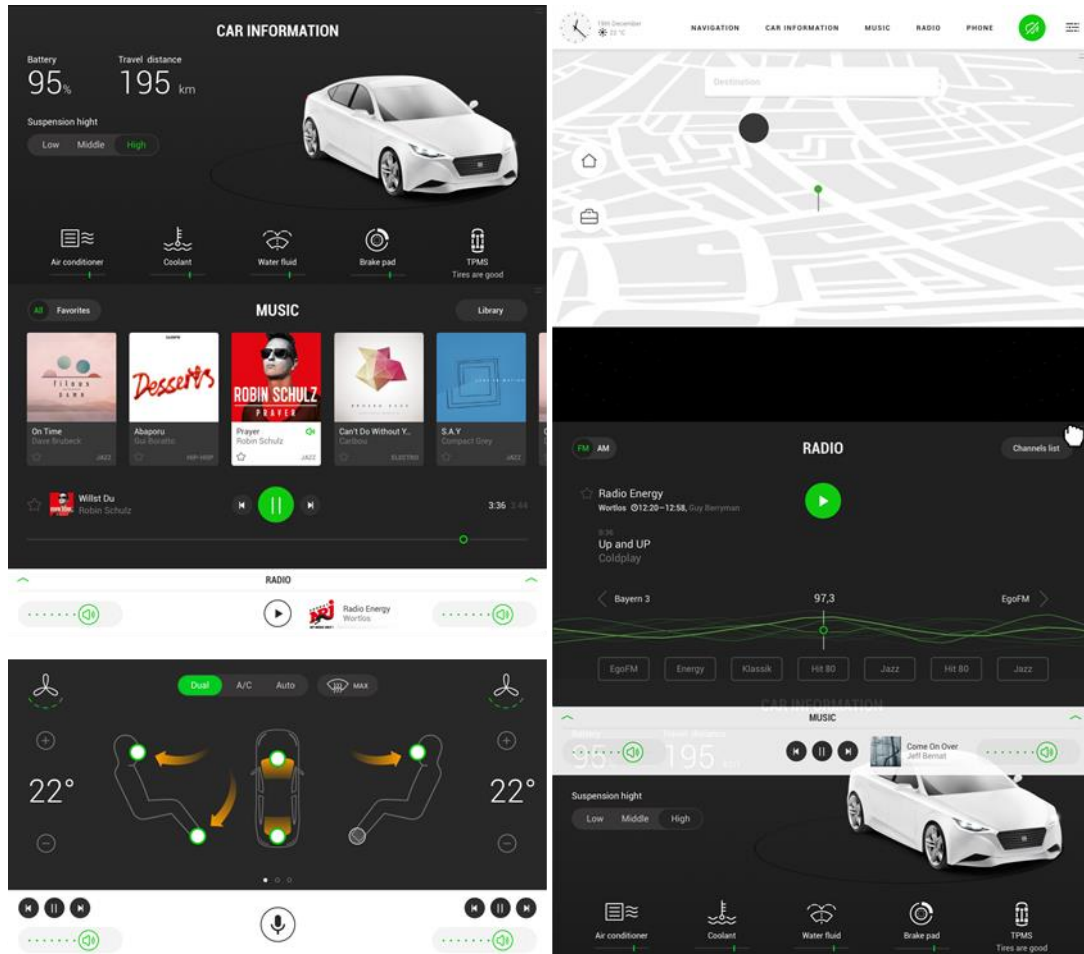




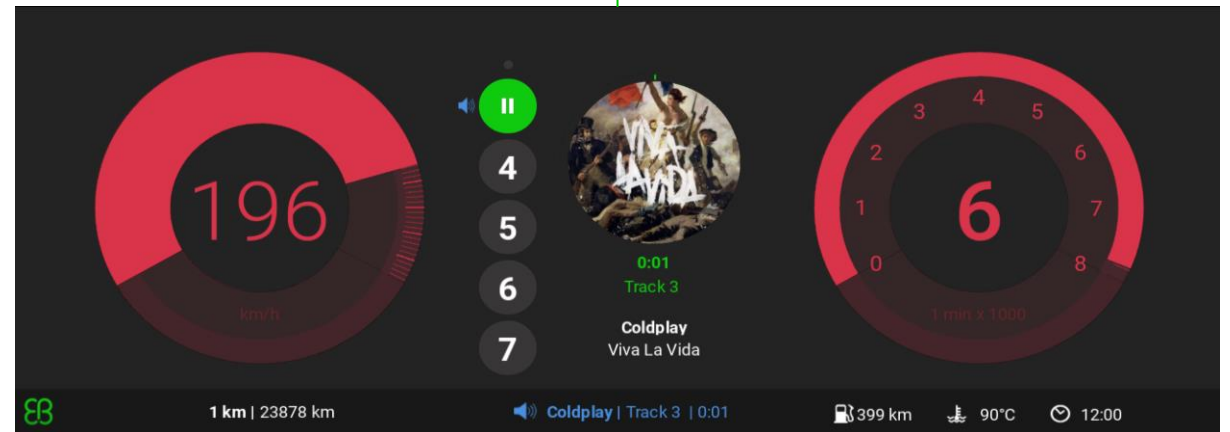
# Detailed Architecture for One Partition



# Reference User Interfaces

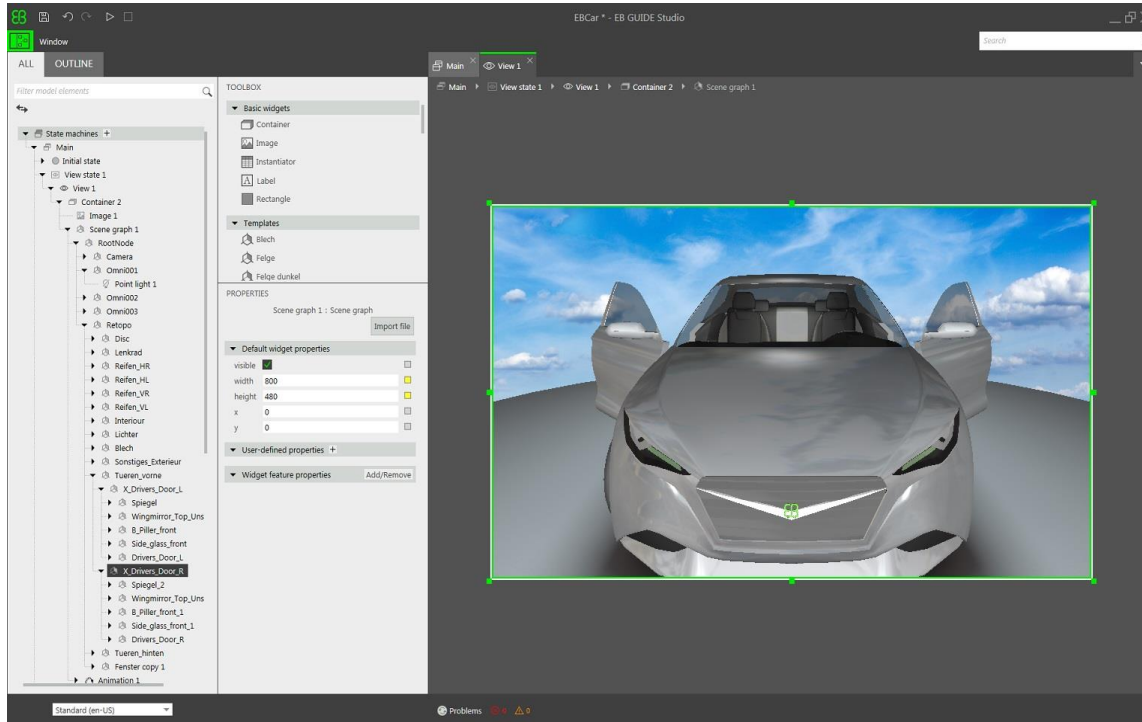


- Holistic HMI
- Supports multiple displays and modalities
- Seamless content synchronization between displays
- Customization



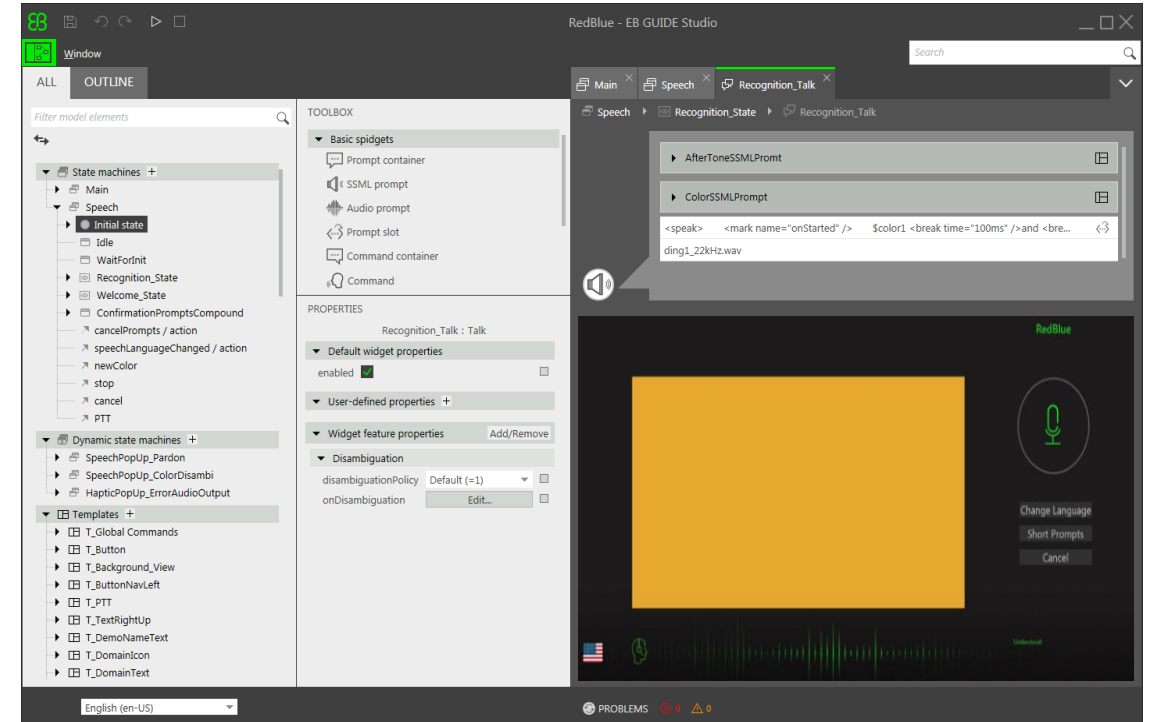


# Multimodal Tool



Graphic user interfaces

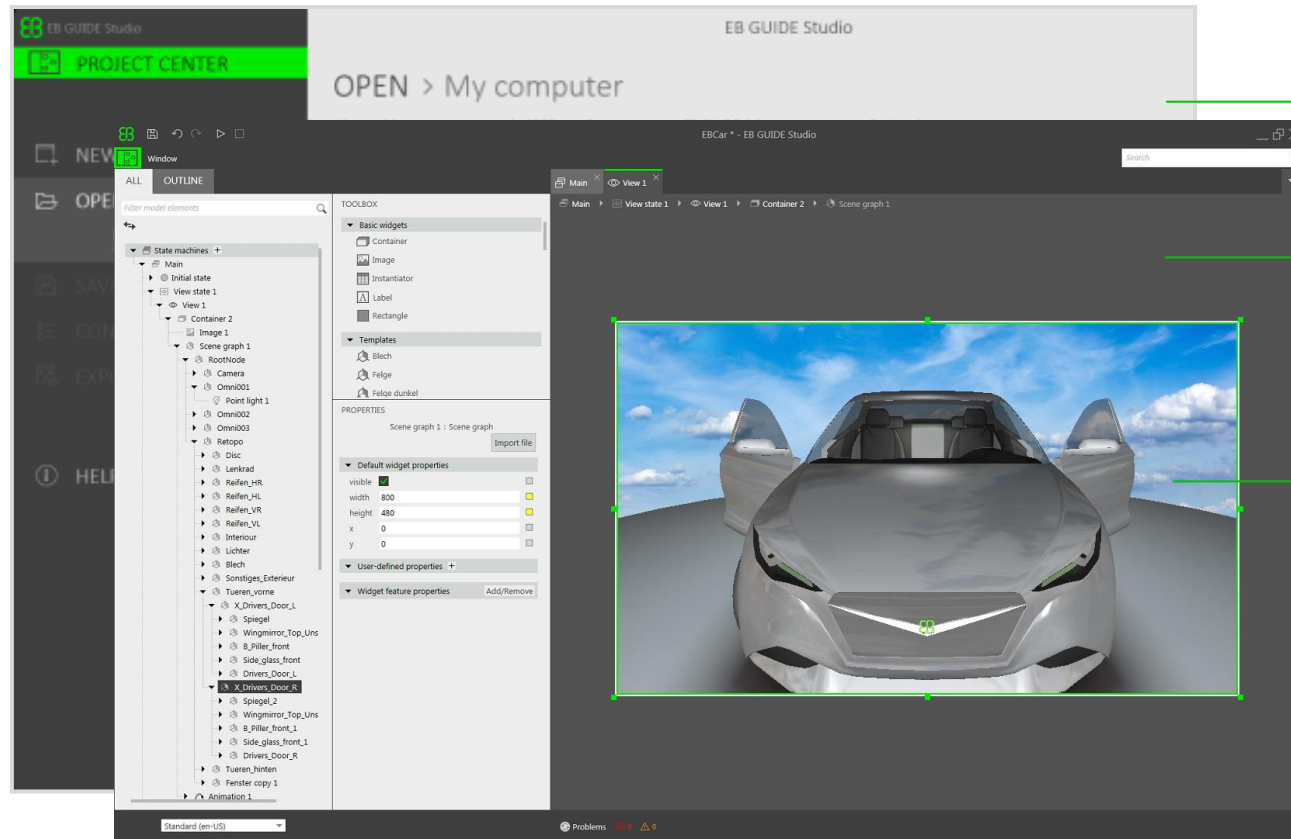
2D | 3D | Composition | Interaction | Animation



Voice user interfaces

Natural Language Understanding (NLU) | Connected Speech Recognition | Hybrid Speech

# EB GUIDE 6



- Multimodal HMI (haptic, touch, speech, gesture) development
- Complex user interfaces
- One tool for cross-team collaboration

- WYSIWYG
- 3D graphics, animations, effects
- Platform agnostic

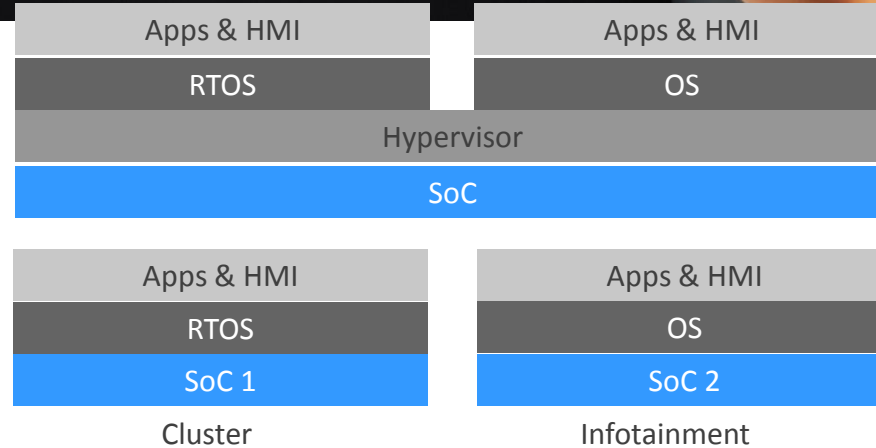


# Multiple Display Support

- Across multiple displays
  - Model user interfaces
  - Synchronize content



- Modeling of modality, resolution, and aspect ratio changes

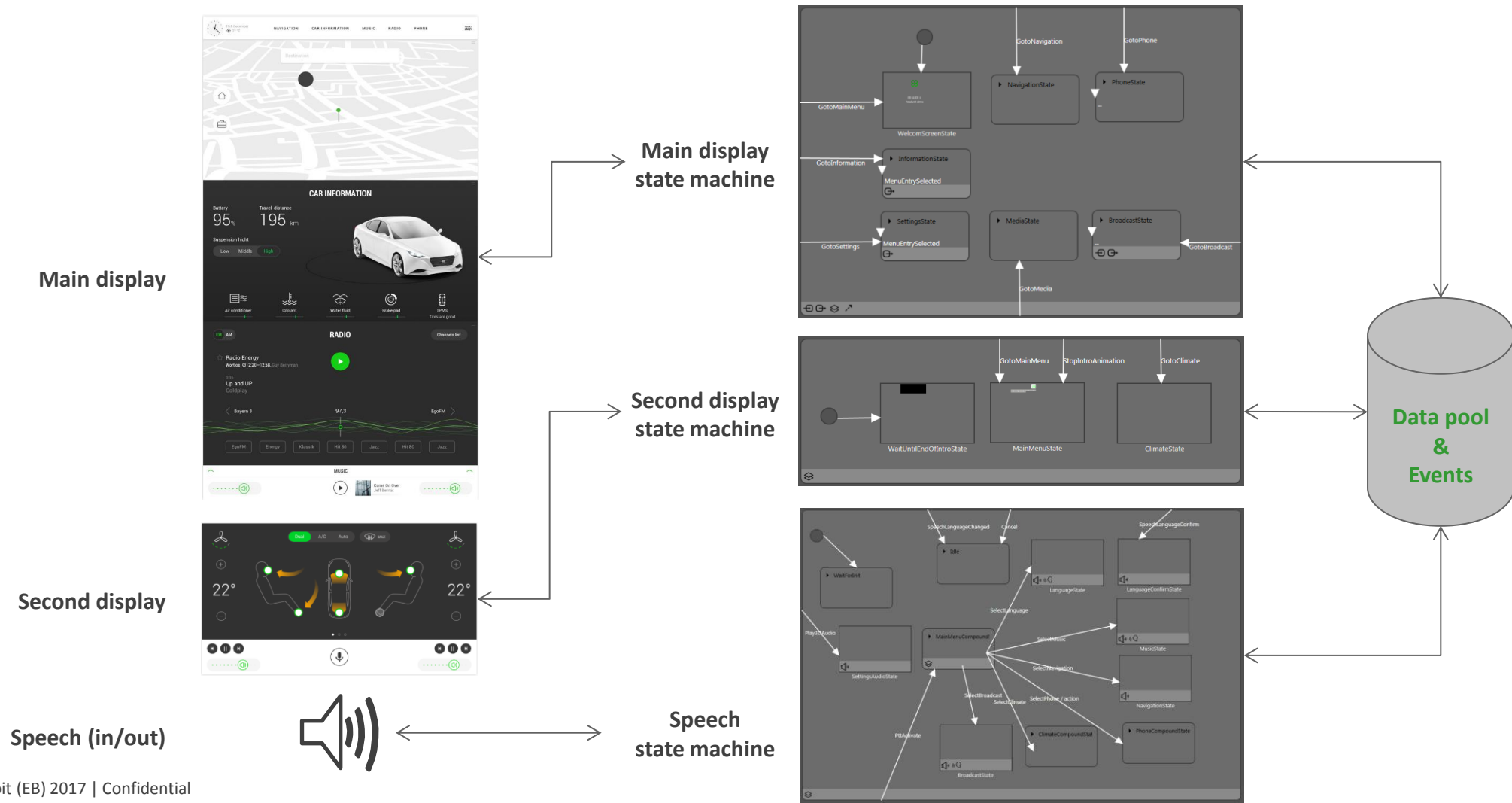


Single SoC

Multi SoC

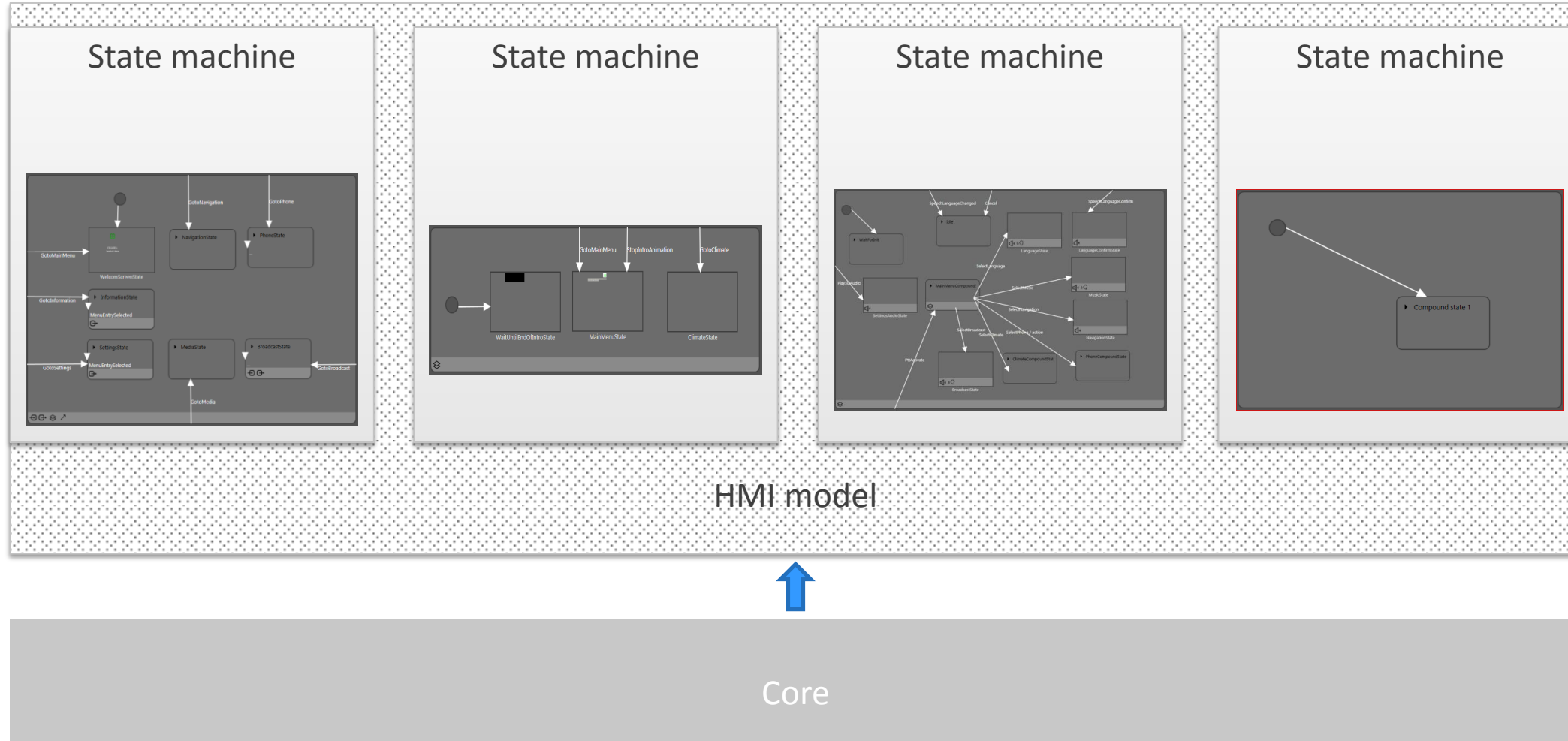
- Single toolchain (EB GUIDE 6)
- Single and distributed multi System on Chip (SoC) solutions

# Today – One GTF instance/process monolithic HMI using a single model

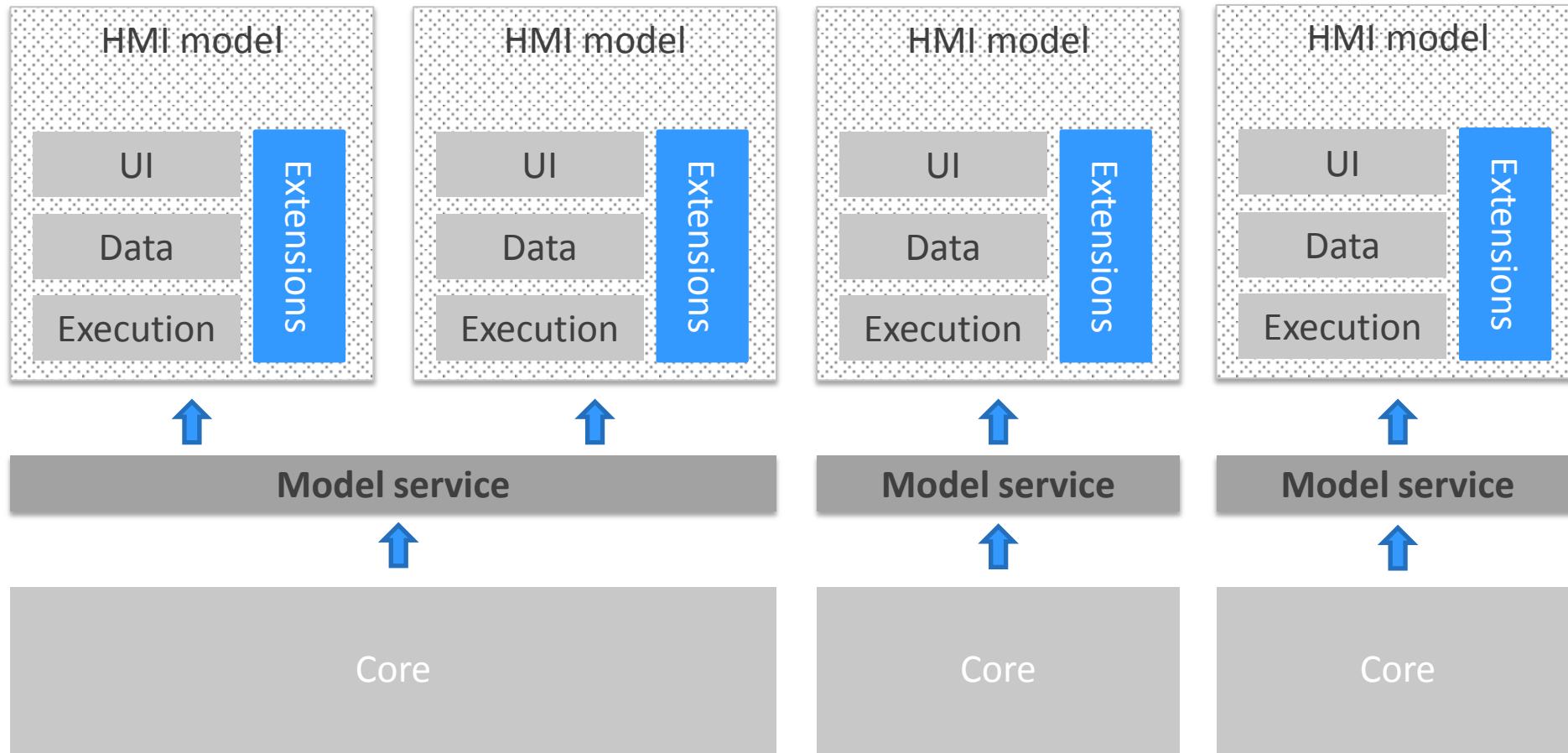




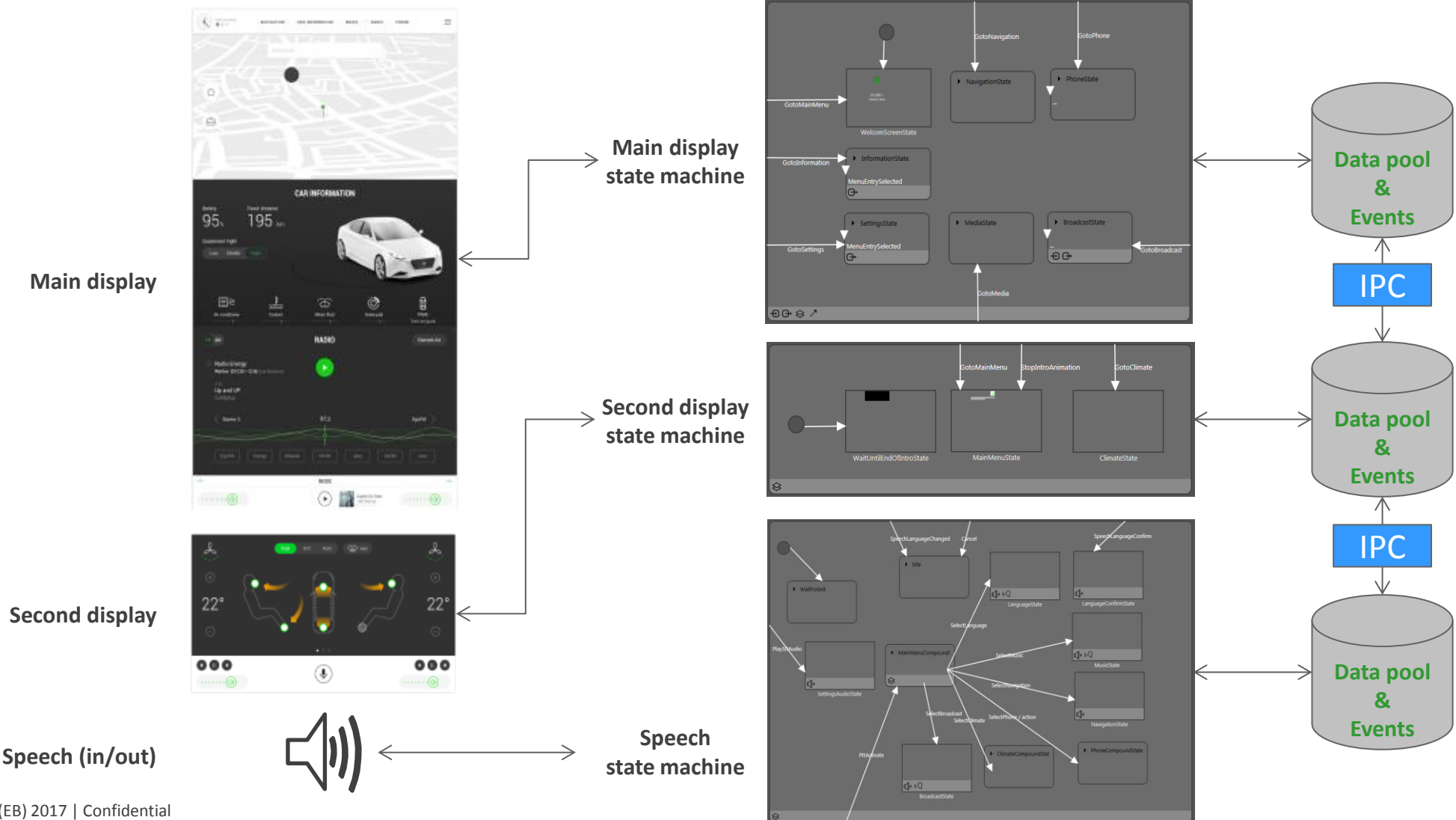
# Today – One GTF instance/process monolithic HMI using a single model



Next step – Multiple GTF instances/process non-monolithic HMI using multiple models

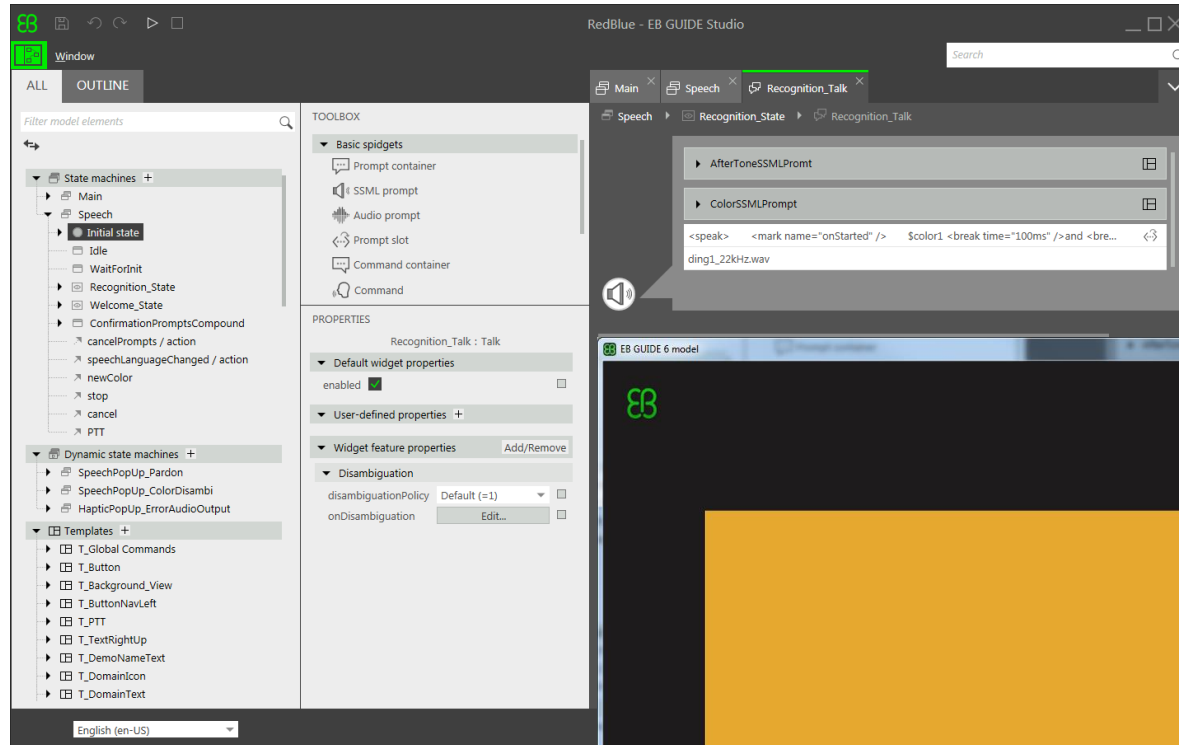


# Goal – Multiple GTF instances/process non-monolithic HMI using multiple models

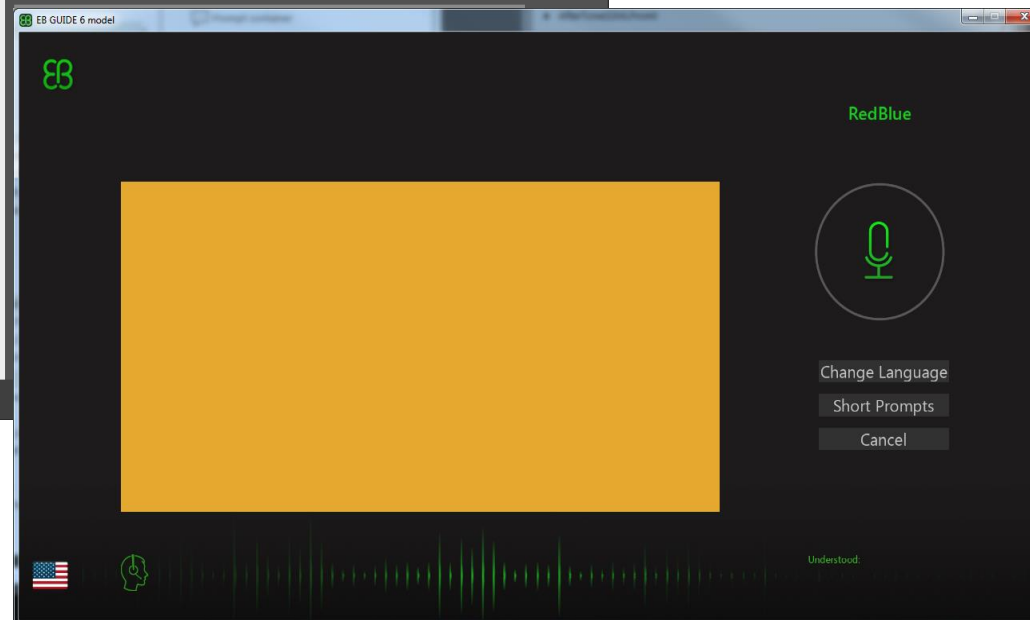




# EB GUIDE 6 Speech Extension



- Single toolchain approach
- Intuitive system responses and interactive dialogues
- Test directly on the tool



- Cloud-based
- Customizable
- Platform agnostic

# Smart Voice Assistant



The personal assistant in the car – the new travel companion | Driver and passenger centric | Navigation | Alerts and updates

# Self-Learning HMI



- Automatically executes non-driving related tasks:
  - Usage-sensitive HMI
  - User-sensitive HMI
  - Context-sensitive HMI
- Minimizes user distraction
- Increases user trust in vehicle



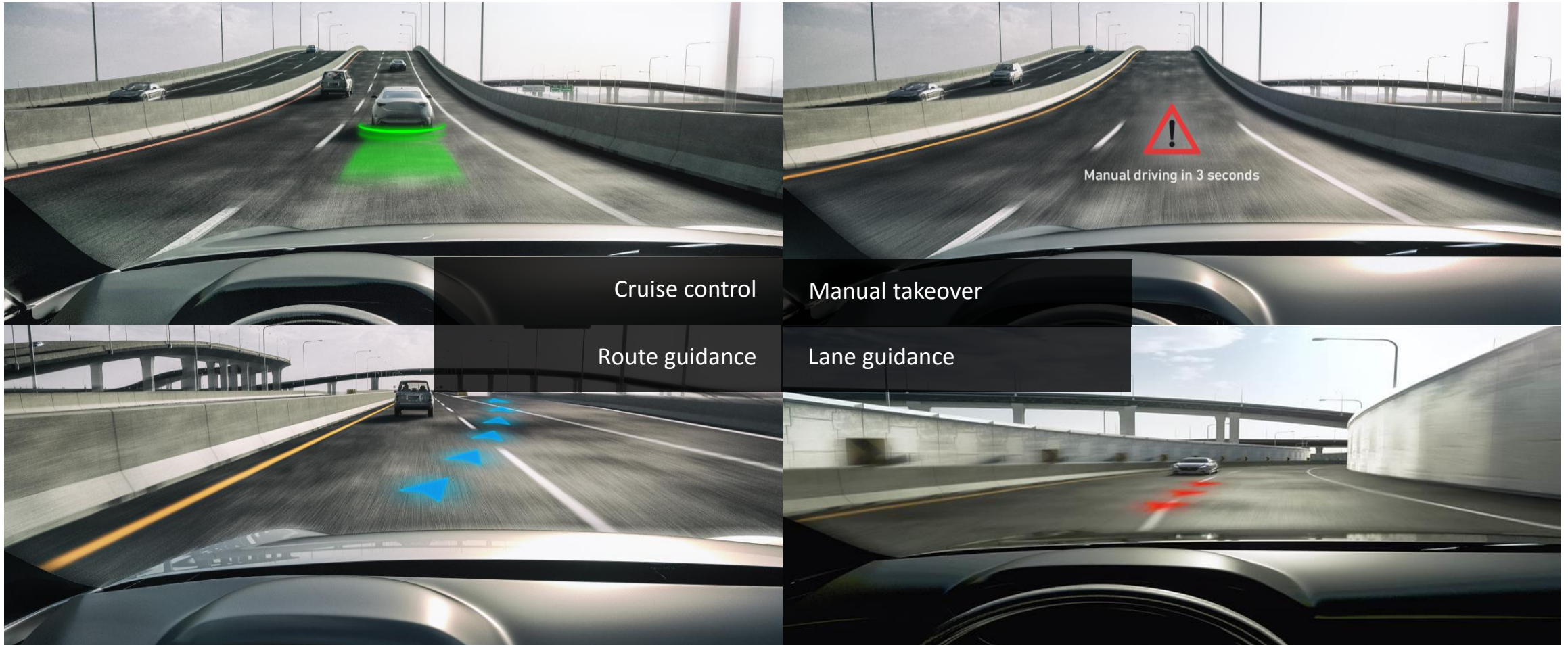
# Predictive Navigation

- Self-learning navigation – frequently used routes and destinations

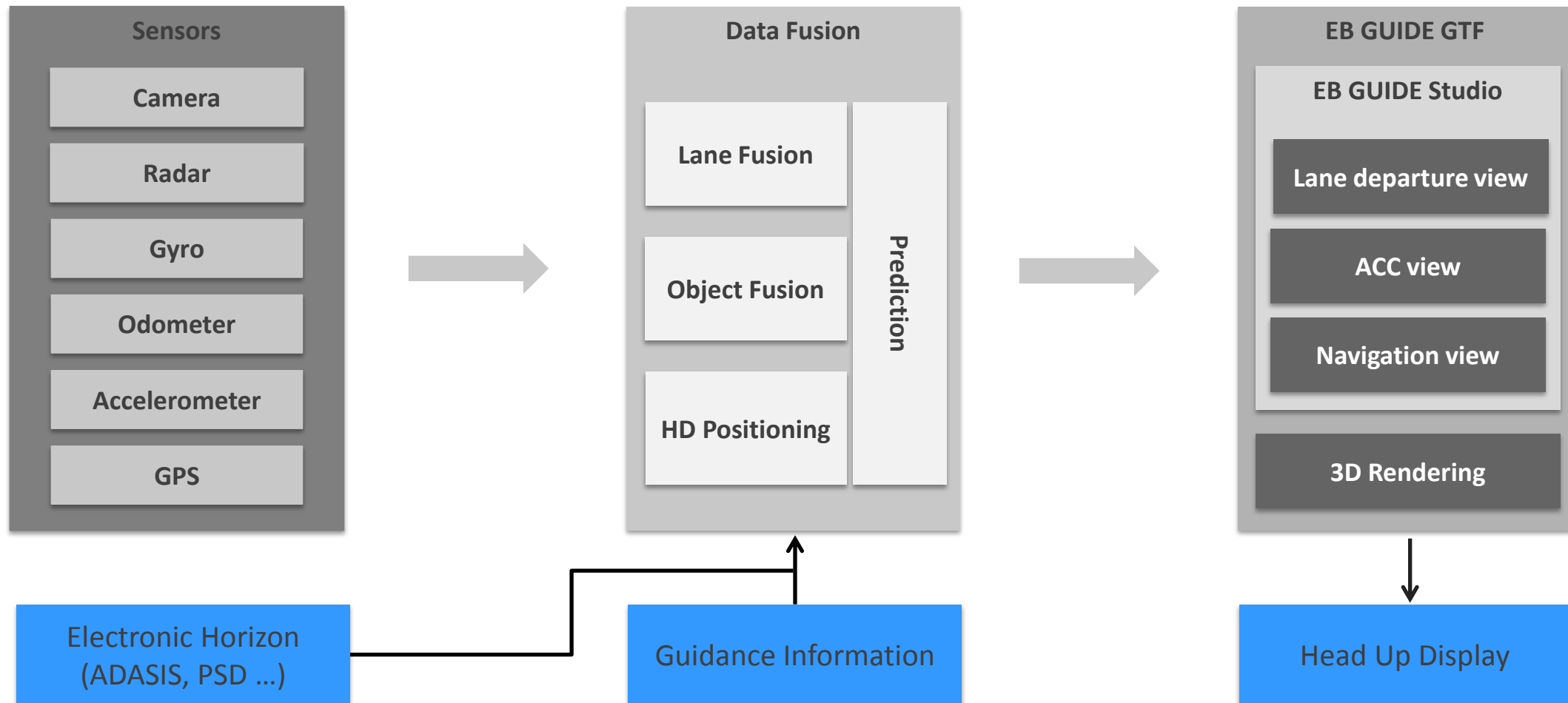


- Real-time guidance and enhanced vehicle control
- Multiple driver profiles, map data providers, data encryption

# Augmented Reality Creator



# Augmented Reality Creator Architecture





# Summary

## From human machine interfaces to human machine relationships



### User experience

- Deliver personalized user experiences with multimodal HMI
- Offer holistic HMI experience and OEM branding



### Intelligent UI

- Learn about user in context
- Adapt to user preferences
- Offer user context-specific information



### Safety and trust

- Minimize user distraction
- Increase user trust in vehicle
- Provide the required functional safety levels

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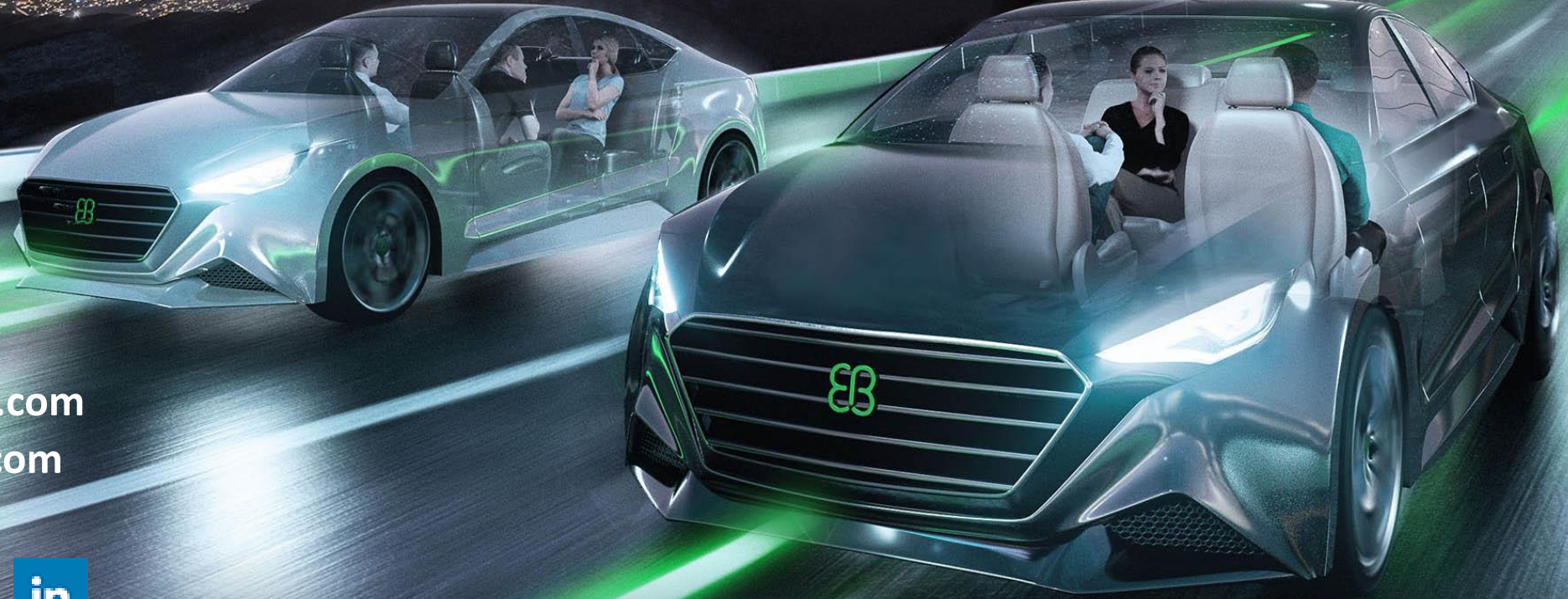




# Get in touch!



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