

# Volvo/Polestar Infotainment System Built on Android Automotive OS

Using an Android Automotive-based platform, Aptiv and Volvo/Polestar collaborated to create a next-generation infotainment system for the OEM's latest electric vehicles, including the Polestar 2 and the Volvo XC40.

## How the process worked

Aptiv and Volvo worked with Google and led the development and integration of Android Automotive OS with the vehicles while gaining early access to Android updates and features. The teams worked intensely together throughout the program, and the nuts-and-bolts development occurred in two-week increments with features constantly modified and improved.

In the course of working with the core Android system, Aptiv developers delivered code changes and suggested enhancements to Google as part of its open source contribution. Those adaptations focused on features such as audio, tuner, power management, diagnostics and others, especially designed to function in a moving vehicle and to integrate with other vehicle systems.

The platform has several layers, starting at the hardware layer with a system-on-a-chip (SoC) and hardware peripherals. On top of that, Aptiv developed hardware abstraction layer (HAL) implementations, vehicle-specific libraries, frameworks and applications. Google provided the Android runtime, Android native libraries, the Android framework and applications.

## QUICKER START, LONGER LIFE

The development process produced several benefits over traditional infotainment system development and extended the system's life in the field:



**FEWER BUG REPORTS AT ANY ONE TIME**



**DESIGN TIME REDUCED FROM 3 YEARS TO 18 MONTHS**



**OPERATIONAL LIFE EXTENDED BY 5+ YEARS**



## CHALLENGE

- Create an infotainment interface that feels as natural as a smartphone
- Ensure that the system works seamlessly with automotive-specific functions
- Provide opportunity to grow an app ecosystem for more innovation



## SOLUTION

- Implement platform based on Android Automotive OS
- Use continuous integration and deployment tools
- Develop code to integrate with other vehicle systems



## RESULTS

- Rapid platform design
- A personalized app ecosystem
- Full life-cycle, over-the-air updates

**API advantage**

Each team brought its own particular skills to the development process. Aptiv's expertise in areas of automotive hardware design and industry regulations helped Google and Volvo define and develop APIs for Android Automotive.

These vehicle APIs, part of Google Automotive Services and the Android Software Development Kit (SDK), allow OEMs to focus on differentiating applications rather than the details of making the functions work.

Aptiv's definitions of the HAL in areas of audio, tuning and power management helped the new system meet "instant-on" requirements. In other words, when a driver turns on the vehicle, critical functions are operational immediately.

**Testing for all conditions**

Aptiv ran a comprehensive battery of tests on the device to ensure it could operate effectively in a vehicle, including tests conducted in extreme temperature conditions – from -40°C to 75°C – and more than 1.5 million tests required by Google for Android devices.

Automating this massive number of tests is essential for enabling continuous improvement and continuous development, as each change is quickly tested and verified.

Aptiv and other stakeholders are working on a model for lifecycle management and maintenance to ensure the longevity of the delivery platform. While Volvo and Aptiv were the first to market with a native Android infotainment platform, other OEMs have since announced plans to follow suit, which signals that the larger application ecosystem is off to a promising start.

**RAPID DELIVERY**



**30%**  
FASTER SPEED TO MARKET  
Compared to traditional development

**COST SAVINGS**



UP-INTEGRATION  
REDUCED COSTS  
BY MORE THAN  
**20%**

**AUTOMATED TESTING**

**1.5 MILLION TESTS**



**-40°C TO 75°C CONDITIONS**

