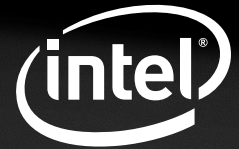


BUSINESS BRIEF

Automotive
In-Vehicle Experiences



Reduce Development Costs with Familiar, Intuitive Android*

Photo courtesy of Volvo

Create amazing in-vehicle experiences and harness a rich ecosystem of apps specially designed for automotive, powered by Android running on an Intel automotive SoC

ESTIMATED SIZE OF IN-VEHICLE
INFOTAINMENT MARKET

\$33.8 BILLION
by 2022¹

13.3%
compound annual growth rate¹



Figure 1. The in-vehicle infotainment market is expected to grow significantly over the next five years

In-vehicle infotainment (IVI) demand

Over the last decade, automakers have learned that digital features sell. Thanks in part to the swift adoption of smartphones, consumers now expect their cars to serve as an extension of their digital lifestyles. High-definition displays should offer touch-screen navigation, climate control, and entertainment, while mobile devices should connect seamlessly to the vehicle's interface.

Consumers are willing to pay for these experiences. The market for IVI is projected to grow to \$33.8 billion by 2022, with a compound annual growth rate of 13.3 percent.¹ However, as more of these features become standard, automakers are looking to differentiate their brands with exciting new offerings—voice recognition, live streaming, and advanced connectivity options.

As the cockpit becomes increasingly complex, automakers and suppliers are looking to simplify the design, deployment, and management of IVI systems. This requires a robust OS and ecosystem of applications that can be easily customized, updated, and supported for many years down the road.

Reduce development time and costs

For most automakers, developing a custom, proprietary OS from the ground up is not worth the investment of time and resources. Furthermore, designing a user interface that is both intuitive and attractive requires significant research and expertise in human-machine interface (HMI) design. Finally, in order to stay competitive, automakers need to get new solutions to market as fast as possible.

Customizable features and ecosystem of apps

Google has extended its Android* OS so that it runs seamlessly in an IVI system. It will also offer a dedicated ecosystem of apps designed for automotive. In addition, Android offers a robust set of resources to help developers customize features quickly and with little up-front cost. Android is familiar to consumers as a platform for their apps and services. It is also flexible: Automakers can design their own HMIs on top of Android that reflect their brand identity while keeping the ease of use for which Android is known.



Figure 2. Intel is the top silicon contributor to the Android® Open Source Project

Optimizing Android for Intel® SoCs

With Android running on an Intel automotive SoC, automakers get optimized processing, the latest software versions, and security features. Intel SoCs range from power efficient to high performance. With one development effort, automakers can scale solutions from premium to volume segments using a single architecture.

Intel's Open Source Technology Center (OTC) has a long history of contributing to the Android Open Source Project (AOSP). Since 2009, Intel has employed thousands of software engineers to ensure that Android delivers top-notch performance, scalability, power efficiency, and security on Intel® platforms. Our OTC works directly with the Android engineering team to optimize its OS and upstream our contributions. In fact, Intel is the leading silicon contributor to the Android software stack, upstreaming more than 75,000 patches to the AOSP as of May 2018. Intel architects continue to collaborate with Google on feature development, debugging, and real-world testing for Android.

With an Intel platform, automakers can trust that they will receive the latest release of the Android OS. We work jointly with Google on prerelease code to have board support packages customer-ready nearly concurrently with each new Android release. Android builds usually require zero changes to the AOSP for Intel features and functions, meaning minimal effort for automakers and suppliers to adjust the baseline for newer Android versions.

Intel works closely with Google to ensure Android is secure on all devices, including vehicles. Hardened security features, such as the root of trust through hardware back-key stores, are employed, requiring drivers to authenticate themselves when they start the car. Additionally, Intel® security technologies in the vehicle enable over-the-air software updates, providing a secure and cost-effective way to deliver patches and ongoing support.



1. "In-Car Infotainment Market by Type," Allied Market Research, April 2016, alliedmarketresearch.com/in-car-infotainment-market.

Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer to learn more at intel.com.

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*Other names and brands may be claimed as the property of others.

Power-efficient, scalable compute

The Intel Atom® A3900 automotive processor series offers market-leading support for Android. It features several key technologies that enable the most intuitive HMI designs and best in-vehicle experiences.

Intel Atom automotive SoCs are power efficient and offer the substantial compute needed to support IVI, digital instrument clusters, and advanced driver assistance systems (ADAS). Because these SoCs are highly scalable, they can accommodate a wide variety of designs, while offering impressive graphics capabilities and hardened security features. They include Intel® Virtualization Technology, which enables the consolidation of IVI, clusters, and ADAS, supporting multiple leading hypervisors to help ensure key functional-safety features get priority access to the processor.

Together, Intel and Android deliver an industry-leading solution for IVI that positions automakers and suppliers to compete in a demanding and rapidly evolving market.

Intel® technology foundation

- Intel Atom® automotive SoCs
- Intel® Virtualization Technology

Where to get more information

For more information about Intel-powered in-vehicle experiences, please visit intel.com/automotive.