

## SOLUTION BRIEF

Intel® Atom™ Automotive Processors  
for In-Vehicle Experiences  
Connected Vehicles



# Connected and Immersive Vehicle Systems Go from Development to Production Faster

The next generation of Intel® Atom™ automotive processors power in-vehicle experiences and speed the deployment of smart and connected features for the next generation of automobiles.

**INTEL OFFERS ONE FLEXIBLE ARCHITECTURE THAT LOWERS THE COST AND COMPLEXITY OF DEPLOYING SMART AND CONNECTED CAR TECHNOLOGIES ACROSS FLEETS AND BRANDS.**

### Redefining In-Vehicle Experiences

As drivers expect more and more connectivity in the car, automakers and suppliers must differentiate their offerings by creating immersive digital experiences that stand out in a crowded market. The latest Intel® Atom™ automotive processors for in-vehicle experiences make designing and incorporating digital and connected features simpler, more powerful, and more cost effective, enabling automakers to maximize profit margins while delivering on market demands.

These processors can power in-vehicle infotainment (IVI), digital instrument clusters, and advanced driver assistance systems (ADAS). With substantial compute in a low-power package, impressive graphics capabilities, and security features—all based on scalable Intel® architecture—these processors allow automakers and suppliers to get cross-fleet solutions to market faster, with lower costs.

### Digital Features in Demand

The demand for IVI, navigation, rear-seat entertainment, and other connected car features is surging, though each new feature adds cost and complexity to the design and manufacturing process. As immersive connected features become a mandatory investment for a wider range of vehicle models, it's critical for automakers and suppliers to manage costs for current and future implementations.

### Enabling the Software-Defined Vehicle

Intel is converging its expertise in devices, connectivity, and the cloud to build a new class of smart and connected solutions for transportation. The new Intel Atom automotive processors deliver a flexible architecture for a wide range of connected vehicle features. With a cost-effective, scalable platform for the software-defined vehicle, automakers and suppliers can increase profit margins for vehicles today, as well as for future models.

#### More compute in a compact, low-power package

The latest Intel Atom system-on-a-chip (SoC) offers visually stunning graphics and Intel® Time Coordinated Computing Technology (Intel® TCC Technology), which makes more demanding and real-time applications possible. Enhanced hardware-level security protects data and vehicle operations.

#### One flexible, scalable architecture

Utilizing Intel® processors allows for the consolidation of IVI, digital instrument clusters, and ADAS features to one platform, which can then be scaled across a range of SKUs. Flexible architecture and sophisticated virtualization deliver the performance headroom to combine and scale these systems.

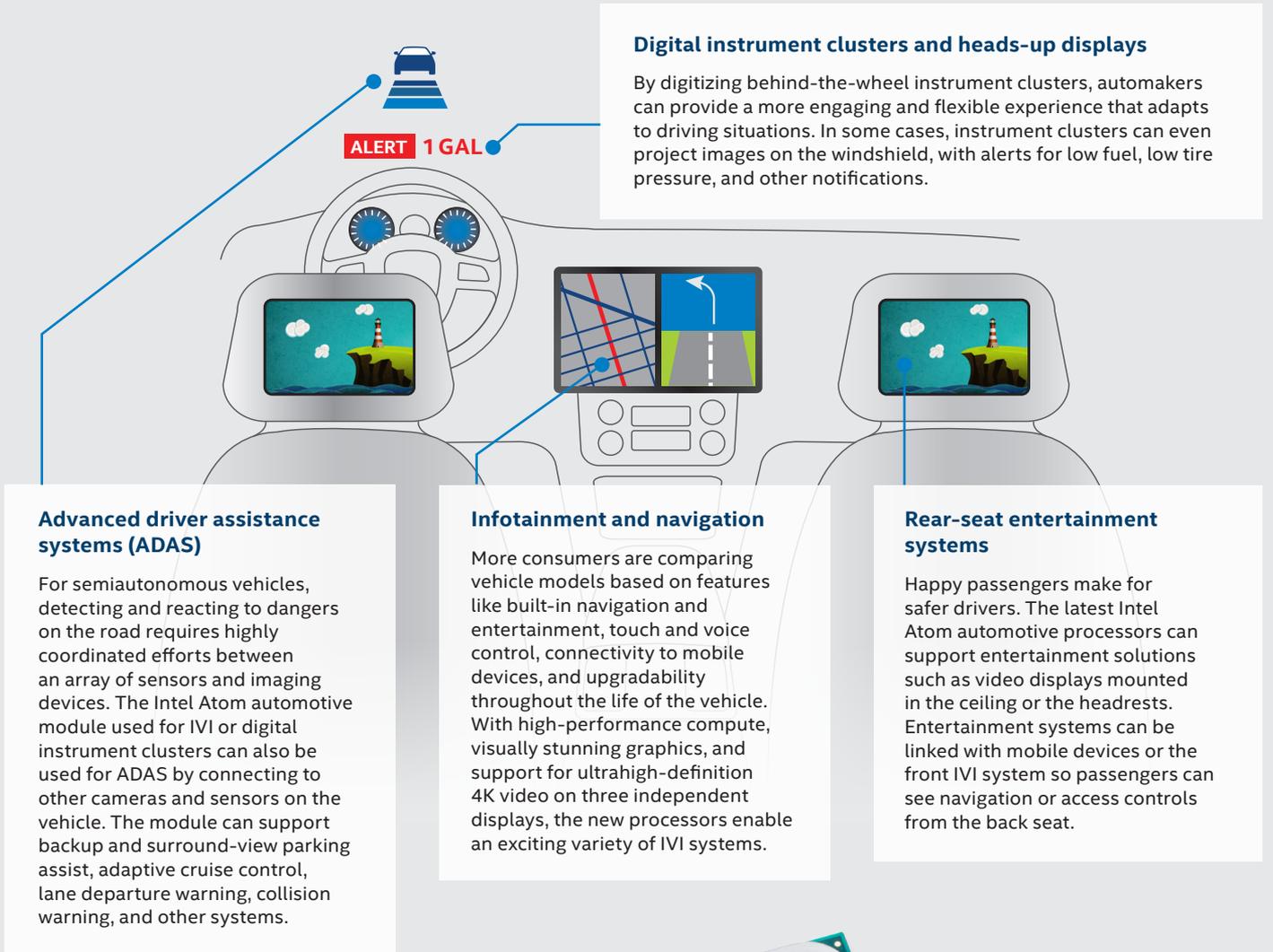
### Lower development costs and complexity

Automakers and suppliers can dramatically reduce time to market, complexity, and development by leveraging Intel's offering of automotive-qualified core components.

In addition, Intel's industry-leading software tools, operating system (OS) support, and development platform help solutions get to market faster.

## A REVOLUTION IN DRIVING

Today's drivers expect more from their in-vehicle experiences. The new Intel Atom automotive processors power a wide range of new, exciting experiences, such as next-generation navigation systems, heads-up displays, and ADAS technologies like surround-view parking assist.



### Scalable Platform with Hardware-Level Security

The new Intel Atom automotive processors enable automakers and suppliers to build in-vehicle experience (IVE) solutions with Intel's enhanced security features and a scalable architecture with interchangeable platforms that they can use for many model years to come.



Intel® Atom™ automotive processors for in-vehicle experiences

## Intel Atom SoC

A key offering of this new generation of Intel processor, the latest Intel Atom SoC achieves new levels of image and video processing power in a compact form factor, supporting critical real-time video analytics in smart and connected vehicles. It integrates numerous specialized processors, including an energy-efficient quad-core CPU, a powerful GPU, and dedicated audio, video, and image processors. It also delivers the ability to handle more sensors and tasks.

Built into a compact flip chip ball grid array (FCBGA) and featuring Intel® 14 nm silicon technology, the Intel Atom SoC offers a new graphics engine that doubles the image processing vectors, greatly expanding its video capabilities. It includes the game-changing time coordinated computing (TCC), which coordinates and synchronizes peripherals and networks of connected devices, achieving improved determinism and resolving latency issues.

## Scalable, heterogeneous architecture

Developers can save time and resources by optimizing apps once, including graphics and video, and then deploying across SKUs, from mid-range to premium vehicle models. Heterogeneous architecture means workloads can run in the vehicle or in the cloud and on a range of platforms, from Intel Atom to Intel® Xeon® processor-based systems and servers.

## Sophisticated virtualization

Intel® Virtualization Technology for Directed I/O (Intel® VT for Directed I/O) provides hardware support for isolating and restricting device access and I/O device assignment. This ensures key safety functions get priority in terms of access to the processor, driving the consolidation of IVI and instrument clusters.

## Integrated, validated components

These new processors are also available as an automotive compute module featuring integrated power management and memory. Automotive-qualified modules meet the Automotive Electronics Council AEC-Q100 standard for stress test qualification for integrated circuits, with SKUs that offer a -40°C to 110°C temperature rating and a seven-year lifetime for industrial applications. The module is prevalidated with Intel's automotive software tools and multiple OSs, so suppliers can build simpler printed circuit board (PCB) solutions.

## Powerful processing and graphics

The new Intel Atom automotive processors deliver excellent memory speeds and bandwidth (up to LPDDR4 2400 and 38.4 GB/s) in a compact, low-power package. They offer fast graphics and HD video for media-centric applications, with support for 4K video at 60 Hz.

## Developer Tools for Intel® Atom™ Automotive Processors for In-Vehicle Experiences

To speed and simplify development, Intel and its partners provide a comprehensive set of developer tools and third-party OS support, including:

- The Intel® C++ Compiler, Intel® VTune™ Amplifier for Systems, and Intel® Graphics Performance Analyzer
- Reference stacks, including an IVI middleware and automotive boot loader
- Reference OS support for Linux\*, Android\* Auto, Green Hill, QNX, and Wind River Helix\* Cockpit
- Hypervisors for multi-OS systems from QNX, Green Hill, and Mentor Graphics
- Performance-tuning tools for the Intel®-based CPU and GPU and complete hardware development vehicles

## Enhanced hardware-level security

With advanced protection at the hardware level, these processors can help reduce vulnerabilities. They feature an integrated converged security engine, a dedicated security coprocessor that dynamically adapts the security level to function criticality. They also offer secure boot and fast cryptographic execution with Intel® AES New Instructions (Intel® AES-NI).

## Powering the Car of the Future

Smart and connected driving will change lives and societies for the better. By combining Intel's expertise in technology with ingenuity in the automotive industry, a new vision for transportation is coming to light. With smart, secure technology from door lock to data center, Intel is building solutions that not only help transportation providers meet today's demands, but also prepare for the amazing future of transportation and autonomy.

## Learn More

To learn more about Intel® IoT technologies for automotive, visit [intel.com/automotive](http://intel.com/automotive).



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, or learn more at [intel.com](http://intel.com).

Software and workloads used in performance tests may have been optimized for performance only on Intel® microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations, and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information go to [intel.com/performance](http://intel.com/performance).

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