

Explore connected cars

Discover the features and benefits of connected cars and learn how they're accelerating innovation across industries.

[Learn more](#)



and benefits

Safety and security

Entertainment

Smart cities

Sustainability

Automotive industry

FAQ

READ TIME

15 minutes

What is a connected car?

A connected car is a vehicle equipped with internet access and sensors that allow it to communicate with other devices, services, and networks. This connectivity enhances navigation, safety, entertainment, and vehicle diagnostics for a smarter and safer driving experience.

Key takeaways

- Connected cars use technologies like vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication to improve safety, convenience, and efficiency.
- Connected cars help shape smart cities by linking to city infrastructure. They reduce traffic, enhance safety, and provide real-time navigation for smarter mobility solutions.
- Connected vehicle technology supports sustainability by enabling electric and fuel-efficient driving. It helps reduce carbon emissions and extends vehicle lifespans through predictive maintenance.
- Features like in-vehicle wireless networks, streaming services, and voice controls improve the driving experience. Connected cars are becoming essential in modern transportation, meeting consumer demand for convenience and innovation.

Definition

What are connected cars?

Like smart devices, connected cars—also called automated vehicles or connected autonomous vehicles (CAVs)—are connected to the internet, which enables remote communications between the vehicle as a system and an external environment. The rise of connected mobile experiences, paired with advancements in technologies like edge computing and the Internet of Things (IoT), has fueled their growing popularity.

The automotive industry has undergone tremendous changes in recent years. In particular, the development of autonomous vehicles and connective technology has been disruptive. Still considered emerging technologies, these disruptions point to the future of auto innovation. Experts believe connected cars will soon be able to interact with one another and share data at scale—making our lives easier, improving transportation, and helping to make roads safer.

Technology

How connected cars work

Communication

Automated vehicles belong to the Internet of Things (IoT), a network of physical devices that collect and transmit data through the internet. These cars are enabled with vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) technology, which means automated vehicles can “see” and communicate wirelessly in an omnichannel (i.e., all-directional) manner with other smart devices. Whether another connected car or device is in view or out of sight, IoT cars are aware of them thanks to these all-directional, [wireless communication capabilities](#). This means drivers not only have access to convenient in-vehicle automations, but they can also receive important, real-time notifications about things like:

- Traffic and intersection alerts.
- Nearby vehicle speed and movement information.
- Construction or school zone warnings.

eSIMS and 5G technology

Autonomous vehicle communication wouldn't be possible without SIM technology, which identifies a device's owner and communicates with cellular networks. Embedded SIMs (eSIMs) also act as a connectivity hub, but unlike SIMs, they can be updated remotely and do not have to be physically changed to work with different cellular carriers, making them a popular choice for automated vehicles. From consumer to fleet vehicles and beyond, eSIMs have the potential to improve IoT applications and accelerate vehicle innovation due to their flexibility, reliability, small size, and ease-of-use. Other reasons eSIM technology is a great opportunity for automated vehicles include:

- **Global adaptability**—eSIMs simplify auto manufacturing and logistics while reducing costs thanks to universal connectivity standardization.
- **Security**—eSIMs provide a layer of security to help prevent hackers from accessing IoT cars.
- **5G networks**—The growth of 5G—especially when combined with eSIM technology—means we can expect to see a lot more connected cars on the roads in coming years.

Edge computing

Edge computing, which allows data to be processed in real time and reduces latency, plays a crucial role in the future of connected vehicles. With autonomous vehicles generating massive amounts of data—often in gigabytes—edge computing enables faster decision-making by processing information closer to where it is generated, rather than relying on distant cloud servers. This real-time processing enhances the efficiency and safety of connected vehicles, allowing them to respond more quickly to their environment.

However, the large volumes of data generated by these vehicles also present a challenge. For original equipment manufacturers (OEMs) and mobility companies, this data can be both a hurdle and an opportunity. By utilizing the data generated by connected vehicles, they can enhance products, improve safety, and deliver better value and experiences to customers.

Features and benefits

Enhanced connectivity and convenience

Having connected capabilities presents a number of attractive options for consumers. [Connected vehicle technology](#) can:

- Deliver continuous improvements and feature enhancements through remote, over-the-air (OTA) updates.
- Interact with mobile applications.
- Provide drivers and passengers with wireless network access.
- Offer drivers and passengers cloud-based entertainment, streaming services, voice-activated personal assistance, and integrated communication and productivity tools.
- Enable vehicle diagnostics and remote-control functions using smartphones or other devices.

These features offer a wide range of benefits for autonomous car owners, including:

- Increased lifetime value of vehicle.
 - Increased efficiency.
 - Improved driver and passenger safety, comfort, and convenience.
 - Overall [improved mobility](#), such as accelerated travel times and reduced delays.
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Safety and security

Connected car security

Even with numerous benefits and features, cybersecurity threats and vulnerabilities are still a concern for many would-be connected car buyers. Auto manufacturers have taken great strides to ensure that connected and autonomous vehicles are protected from data breaches and malware. Some of these security features include:

- Data encryption to prevent hackers from accessing your vehicle.
- Firmware and software updates that keep your automated car functionality up to date.
- Patches for potential software problems or threats.

Because [connected and autonomous vehicle](#) manufacturers work with a variety of third-party vendors, complications can arise on both the software and hardware fronts. To ensure connected vehicle optimization and safety, automakers must take an integrated approach to vehicle manufacturing, security, and support over the life of the vehicle. They can achieve this by:

- Regularly sending and analyzing data to improve mobility experiences.
- Integrating segmented internal systems that seamlessly and efficiently “talk” to one another, provide more sophisticated functionality, and reduce security blind spots.
- Focusing on data security, safety, and technology integration to address the complexity of modern connected vehicles.

Entertainment

Entertainment for connected cars

Automated vehicle infotainment

For many consumers, in-vehicle entertainment or “infotainment” systems are some of the most appealing aspects of connected cars. Like the many features and functionality provided by your smartphone, in-vehicle infotainment provides a [smart, connected experience](#).

Connected cars can perform many of the same functions as your smartphone. Inside a connected vehicle, you might find:

- Customized user experiences and settings based on preferences linked to biometric profiles—for example, the car recognizes the driver via facial recognition technology.
- In-vehicle voice assistants with a wide range of command capabilities, from turning down your volume to creating appointment reminders.
- Rear seat entertainment and WiFi connectivity.
- Streaming services.
- In-car gaming for passengers.
- Gesture recognition that enables drivers to interact with and control their vehicles through hand motions rather than touching buttons or screens, which requires them to take their eyes off the road.

These advanced features are possible thanks to eSIMs, wireless networks, and 5G networks as well as [emerging mobility](#) technologies like proximity sensors and conversational AI. The automated connected vehicles of the future will not only make transportation safer and more efficient, but more entertaining and enjoyable as well.

Smart cities

Connected cars and smart cities

The rise of smart cities

Urban centers across the world are embracing advanced smart technologies—investing in AI, cloud computing, IoT, and other digital solutions—as they work to pursue smart city initiatives. But what’s driving this global trend?

As urban populations grow, cities face greater demands and increasingly complex challenges. In a digital-first world, residents and businesses expect fast, user-friendly services and real-time access to information. City managers and administrators are under pressure to deliver these services efficiently while maintaining safety, supporting economic growth, and ensuring critical infrastructure—such as water, electricity, roadways, traffic systems, and public transportation—operates seamlessly.

To meet these evolving needs, cities are accelerating their digital transformation. Smart cities are emerging as the most desirable places to live and work, offering connected, secure, and reliable services powered by advanced technologies. Among these innovations, autonomous vehicles (AVs) play a key role in shaping smarter, safer, and more sustainable transportation systems.

Improved safety and efficiency

Connected cars offer a range of benefits for car owners and commuters, with the potential to greatly enhance overall mobility experiences. Autonomous vehicles (AVs) in particular can reduce traffic congestion, accidents, and improve road safety by addressing

human-factor risks that lead to vehicle accidents. As a result, insurance premiums may go down, emergency rooms could see less vehicle-related injuries, and law enforcement efforts could be redirected from traffic enforcement to other departments. How is all this possible? With the help of smart cities.

[Smart cities use connected networks](#) and cloud technologies to create sophisticated infrastructure that interacts with AVs. For example, smart city technology can communicate with AV sensors, sending traffic data and navigation information that helps drivers make better decisions. Not only can smart cities help facilitate the flow of traffic and reduce congestion, but they can also alert drivers to potential hazards and even objects and pedestrians in the surrounding environment.

While the development of smart cities is not wholly focused on traffic issues and AVs, the emergence of connected cars and the need for improved mobility play a significant role in shaping the future of smart cities. Together, smart cities and AVs can transform our lives through improved road safety for drivers and pedestrians alike, increase transportation efficiency, and bolster environmental sustainability efforts.

Sustainability

Contributions to sustainability

For many consumers, efforts to reduce carbon emissions and promote [environmental sustainability](#) are more appealing than in-vehicle entertainment.

Connected vehicle technology provides drivers with real-time data and information about how their driving habits affect the environment, ultimately helping them make more sustainable choices. Best of all, you don't have to sacrifice mobility or luxury driving experiences to make these kinds of decisions. For instance, modern innovation means connected cars can be at least partially electric, emitting less emissions and consuming less fuel—if any at all.

Not only that, but predictive maintenance helps connected car owners stay on top of servicing their vehicles, which keeps them running efficiently and extends the car's lifecycle. Thanks to connected vehicle technology, the planet will see less automotive waste and environmental pollution.

Automotive industry

The future of connected vehicles

Progress on the auto innovation front is rapidly evolving, and experts agree that in just a few years, over half of the cars on the road will be connected vehicles. Initially, the desire for basic in-vehicle entertainment systems and simple computerized controls—such as hands-free calling—drove demand for connected cars. However, on-the-go connectivity and smart features are quickly becoming a consumer requirement.

By helping accelerate the transformation of automakers from traditional manufacturers to mobility services providers, cloud solutions like those offered by [Microsoft industry](#) are central to innovation in automotive, mobility and transportation industries. Continued advances in wireless connectivity, artificial intelligence, and real-time data processing will bring even more opportunities for connected and autonomous cars to make our roads safer, our commutes more efficient, and our planet healthier.

01/

What are connected and automated vehicles?



Like smart devices, connected and automated vehicles are connected to the internet, so they can be controlled remotely as well as communicate with other connected devices. Autonomous vehicles can provide assisted driving services, alert drivers to potential hazards or route delays, help prevent speeding and automobile accidents, and even alert emergency services should a collision occur.

02/

What's the difference between connected cars and autonomous vehicles?



The terms “connected cars” and “autonomous vehicles” are often used interchangeably, but there are minor differences between the two. The technology behind connected cars is steadily evolving to become more automated, but drivers still have ultimate control.

In autonomous vehicles—also known as driverless cars—everyone inside the vehicle is considered a passenger. Autonomous vehicles provide various degrees of self-driving capabilities and can provide additional functionalities—like Advanced Driver Assistance Systems (ADAS)—which could include brake-by-wire, adaptive cruise control, lane-keeping technology, and automated emergency braking.

03/

What is advanced vehicle technology?



Advanced vehicle technology provides drivers with real-time data and information about their driving habits, traffic conditions, potential road hazards, car maintenance needs, and more. Additionally, connected vehicle technology enables drivers to utilize a variety of wireless, in-vehicle features such as voice commands, streaming entertainment, and assisted driving. Sensors, software, and hardware work together to make these operations possible and enable autonomous vehicles to operate efficiently and effectively.

04/

What are the five levels of autonomous vehicles?



The five levels of autonomous vehicles, or autonomous driving, are a set of standards maintained by SAE International and include:

Level 1—driver assistance. This level provides simple automation that helps the human driver. Cruise control is an example of Level 1 driver assistance.

Level 2—partial automation. At this level, the human driver is still responsible for monitoring tasks, but the car can perform automations like steering and acceleration.

Level 3—conditional automation. With conditional automation, an autonomous vehicle can detect its surrounding environment and operate mostly on its own, but a human driver is still needed.

Level 4—high automation. At Level 4, while a human can override operations, the autonomous vehicle is capable of operating completely on its own in certain scenarios, but geofencing is required.

Level 5—full automation. When an autonomous vehicle is fully automated, it can perform all driving tasks on its own and in all circumstances and environments. No human interaction is required at Level 5.

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