Connected Living

Emerging Trends & Market Predictions

Driving the IoT and creating value

The evolution of the Connected Car

"Today" : ~2013 - 2015

Smart device integration & Infotainment applications

Near-Term : ~2015 - 2020

Internet/WLAN access; Partial Autonomous Vehicles; Partial Vehicle-to-Vehicle (V2V) & Vehicle-to-Infrastructure (V2I) connectivity

Longer-Term : ~2020 and on

Ubiquitous V2V & V2I connectivity; Fully Autonomous Vehicles

Sample Feature Set

Connected	Smart	Automated
• System and automobile diagnostics	• WLAN hotspot	• Ubiquitous V2V & V2I communications
• Navigation	• Vehicle condition and service reminders	– Cooperative intersection safety
• Smart device connectivity	• Optimized fuel consumption	– Cooperative adaptive cruise control
• Roadside assistance (e.g. OnStar)	• Fatigue detection	– Dynamic mobility applications
• Voice command/hands free control	• V2V & V2I	– Etc.
• Etc.	– Collision protection	• Driverless vehicle
	– Heavy traffic or parking auto-pilot	
	– Other	

We are here

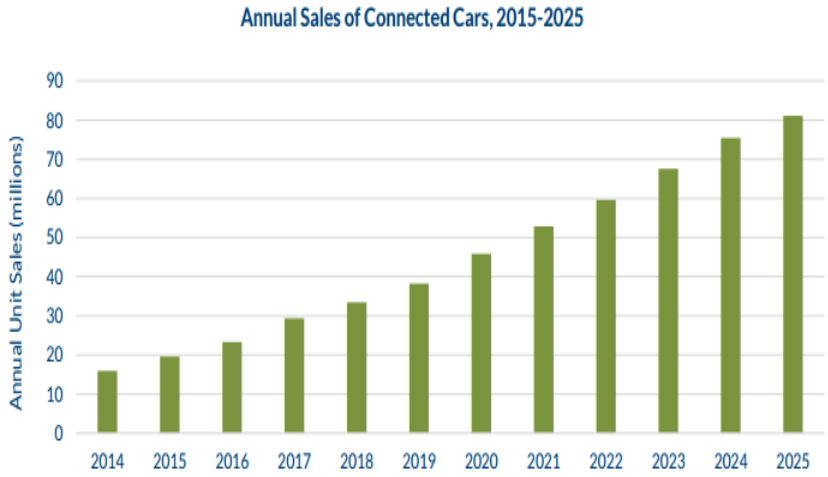
Source: Industry interviews, market research

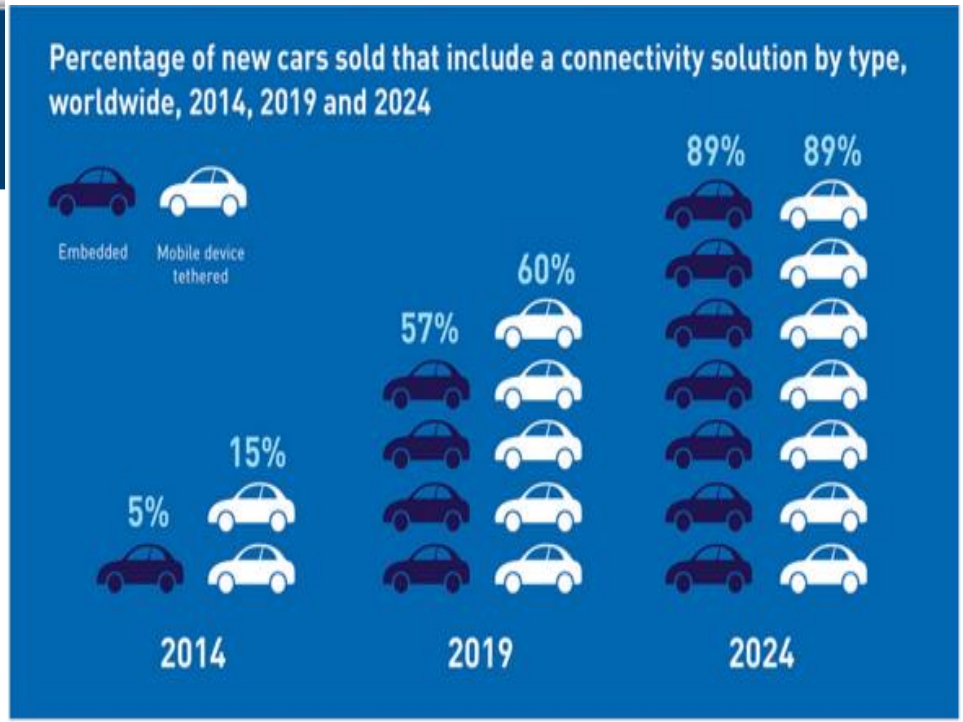
Key Overview + Analyst Predictions

- **Connected Cars/Connected Travel** = “major element” of IoT. Some predictions place with one in five vehicles having a wireless network connection by 2020, accounting for more than 25% of a billion cars on roads globally
- **New concepts of mobility and vehicle usage** will lead to new business models and expansion of alternatives to car ownership, especially in urban environments. Connected cars are playing a key role in the intersection between the smart home and other forms of transport.
- **Connected technologies** are enabling a **shift in vehicle ownership** models to one defined more by experience e.g. car sharing such as Lyft or Zipcar
- **Autonomous driving** will come to market system to by system such as emergency braking services
- Connected Cars traditionally have had their connections made to mobile technology, but this trend is changing. Analysts e.g. Gartner expect the network to expand to vehicle-to-vehicle and vehicle-to-infrastructure connections.
- **Growth fuelled by legislative initiatives**. In the EU, for example, all cars will be fitted with an eCall-equipped chip by 2018 that will automatically contact the nearest emergency centre in case of a collision.
- McKinsey study sees “**dramatic increase in vehicle connectivity**” that is “**transforming the automotive sector**” could boost the value of the global market for connectivity components and services to €170bn (£127bn) by 2020, more than five times higher than today’s €30bn.
- The study finds majority of car purchasers immediately **rule out buying a new car without internet access** as well as **prioritise connectivity over features such as engine power and fuel efficiency**.

Analyst forecasts and viewpoints

Annual Sales of Connected Cars Will Exceed 81 Million Units by 2025





The growth in embedded connectivity is likely to be fuelled in part by regulations making it mandatory for new vehicles to ship with systems that are able to automatically alert emergency services in the event of an accident.

Key Themes & Announcements at CES

General Motors

- **GM** partners with **Lyft**. GM will invest $500 million in the ridesharing service. The goal of the partnership is to *build an integrated network of on-demand autonomous vehicles in the U.S*. by combining GM's auto technology expertise with Lyft's background in providing ride-sharing services. **GM** built electric vehicles, Chevy Volt and Spark EV, previously

Ford Motors

- **Ford and Amazon** enter into tie-up with Amazon, using its voice-activated speaker Echo to enhance communication between homes and cars - allowing motorists to open their garage before they arrive home, or turn the lights off from the car

- **Ford and Google** on self driving car. Google has been seeking manufacturing partners that would use the company's self-driving system, which it believes could eliminate the roughly 33,000 annual deaths on U.S. roads. *No deal announced*

Toyota

- **Ford and Toyota** are joining together to make their own car operating system, known as SyncConnect, enabling drivers to access their vehicles using a smartphone app.

- **Toyota plans to** spend $1 billion through 2020 on artificial-intelligence research at Stanford University and the Massachusetts Institute of Technology. One of its aims will be enhancing the safety of automobiles with the ultimate goal of creating a car that is incapable of causing a crash

Other Key Themes & Announcements at CES

- **Kia and Hyundai** plan to spend $2 billion by 2018 to develop Advanced Driver Assistance System (ADAS) technologies. The companies have a shared goal of selling cars with sophisticated autopilot systems by 2020 and fully autonomous vehicles by 2030.

- **Delphi** is supplying a vehicle-to-vehicle communications feature in its 2017 Cadillac CTS model, and showcase a vehicle that talks to devices - from streetlights to smartphones.

Faraday Future

- The Chinese-backed Faraday Future said its battery-powered FFZero1 would project information over the driver's view and include a smartphone dock in its steering wheel. Faraday said it would produce its first vehicle in two years time

- Faraday Future highlights that the modular basis of its design mean easy reconfiguration of elements to create other types of electric vehicles including pick-up trucks. Using the same ***basic underlying structure on all its vehicles***, adapting it to include anywhere from one to four motors, battery packs of various sizes, different types of wheelbases

AT&T LTE to power Ford SYNC Connect in more than 10 million vehicles in North America by 2020

- **Ford and AT&T** have partnered to bring high-speed connectivity and enhanced customer experience to more than 10 million Ford customers by 2020
- **Ford SYNC Connect** allows drivers to interact with, or remotely control ***their vehicles*** through the built-in AT&T network connection; customers can use smartphones to unlock doors, check fuel level, locate a parked vehicle and so forth.
- **SYNC Connect** plays a key role in ***Ford's Connectivity Strategy*** (Ford Smart Mobility) within connectivity, mobility, autonomous vehicles, the customer experience, and data and analytics.
- After the initial rollout in North America, **SYNC Connect** is launching globally, adding another 10 million connected vehicles by 2020.

How connected transportation will transform smart cities

- **Overview**: Estimations from studies say that in 2030, 20% or more of economic wealth will be derived from cities. The establishment of Transportation systems serves as a means to that end – **connecting jobs, products, goods** to market particularly in a growing middle class in megacities and where there is congested car traffic

- **Multimodal transportation** that gives commuters a variety of options to get to their destination. Different modes of - transport bicycles, freight, buses etc. have to structurally work all together. Are solutions in place to enable this both scalable or sustainable?

- **Part of the value of the connected car** to the bigger transport system is its **potential to connect other databases** of other entities or enterprises in the value chain

- **Smart Ford Mobility**: Advanced development of vehicles and their interactions with cities and urban areas. Currently, digitisation means everything is connected including the car. The car and mobility that will be linked other enterprises/areas. **Ford** is conducting 25 experiments studying UBI, parking, and car sharing/shared car ownership

- **Cisco Systems** is exploring the Smart city, and the range of different types of network connectivity, and vehicle to vehicle and Vehicle to infrastructure Communciation

- **Cisco Systems** is present in 100 cities and focusing not only on one vertical connected transport – but focusing on energy infrastructure, building grid, anything that holds the potential to be IP connected. Can these systems seamlessly interact with each other?

How connected transportation will transform smart cities

- **What are the roles of stakeholders, including governments?** There is a need for demonstration of technology solutions to show feasibility, and demonstrate value
- There is a **disconnection on materialisation of ideas of technology**, and **how we pay for infrastructure?** A need for demos to show value of connected transport e.g. reduction of congestion. Policy makers will invest in that later.
- **Much Infrastructure is installed by cities not just by government** – e.g. by utilities, neighbourhoods, hospitals, telecom operators. Business models will arise from stakeholders interacting with transport authorities
- **Connected transport embraces many concepts**: shared modes of transportation point A to B, Urban centres and towns with systems that that connects with traffic control system; a traveller being able to plan journey into work taking car, train and possibly ride sharing? How will the human interface in these systems be?
- **Value of Data**: Embracing data streaming off of lights, parking meters in city; getting relevant data and insights to the driver for traffic management or parking availability and pricing will be important. **Systems** that send **signals dynamically and present data that is potentially interoperable** will be important.

Challenges: Connected Transportation in Smart Cities

- **Digital can overlay the physical**. If its done right it can have a dramatic effect in making it cost effective. For example, roads that can be enhanced with smart sensor networks

- **Network providers using existing capacity.** Providers can determine how best to use existing capacity/resources to create experience for existing users e.g. AT&T offers multi-device data sharing plans.

- **Policies/Institutional Issues -** There is a need for policy to enable infrastructure development to move forward at a state and local level and devise ways for public sectors to partner with private sectors.

- **Demonstrate value proposition -** Knowing problem is key, seeing solutions derived from industrial design, maintenance of infrastructure, and understanding costs. Sensors and actuators in vehicles and structure – sense the performance of the vehicle and can help capture this information.

- **Opening up data –** data is powerful for insights, processes, deciding making but hoarding of data continues. There is sensitivity round data, but this needs to change: There is a need to make the data safe, secure by many organisations, entrepreneurs, starts ups, etc.

Autonomous Driving Cars

- **Between now and 2025** social issues arise e.g. real consumer acceptance of self driving cars arise. There is a need to figure out implications of how these things will work, e.g. is the vehicle programed to break the law?
- **Semi autonomous services of the car are available**: Parallel parking, lane departure warning, autodrive, collision warnings – combining these systems is working towards autonomous driving. Does public policy city planning accept this?
- **Access vs Ownership of Car:** shared car business model creates affordability. The car is second most expensive item for consumers. A consumer on avg pays between 12-17% for owning a car. Emerging markets see consumers paying 40-60% of their income on their vehicle. This cost can be reduced to 24% if a car can be shared by ten people
- **Shared cars in emerging markets -** having access to a shared car for a closed community is important. Some cities need new forms of shared mobility, multi-mode mobility, such as china, are selling twice as many scooters as vehicles. Electric mobility, new forms of multi mode transport will come to fruition in those cities
- **Government role is important** in policies/decisions relation to V2V and V2I and in testing out autonomous functionality. There is a need for minimum standards to be helped established by governments. Standards help to protect industry against liabilities and risk of liability e.g. defining rules of engagement of self driving cars prior to a crash
- **Self driving car** - Bosch, Nvidia and Valeo showcasing further steps toward the self-driving car. **Google** is involved in this space with automakers; aims to bring self-driving cars to the market by 2020.
- **Ford** in 2015 said it would expand advanced safety technology including automatic braking, enabling hands-free operation of cars under certain conditions by automating such basic functions as steering, braking and throttle.
- **Volvo** has launched a corporate initiative that by 2020 no person should be killed or seriously injured in a new Volvo. The company says it believes that self-driving cars, as well as autonomous driving features, are part of the answer

Autonomous Driving Cars and new sharing models

- Self-driving cars such as **Uber, Lyft and Zipcar** (for longer drives) will push down prices of travelling . When ride/car-sharing becomes more the norm, including in urban areas, traveling in a car becomes like traveling by plane; service that ***separates riders from manufacturers and their brands***.

- **GM** announced its $500 million investment into ride-sharing company Lyft. As part of the investment, GM and Lyft said they will work on developing an on-demand network of self-driving cars; an area of research where companies like Google, Tesla and Uber are investing.

- **Shared car access:** GM investing in Lyft has yet to see success - Will Lyft can keep the GM brand relevant to commuters, particularly from Urban areas, who are not concerned with car brand names?

- **New ownership models**, such as Zipcar, the world's largest car sharing and car club service ,will further fuel the growth of the market.

- Part of the **strength of this business model** is the vehicle knowing who you are, who is in the car with you along with finely distributing the cost of ownership/usage seamlessly

Data Analytics helping to cuts costs, improve efficiency

- Data analytics is helping to reduce costs for manufacturers. **GM** states it can make $350 million in revenue over the next three years on data from its connected cars.

Mercedes-AMG and Daimler AG, in 2012 began to deploy an in-memory platform across business functions to analyze large amounts of data in real time and improve manufacturing processes; Piloting a real-time quality assurance platform that capitalizes on predictive analytics to optimize engine-testing processes.

IBM announced the launch of a new cloud-based analytics service, in 2015, that analyses data from connected cars for use cases like predictive maintenance and real-time engine diagnostics. IBM aims to sell the service to auto manufacturers looking to gain insights from data collected from their cars

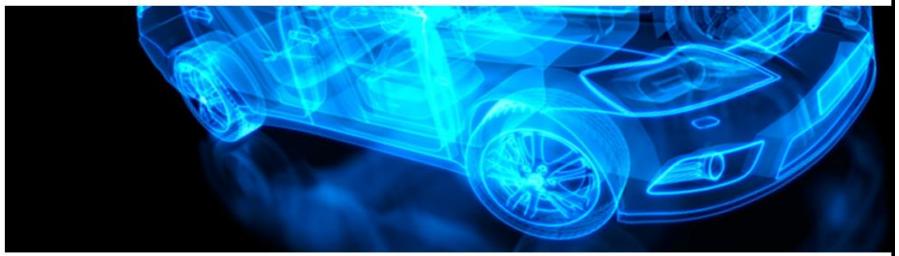
NVIDIA unveiled a supercomputer aimed at smart cars. The NVIDIA DRIVE PX 2 engine enables cars to deep learn; a form of artificial intelligence - to recognize objects in their environment, anticipate potential threats and navigate safely.

Volkswagen (VW) has entered into partnership with Inrix 2014, in order to provide drivers with information/data on range of topics: real time information parking spaces in 41 European markets, and information on prices charged by Fuel stations in 22 markets.

Connected Transport Standards Landscape

ISO suite of standards kicks the connected car into gear

by *Elizabeth Gasiorowski-Denis* on 8 October 2014



ETSI World Class Standards

Events mailing list | Newsletter | Search... (Search Website / Standards)

Standards | Technologies & Clusters | Membership | News & Events | Committees & Portal | About us | Contact us

News & Events › Latest News › CEN and ETSI deliver first set of standards for Cooperative Intelligent Transport Systems (C-ITS)

Upcoming Events
Latest News
ETSI Newsletter
Recommended Events
ETSI Seminar
Past Events
News & Events Contacts

CEN and ETSI deliver first set of standards for Cooperative Intelligent Transport Systems (C-ITS)

Berlin, 12 February 2014

A key step towards connected cars in Europe

CEN and ETSI have confirmed today, at the 6th ETSI workshop on ITS in Berlin, that the basic set of standards for Cooperative Intelligence Transport Systems (C-ITS), as requested by the European Commission in 2009, have now been adopted and issued. The so-called 'Release 1 specifications' developed by CEN and ETSI will enable vehicles made by different manufacturers to communicate with

W3C and Automotive Industry Start New Web Standards Work for Connected Cars

Translations | W3C Press Release Archive

3 February 2015 — In recognition of increased consumer demand for data and services in Connected Cars, W3C announced today a new automotive industry collaboration to bring drivers and passengers a rich Web experience. The effort will focus initially on giving application vendors standard and more secure access to vehicle data.

"Car owners want access to the Web and receive real-time updates about their vehicles and the world around them, including weather, traffic, and parking information," said **Jeff Jaffe, W3C CEO**. "They also want smooth integration with their mobile devices. No other platform can match the Web's ability to bridge the diversity of data that will come from the car, user devices, the Web, and the Internet of Things. But we need to enable Web access in a way that does not compromise safety, and to provide secure access to data in a way that takes into account user privacy preferences. The auto industry's support for this new initiative is an encouraging sign that the Open Web Platform will help make driving safer and more fun."

In February 2013 auto manufacturers, chip makers, browser makers, and mobile operators began work at W3C on draft specifications for car data, such as vehicle identification, acceleration and speed, tire pressure, battery status, and personalization information such as seat position and climate information. Today's new Automotive Working Group is chartered advance those draft specifications to Web standards.

"Connectivity is transforming the car industry," said **Matt Jones, Head of Future Infotainment at Jaguar Land Rover**. "We believe the Web is the auto industry's best path forward to keep up with rapidly changing consumer expectations and evolving technology, as well as addressing challenges such as over-the-air updates and advanced diagnostics. Using Web technology in the car will reduce time to market for automotive apps, and allowing more innovation from existing development teams."

Ford's SmartDeviceLink Standard

- **Ford and Toyota** have stated that they will adopt the same software, SmartDeviceLink (SDL), to link smartphone apps to vehicle dashboard screens; inviting automakers to join in countering Apple and Google's push to control cars of the future.

- **Toyota and Ford** entered a collaboration agreement for next generation in-car telematics system standardization in 2011. Ford wants to ensure SDL runs on cars from 5 million today to 28 million by 2020.

- **Open-source SDL standard** developed by Ford was launched in 2013, connecting mobile apps with in-car interfaces.

- **SDL offers broad device and platform compatibility**, enabling the automotive developer community to create apps that will work, unmodified, across multiple automotive brands and vehicle models.

Car as a Connection Hub to the Home

- **Ford and Amazon**, using its voice-activated speaker, Echo, to enhance communication between homes and cars - allowing motorists to open their garage before they arrive home, or turn the lights off from the car. Drivers can communicate with **amazon's smart home hub** and, for example, control lights, thermostats, security systems and other home devices from their cars.

- **Qualcomm** revealed a new Smart Home Reference Platform to power the increasing number of smart homes. The new platform will be able to support functions such as ***voice recognition, audio, display, camera, connectivity, and control capabilities*** for home control hubs and smart speakers.

- **BMW** unveiled its "customer-ready" smart home app for iOS in 2015, as well as a "research application" that allows cars to interface with Samsung's SmartThings platform, which includes a complete home-monitoring system. The Korean and German companies are working together to integrate SmartThings functionality into BMW vehicles.

- Built on the **Vinli platform,** Vinli Home Connect brings compatible connected home platforms together into one interface with the connected car. The Vinli onboard device and platform is used with leading connected home products from companies like Nest and Samsung's SmartThings.

Cyber Security and maintaining Privacy

- **Auto ISAC (Information Sharing and Analysis Center):** an alliance of 12 automakers went live in 2015. Auto ISAC is foundational step to share information about cyber threats among industry members
- **TRL:** stated that further work was needed into cyber security standards for V2V and V2I communication; including ***unified standard & trust domain establishment*** based on Public Key Infrastructure, enabling authentication of messages between entities
- **DLA Piper**: Most car companies are active in the self-regulation. Global Law firm, DLA Piper, working in the areas of privacy issues stated that ‘*’car companies have every incentive to get this right*’’
- **Visteon:** showcased infotainment systems that are better protected from hacking attacks. Visteon says radios today don't have a minimum level of security. Visteon has codes in chips, uses encryption to stop unauthorized applications.
- **Intel** in Sept 2015, launched an industry board aiming to identify significant security threats to connected cars. With the Automotive Security Review Board (ASRB) a series of ongoing security tests and audits planned to be performed with the intention to codify best practices and design recommendations
- **Autonomous Driving.** The move to autonomous driving, brings in all types of radar sensors, cameras, and wireless. Each can be hacked. Thus there is a need to ***take the security levels of wireless, sensors, and cameras, and fuse them into a system*** that raises the total confidence level to an acceptable perch.

Safety enforcement in Connected/Automated Vehicles

Car Manufactures are increasingly embracing technologies: driver assistance, lane detection, and automated emergency braking, going forward the integration of autonomous driving capabilities has been done in order to reduce human error on the roads.

- **Toyota Research Institute:** a collaborative research partnership with Stanford and MIT set up to delve into artificial intelligence and robotics. One of its aims will be enhancing the safety of automobiles with the ultimate goal of creating a car that is incapable of causing a crash

- **American Automotive Association:** spoke of potential in-car technology to help address auto-related fatalities in the U.S, which reached a new low in 2014 but still amount to about an average of one auto-related death every 15 minutes.

- **DWF**: From a legal perspective, the regulations for auto manufacturers are becoming tighter. **DWF** states Manufacturers' challenges now lie in ***developing new performance systems or body shapes for a vehicle to conform with internationally agreed standards*** if vehicles are sold in multiple countries. These international standards are still being developed.