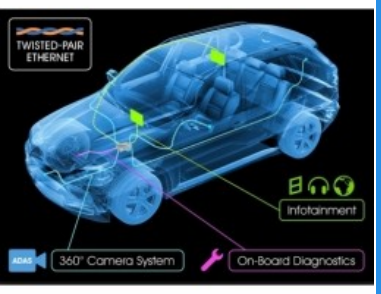
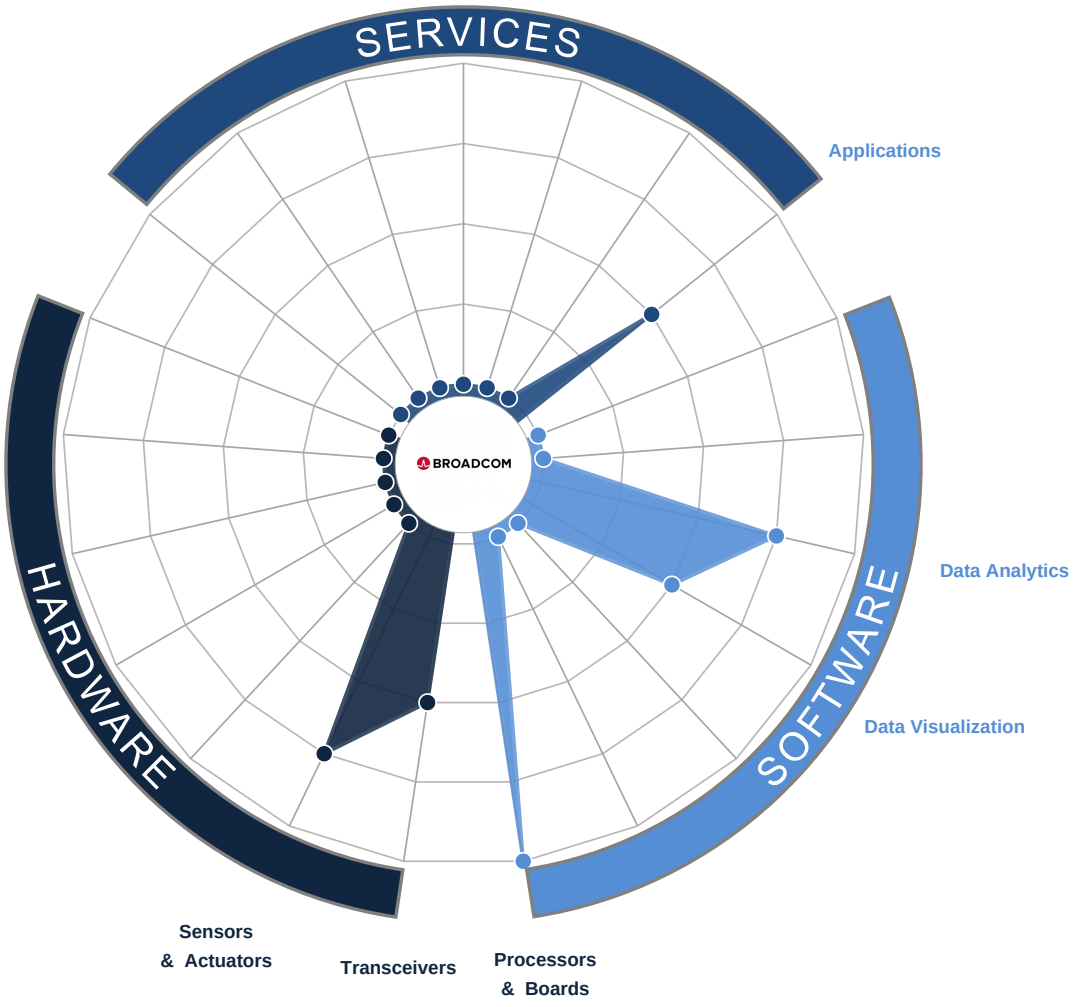



# Rolls Out Second-Gen Automotive Switch with BroadR-Reach



# Overview

| | |
|---|---|
| Applicable Industries | Automotive |
| Applicable Functions | Information Technology<br>Product Development |
| Connectivity Protocols | Ethernet<br>IPv6 |
| Challenge | Carmakers are facing the next wave of automotive connectivity. Cars will extend their reach, tapping our homes, talking to nearby cars and connecting to myriad other devices. New challenge is to meet bandwidth demands. |
| Customer | BMW is a German luxury automobile, motorcycle, and engine manufacturing company with 116,324 employees worldwide. |
| Solution | Broadcom's second-generation automotive Ethernet switch with integrated BroadR-Reach PHYs are set to address the increasing load on the car's network. The next-generation BroadR-Reach automotive Ethernet switch portfolio is developed to securely enable infotainment, Advanced Driver Assistance Systems (ADAS) and time-sensitive applications for the in-car network.<br><br>Hardware Components<br>- BroadRReach PHYs: automotive Ethernet switch solution<br><br>Software Components<br>- Advanced Driver Assistance Systems (ADAS) |
| Data Collected | Real-time driving data, including speed, back-up images, infotainment system data |

| | |
|---|---|
| Solution Type | IOT |
| Solution Maturity | Cutting Edge (technology has been on the market for < 2 years) |

## Operational Impact

| | |
|---|---|
| Impact #1 | Data Aggregation - Cloud solutions enable aggregation of 'big data' to enable more robust analysis and lower costs. |
| Impact #2 | Real-time Tracking - The location of individuals and assets can be identified in near real-time which creates more port capacity and greater functionality for vehicles. |
| Impact #3 | Network Safety - Device/message authentication and message encryption can protect the car from malicious attacks. |

## Quantitative Benefit

| | |
|---|---|
| Benefit #1 | Broadcom was able to cut power consumption by 30% and shrink the package size by half by moving from a 65 nm process node to a 28 nm silicon design. |

# Broadcom Rolls Out Second-Gen Automotive Switch with Integrated BroadR-Reach® PHYs for Connected Cars

**By: Sarah Murry | Posted: October 27, 2015**

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Now that drivers and passengers are starting to discover the perks of in-car connectivity – from streaming music and real-time traffic updates to camera sensors that provide a dashboard view of what's behind the car – the industry is about to push through another wave of connectivity to further enhance the on-the-road experience.

This time around, cars will extend their reach, tapping our homes, talking to nearby cars and connecting to myriad other devices. As such, the ecosystem for applications that will introduce new safety features and enhance diagnostic reporting tools, for example, is just at the starting gate.

But this next wave of automotive connectivity will also introduce a new challenge for carmakers – meeting bandwidth demands.

Broadcom's second-generation automotive Ethernet switch with integrated BroadR-Reach® PHYs (BCM89531, BCM89530, BCM89231, BCM89230) are set to address the ever-increasing load on the car's network. Today, at the IEEE Ethernet & IP @ Automotive Tech Day event, the company announced the next-generation BroadR-Reach automotive Ethernet switch portfolio that securely enables infotainment, Advanced Driver Assistance Systems (ADAS) and time-sensitive applications for the in-car network.

"The first-generation switch was designed to support single-switch network electronic control unit applications," said Timothy Lau, associate product line director of automotive connectivity at Broadcom. "Typical implementation would be a 'star' topology with a central hub."

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But that needs to change as automotive electronics applications in future car models demand a more sophisticated network architecture.

*Similar to the way a set-top box or media gateway works in the home, automotive networks need to evolve to support multiple network endpoints that can connect to the Internet and communicate with each other across different domains," Lau said.*

"We are quickly seeing that in-vehicle networks are moving rapidly away from a single hub to a centralized network topology," he said. "It's about establishing high performance and security in a backbone technology that connects across multiple domains."

For example, a common feature in today's cars is a rear backup camera. When the driver goes in reverse, the camera captures the video and sends it to the front dashboard display.

In a second-generation gateway set up across multiple domains, that image can now be shared on other displays in the car, along with data from the infotainment system or content streamed from a mobile device.

“Any type of data can be shared to all the passengers in the car,” Lau said.

That becomes more important as the industry seeks to test out the viability of self-driving cars, which need to be able to quickly share real-time sensor, navigation and camera data across a centralized network to make critical driving decisions.

In order to work toward these goals and deliver a centralized Ethernet-based network that’s future-proofed, Broadcom had to aggressively reduce the size and power consumption of its second-gen BroadR-Reach silicon.

By moving from a 65 nanometer (nm) process node to a 28nm silicon design, Broadcom was able to slash power consumption by 30 percent and shrink the package size by half. Lowering the power consumption not only means less drain on the car battery and fewer cooling mechanisms, but also adds to design flexibility.

In some ways, the Ethernet networks in cars will start to look more like the ones in data centers – and that could be a good thing.

“We added the ability to connect or stack multiple switches together,” he said “That’s common in enterprise networking. But for vehicles, connecting switch solutions together creates more port capacity and greater functionality.”

Another thing that Automotive Ethernet networks have in common with enterprise networks is the use of tested, industry-standard security protocols. By leveraging automotive Ethernet as the car’s network backbone, network security features such as device/message authentication and message encryption can protect the car from malicious attacks.

“The automotive network will ultimately grow to become complex and very powerful,” Lau said, “Broadcom is hoping to enable carmakers to provide the highest level of performance for their customers.”

BroadR-Reach automotive Ethernet is already on the road today in the BMW X3, X4, X5, X6, i3, i8, 6 Series, 7 Series, Jaguar XJ and XF and Volkswagen Passat. Second-generation BroadR-Reach switch with integrated PHYs are sampling with customers now for the 2018 model year.

*Broadcom, NXP and Realtek will present a joint demonstration of BroadR-Reach automotive Ethernet at the IEEE Ethernet & IP @ Automotive Tech Day, October 27 – 28, 2015 in Yokohama, Japan.*

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