
WHITE PAPER

Broadcast Media in the Personalized Software-defined Vehicle and the Era of Content Streaming



Broadcast Media Matters

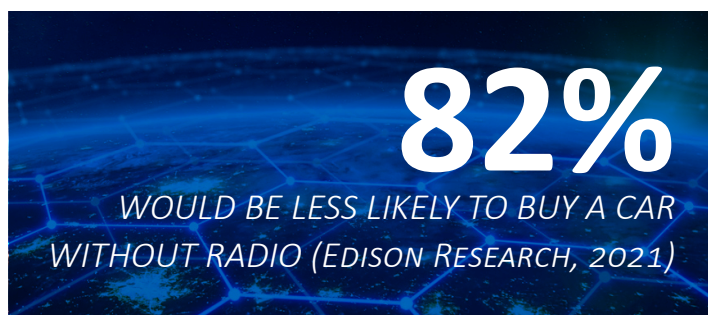
In a world where cloud media streaming is second nature to nearly anyone who can afford to buy a new car, broadcast media continues to be the most important in-vehicle audio service to drivers and car buyers. As the industry approaches the age of the Software-defined Vehicle with myriad online media sources, though, is there still space for this 100-year-old concept, or has the day of in-car broadcast radio come to a natural end?



Field data shows that car drivers still listen to the radio. 90% of US car buyers in a recent survey by Edison Research expect broadcast radio as standard, and 82% said they would be less likely to buy a car that did not have a radio. More respondents listened frequently to car radio than online streaming services (65% compared to 23%), and they

primarily listened to get news and information (63%). So, even against the growing impact of online content provision in the car, the appetite for broadcast media remains strong.

However, the usage patterns throughout the vehicle now include individualized passenger entertainment. Taking passengers into account shows around one-third of vehicle occupants listening to online radio and podcasts, and half listen to brought-in digital music, as shown in Figure 1 (Edison Research, 2022). The 2022 Edison report shows the number of vehicle occupants listening to some form of audio in the car via a brought-in device now tops 50%. With the wide range of online audio options on the increase, carmakers face a challenge to present a cohesive media package that covers all the bases.



% In-car listening through a cell phone

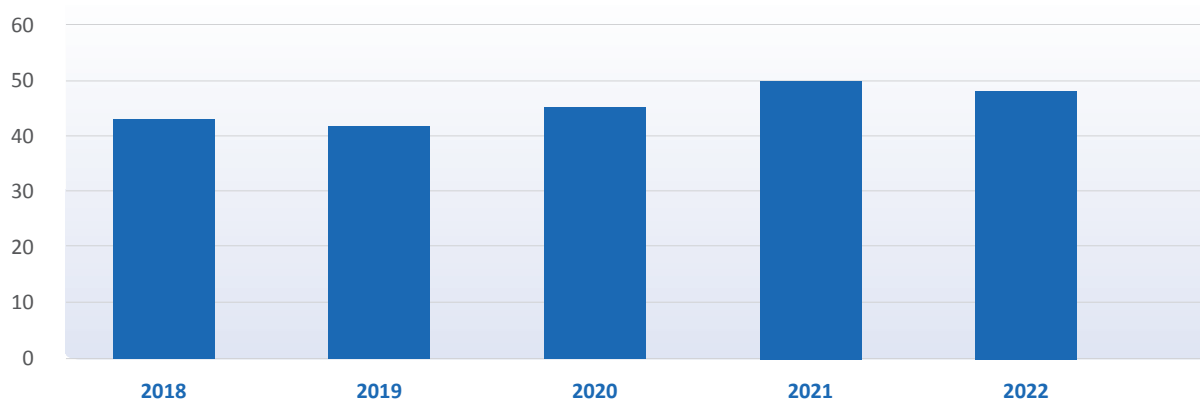


Figure 1: Car users are listening to a wide range of audio sources, dominated by broadcast radio

Personalization Starts with the Radio

Radio preset buttons date to the 1930s (Siegel, 2017). For decades, the only “personalized” interface in the car was the row of preset buttons on the radio. The radio preset interface is also one of the few universal personalized features in the industry.

In today’s latest vehicles, personalized features go beyond infotainment, and for a handful of brands, link to cloud-based user profiles that travel with the user (SBD Automotive, 2022). Figure 2 offers a glimpse at how brands like Audi, BMW, Hyundai, Mercedes-Benz, and XPeng are linking personalized features across the vehicle with an identity rather than a device, enabling individualized passenger as well as driver experiences.

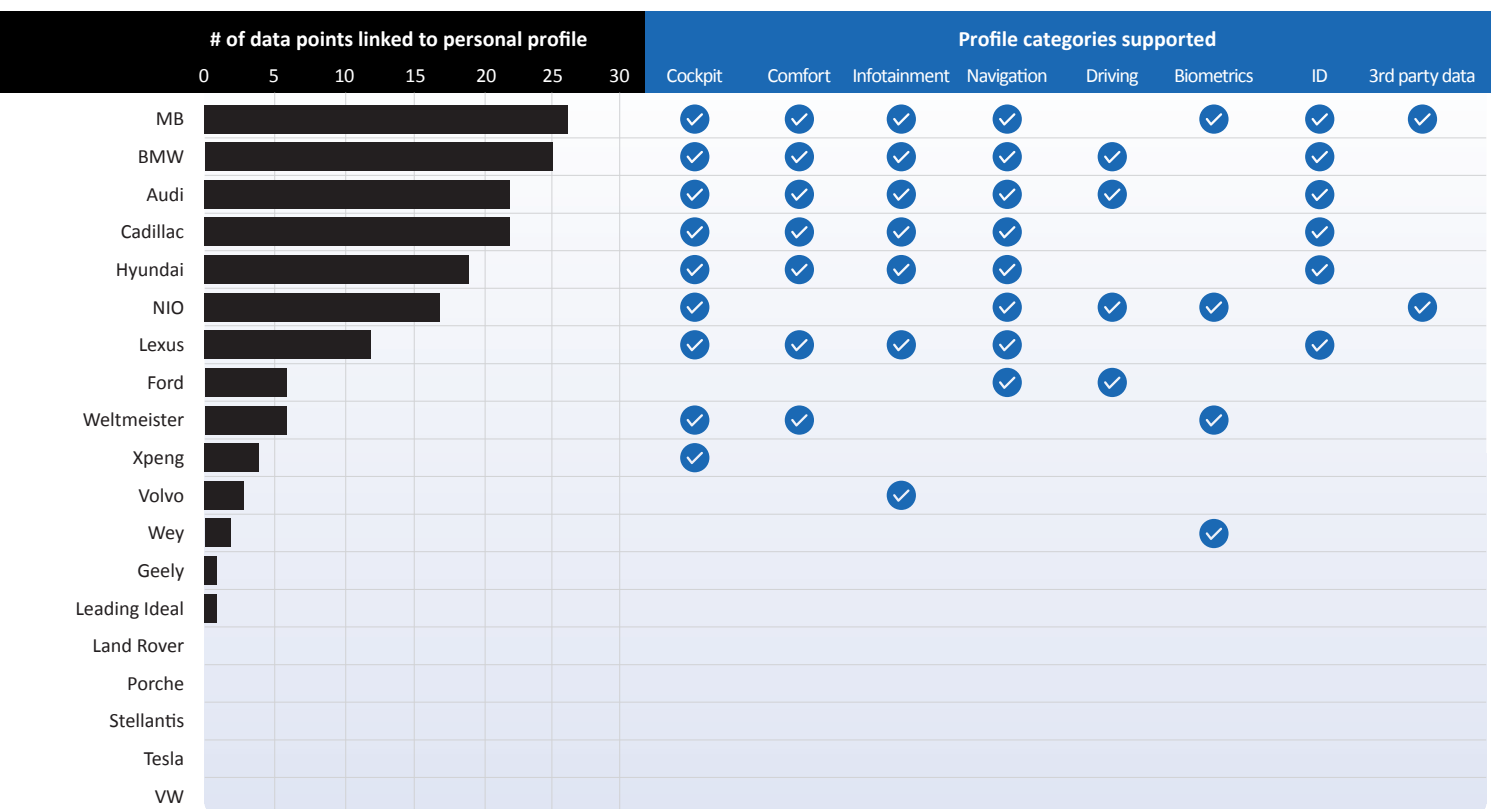


Figure 2: Carmakers are taking their personalization beyond the car with cloud-based user profiles

SBD Automotive expects that the combination of near-universal embedded connectivity and the active interest among vehicle users for streamed media will result in roughly 40% of cars embedding internet-based radio and music streaming (Figure 3).

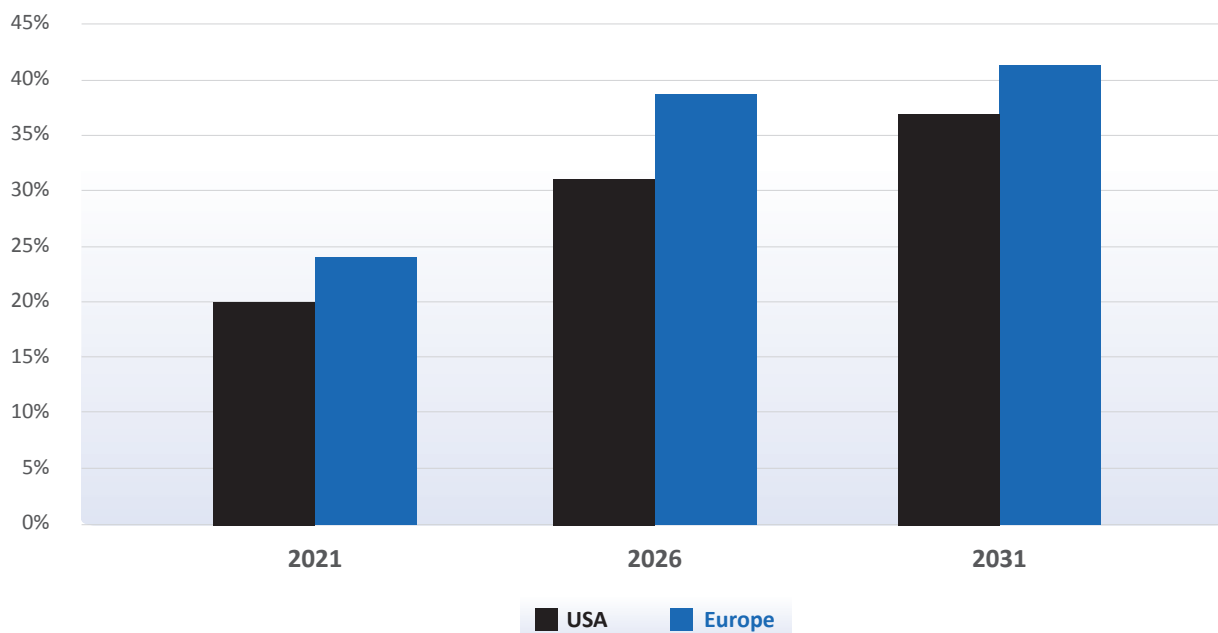


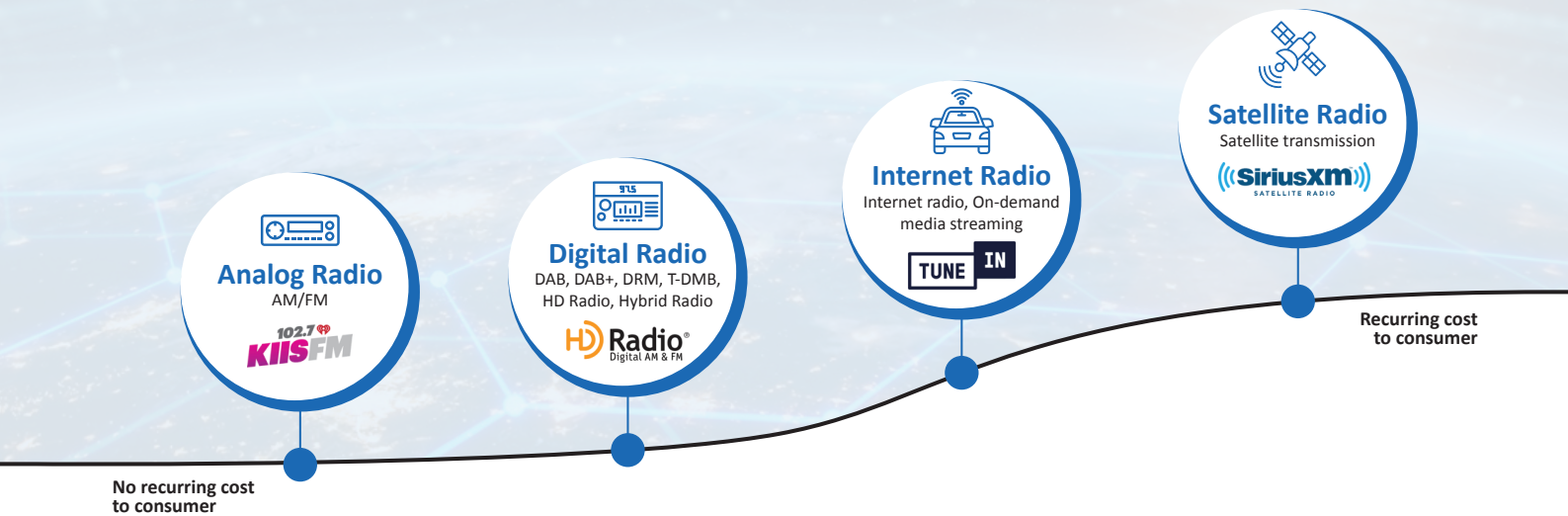
Figure 3: Embedded internet audio is increasingly popular

Mercedes-Benz, with its Xperi partnership, shows a way forward that combines thousands of radio stations, stored media, and supporting metadata to create a personalized in-car experience (Xperi, 2020). As more in-vehicle functionality, such as radio, becomes defined in software, carmakers have a greater opportunity to enhance the presence of broadcast media applications to combine the best of broadcast media (live, local, curated content) and streamed pre-recorded content (vast content libraries). Vehicle manufacturers, partnering with a range of media service providers, such as TuneIn, SiriusXM, Xperi, and Deezer fill an obvious gap between locally available radio stations and global content libraries to create data-driven personalized listening for both drivers and passengers.

Challenges of Internet Radio – and How Carmakers & Suppliers have Managed with them

Carmakers face two key challenges with the expansion of broadcast radio beyond what is locally available – data cost and discoverability. Although users want to listen to the radio, many are wary of having to pay for it. 70% of in-car listeners of brought-in online audio are concerned about data volumes, and 93% of car buyers say it is important that radio remains free to listen to (Edison Research, 2021). But with tens of millions of subscribers, the market need is strong.





Of those that do pay for internet audio, finding something to listen to is possibly an even bigger issue. TuneIn, for example, links users to over 100,000 radio stations and thousands of podcast episodes. Xperi provides access to over 48,000 stations. Apple Music and Spotify have catalogues exceeding 80 million tracks each. Discovering the right content while driving a vehicle presents an HMI minefield. In 2018, when Ram's 1500 launched with the (then) new 360L service from SiriusXM, there was only a spoken search for the service and a hard-to-use category-based search, making it difficult to browse the combination of broadcast and on-demand content (SBD Automotive, 2018). By comparison, at a similar time



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when the 360L service would have been integrated by Ram, Netflix estimated 80% of its views came from suggestions and only 20% from a search (McAlone, 2016). So, in-car interfaces for discovery from the full range of broadcast and on-demand media sources need to be much more clever than just searching for something the user knows ought to be available.

Delivering on New Broadcast Media Opportunities

The transition towards vehicles as an intelligent personalized third space opens opportunities for delivering a new broadcast media strategy. The addition of data-driven modelling in connected vehicles means consumers should expect a cohesive approach to media delivery – it's more than a choice between a tuner and stored media (on-board or cloud-based). The intelligent vehicle should deliver on user preferences and habits, while opening doors for potentially interesting media from new sources.

Users should expect vehicle interfaces that link their typical preferences and habits to available content, options to offer enough information for their media manager to suggest appropriate content, or simple recommendations for likely listening opportunities.

Example Discovery Opportunity	Context	User Experience
Propose content	User tunes into NPR's Morning Edition which features a story on Harry Styles	"There is a podcast about the Harry Styles concert in New York you heard about this morning, would you like me to play it?"
Manage partial queries with support from past listening habits	It is SXSW in Austin, Texas, and the user wants to tune into something live	User: "What can I listen to from SXSW tonight?" Vehicle: "Kimbra is playing at SXSW, do you want to tune into the live stream?"
Localize when travelling based on home listening	User rents a car while travelling	"Welcome to Atlanta, Hartsfield International Airport! Do you want to listen to a local station or one from home? Local station 96 Rock is similar to WCSX".
Listen to local radio from somewhere else	User wants a local perspective	"Play me a local talk radio station from St. Louis".

By developing experiences from individualized listening patterns across the full range of media options, vehicle manufacturers can reduce the complexity of the discovery process to quickly offer a small number of listening options to users with both spoken and visual interfaces.

Case Study: TuneIn Radio on Tesla

Tesla's integration of TuneIn offers a good example of how OEMs can do a basic internet radio integration as part of a multi-source media strategy. The on-screen interface (Figure 4) combines channel presets (Favorites) together with suggestions (Featured Stations, Featured Podcasts). The opportunity to link the user's cloud-based TuneIn profile to the vehicle service allows Tesla to personalize the service based on the user's whole-day listening patterns, rather than simply what they do in the car.



Figure 4: TuneIn's Tesla Integration in 2020

In today's market, vehicle manufacturers are increasing their own role in software development, making their own stacks from a combination of owned and external software modules. Entering into data-driven service partnerships like this one gives OEMs the opportunity to take the integration a step further, by linking together presets and suggestions from multiple audio sources and enhancing the use of visual interfaces to further support content discovery. By viewing internet radio as an integral audio source rather than a bolt-on application, HMI designers can build interfaces that break the decades-old mold of each source having its own preset list. Users can see their favorites and targeted selections in one place, regardless of the source, with the option of using those to explore a particular source or service more deeply in the specific app. But that kind of holistic media approach only really covers all of the bases if internet radio is part of the integration. Otherwise, users will likely stick to a handful of tuner presets and end up using their brought-in device for online content.

Internet Radio Bridges Terrestrial Broadcast and On-Demand Audio to Deliver Live Local Content to Global Audiences

Vehicle users want radio in their cars – that fact has not changed in more than 60 years. Embedded connectivity and the increasing popularity of in-vehicle on-demand audio offers a huge wealth of listening content, with live radio continuing to play a large part in internet-based media consumption. Future vehicles need internet radio to bridge the gap between great local-to-the-car live media and great global stored media. Internet radio can now offer the same combination of local and global content to users around the world, allowing listeners to tune into non-local content without waiting for someone else to decide it should be syndicated. Hybrid radio in vehicles initially supported additional metadata and signal gaps, and it is now time to push the boundaries so that large-scale internet radio becomes a core part of the in-vehicle media offering to give consumers the range of audio they want in their cars.

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