



# Maximizing the value of in-vehicle WiFi systems

Enabling media streaming onboard



# Who we are

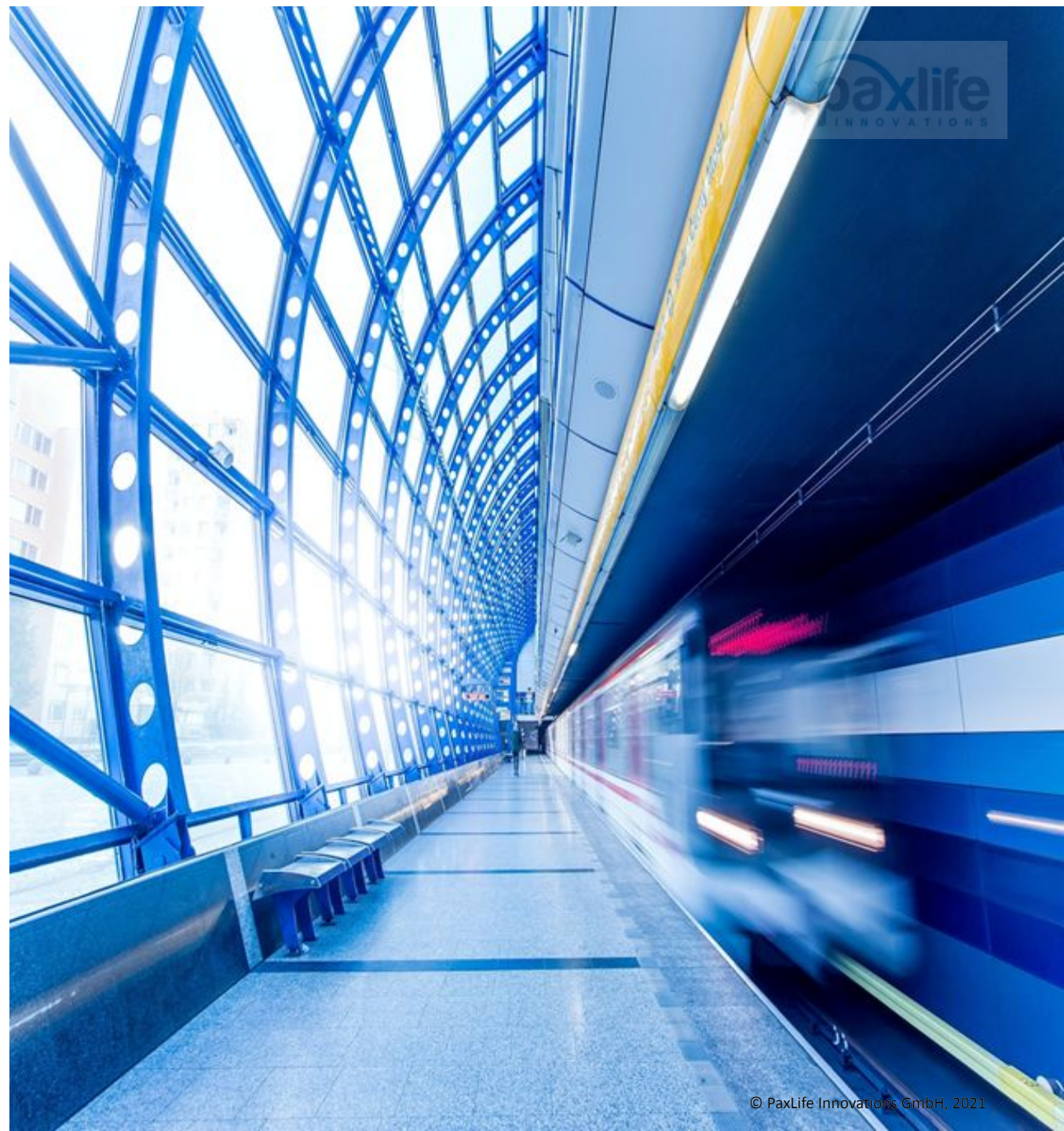
PaxLife Innovations GmbH originally started out by connecting aircraft passengers to the digital world.

To answer the challenge of bringing onboard content and passenger services in a modern fashion, PaxLife developed a cloudedge architecture that is at the heart of its infotainment solutions today.

PaxLife Innovations brought its cutting-edge technology and media expertise to rail and public transit in 2019.

Business philosophy:

“We do not develop apps, but we do the integration and delivery into the actual vehicles. We behave like a data center in the vehicle on behalf of our partners.”



# Increase in data consumption

Media consumption patterns are changing dramatically. Traditional linear TV is experiencing a significant shift in viewership towards streaming platforms.

In Europe, numerous launches of international and national direct-to-consumer SVOD services (subscription video on demand services, such as netflix) by media players have led to **a rapid consumers preferences for accessing streaming content anytime, anywhere and on any device: OTT SVOD subscriptions have increased from 300 000 in 2010 to over 140 millions subscriptions in 2020.**

And this starts to lead to advertisement budgets being rebalanced towards digital media streaming channels.

source: European Audiovisual Observatory "Trends in the VOD market in EU28".



# Vehicle's WiFi network under pressure

Passengers – especially younger ones – are increasingly expecting to stream media onboard the same way they do it regularly at home. In an ideal world, to make this work, transport operators would easily provide enough bandwidth for everybody to use.

But the reality is somewhat different.

It remains a challenge for the public transport industry, due to existing limitations: the number of existing 4G towers to offer a good coverage is still insufficient in some areas; also, when the coverage is there, the number of sim cards required to support the ever-increasing media streaming consumption would translate into a real financial burden.

Therefore, how to bring easily standard WiFi systems installed in vehicles in line with media streaming consumption?



# What we do

Significant investments are made to install WiFi networks in vehicles and answer passenger demands for a good travel experience. But in parallel expectations keep evolving; what has worked a few years ago might not be enough in the today's world.

**Our proposal: we are helping to free up vehicles' WiFi bandwidth while extending its use by passengers for streaming purposes and providing a better experience during the journey.**

Simple and affordable: we offer a simple plug-in software module or a virtual machine embedded in your server.

It works similarly for rail and for buses.

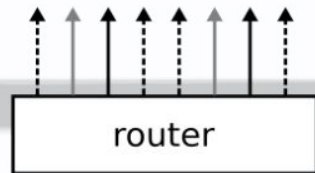
This is our contribution to support public transport as tomorrow's mobility of choice.



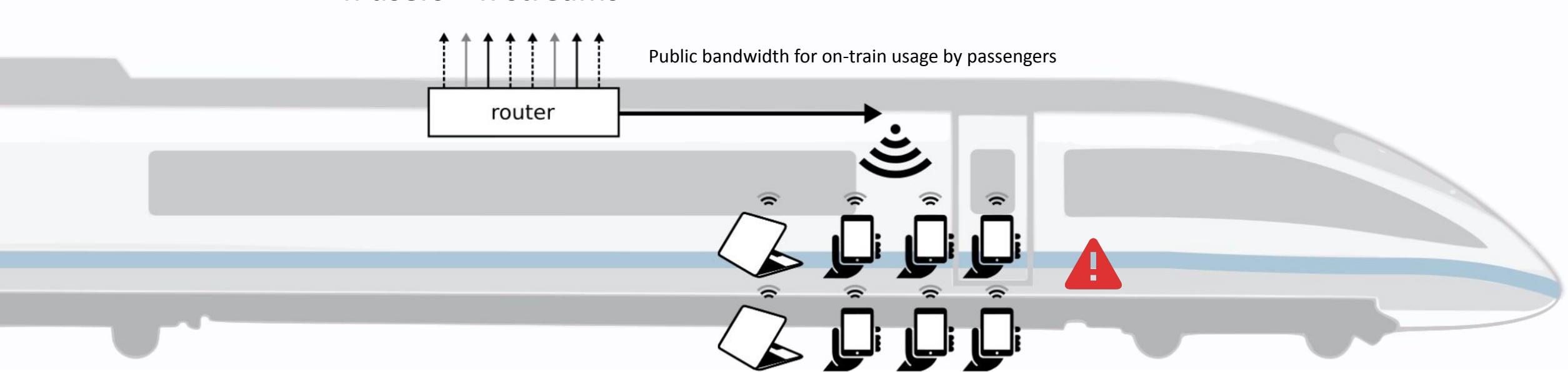
# Standard setup : the vehicle's cellular network is regularly under pressure

Cellular ( 4G, 5G...)

**n users = n streams**



Public bandwidth for on-train usage by passengers

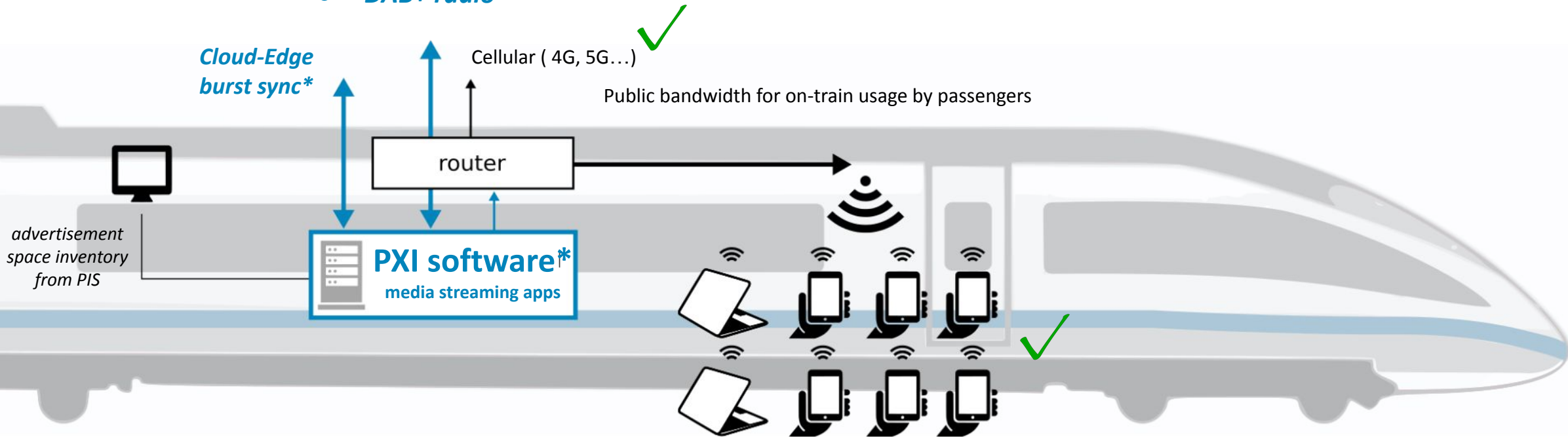


Passengers streaming favorite apps

# We free up existing bandwidth capacity while improving passenger experience at the same time

*Protected bandwidth for:*

- *digital services*
- *live streaming feeds*
- *DAB+ radio*



Initial CDN specs:

- 6 SSD bays, 4 to 24 TB cache
- Cloud-Edge burst sync via 5G or AP-to-AP WiFi sync at 1.7+ Gbps throughput

*\*provided and managed by PXI, software may be embedded in other systems*

powered by **railSTACK**

# Maximize the value of in-vehicle WiFi systems

## Simple plug-in, fully managed and modular proposition

Enable virtually unlimited onboard WiFi bandwidth for passengers while preserving the vehicles' existing 4G bandwidth for other uses, thanks to:

- Live streaming capability, for video and audio
- Media streaming apps hosted onboard
- A bouquet of up to 32 DAB+ radio channels

We offer:

- ★ A simple plug-in solution in to WiFi systems
- ★ Easy integration with existing PIS solutions
- ★ A fully managed service

We cover everything from management of media players/services providers, technical integration and delivery to vehicles, ongoing monitoring, support and maintenance.

Software as a Service portfolio

Select the framework that suits you best:

- from a **simple software module** to a **virtual machine (VM)** suitable to any existing hardware equipment
- a **server-based solution**, for better performance and service levels
- include a display-based **advertising placement resale function** that could potentially finance the service
- expand to **additional software services** that might be hosted onboard
- benefit from a rail certified offering that also fits into any vehicles: **buses, trams, ships, aircraft**



# Live streaming enabled

## One reliable live stream is now sufficient for all passengers

4G is installed and running in vehicles.

In order to preserve maximum availability of the standard bandwidth, we manage and combine the numerous live streams requested by passengers during the journey into one single reliable stream delivered via the vehicle's server and requiring minimum 4G bandwidth capacity.

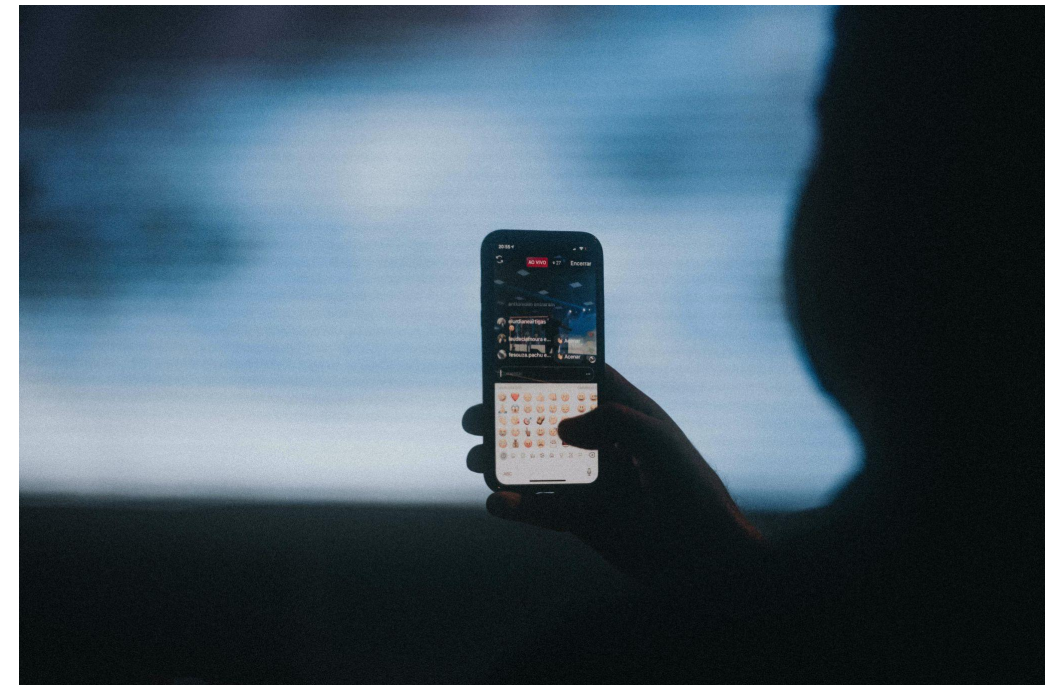
Fully managed service for reliable streaming

Both live TV and Radio, both public and AVOD media

### Benefits:

- **Delight all passengers with live entertainment**
- **Relieve the pressure from vehicles' 4G network**
- **Fully managed service & reliable stream regardless of connectivity level and number of users onboard.**

paxSTREAM

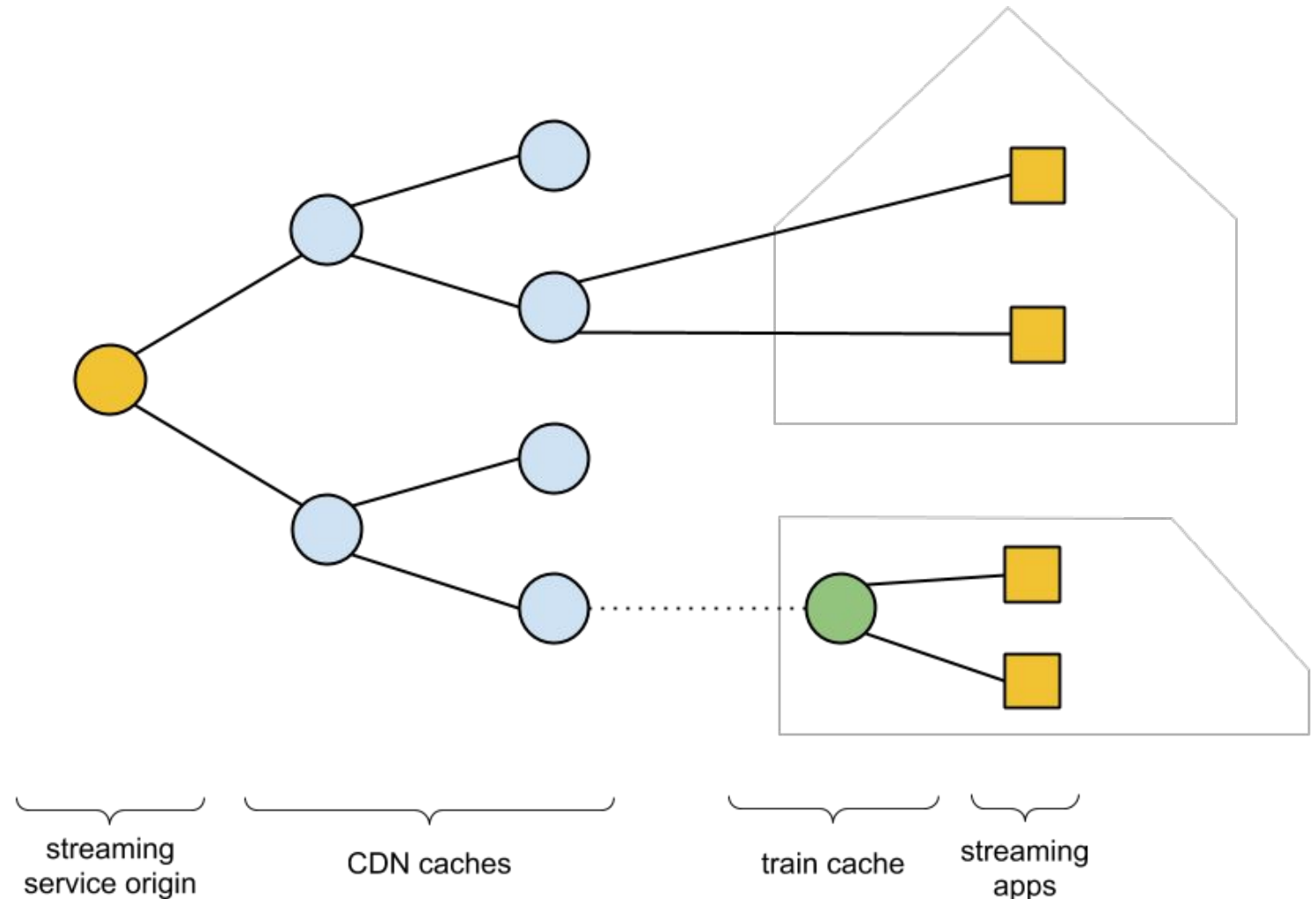


# Content Delivery Network in vehicles

The delivery of media apps to people at home relies on Content Delivery Network companies. These CDN companies ensure the quality of the media delivery up to the end users to their devices, in a “fixed” environment.

For “mobile” environments, PXI provides a similar CDN platform, embedded in vehicles, ensuring that supported media apps are reliably delivered from the onboard server to passengers’ devices throughout the entire journey.

The server is synchronising with media content via high-speed connections available along the route.



# Media streaming apps hosted onboard

## Offload the data traffic used for On-demand Video, Music or News

Our paxCDN software enables virtually unlimited WiFi bandwidth onboard for passengers to stream favorite media apps, without increasing broadband data charges for transport operators.

Streaming heavily relies on CDNs. As a standard, we support national & local public radio/TV streaming apps, hosted onboard and delivered to passengers via/at the vehicle's WiFi speed.

Thus, passengers stream video and music content on their own devices the same way they experience it at home, in excellent quality, without interruption and with no strains on their mobile data budget.

### Benefits:

- **No licensing cost for content**
- **Free up existing bandwidth capacity**
- **Independent from outside connectivity**
- **Improved passenger offering and viewing experience**



**Imagine...your passengers' preferred choice of streaming apps enabled by a local CDN solution in the vehicle, without blocking the bandwidth for others**

To complete the offering, the seamless integration of any private media streaming platforms (SVOD, AVOD) interested in connecting with more viewers on the go is also possible.



# Digital Radio, DAB+ technology

## Live radio channels free of charge & in continuous broadcasting

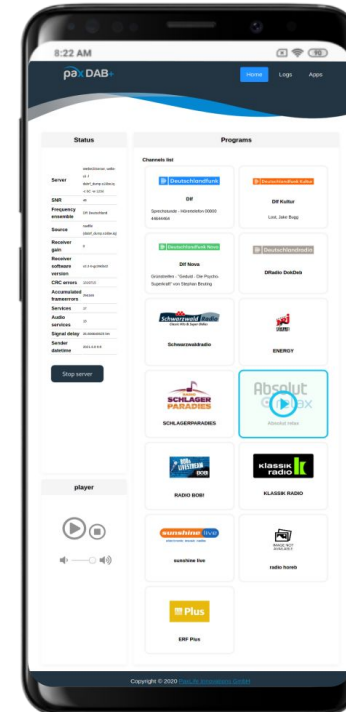
Why should transport operators and passengers not benefit from the numerous DAB+ radio channels that are already available and whose content is free of charge?

Thanks to a small receiving box plugging into local onboard WiFi, paxDAB+ allows each passenger to access up to 32 live radio channels\* on its personal device without experiencing any interruption.

paxDAB+ achieves uninterrupted live radio transmission by combining both 4G connection and DAB+ stream delivery. It optimizes buffering + other settings depending on the current train position.

### Benefits:

- High quality content free of charge
- Extend existing bandwidth
- Continuous broadcasting, regardless of the outside connectivity using hybrid reception

*Screenshot of some of the national radio broadcasters channels available via paxDAB+ at the train of a German railway operator.*

\*depending on the DAB+ coverage

# Digital Out-Of-Home Advert Service for PIS Displays

## Passenger Audience Monetization

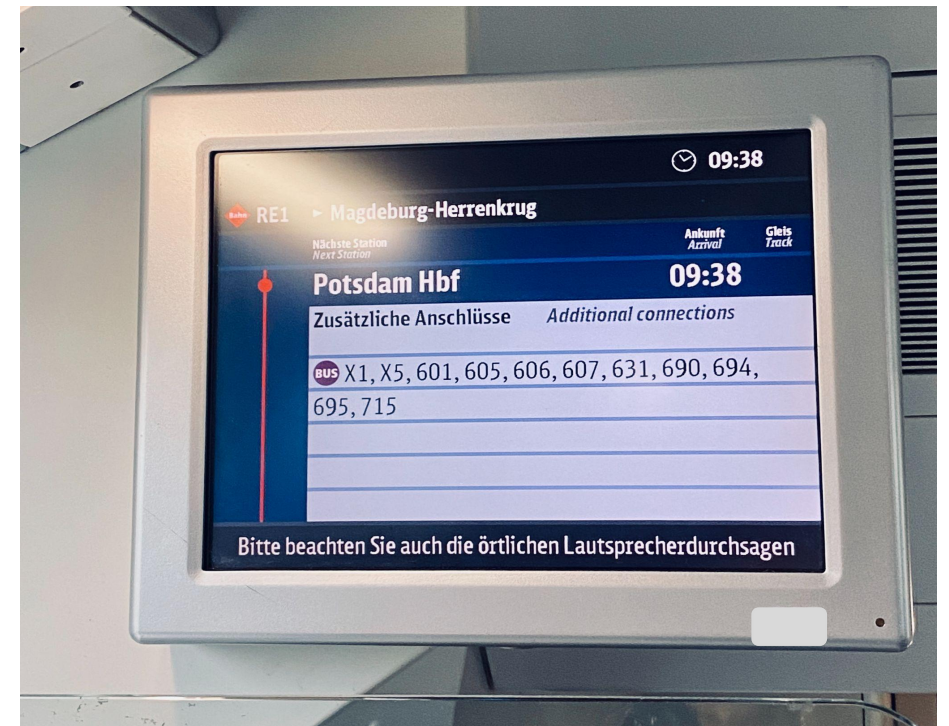
On a regular basis transport operators connect with a captive audience that is highly valued by advertisers.

We have developed an access to multiple networks of placement buyers specialized in digital real time advertising (DOOH, programmatic), while in parallel our software embedded in the vehicle's router feeds automatically the passenger information screens with advertising content.

**Offer easily the slots available for advertising on passenger displays to the highest bidder.**

### Benefits:

- **Enhanced ancillary revenue channel**
- **Fully managed service**
- **if done well it can even finance the portfolio of entertainment services**

## Maximizing the value of in-vehicle WiFi systems

What about a proof of concept?

Contact: [ralf@paxlife.aero](mailto:ralf@paxlife.aero)

[info@paxlife.aero](mailto:info@paxlife.aero) / [sales@paxlife.aero](mailto:sales@paxlife.aero)

+49 (0) 331 243424-0

Thank You!