

The image features a dark blue background with a large, stylized graphic on the right side consisting of three overlapping circles in red and blue. The top-left circle is red, the middle-left circle is blue, and the rightmost circle is red. The text is positioned on the left side of the image.

EBU

OPERATING EUROVISION AND EURORADIO

SMPTE ITALIAN SEMINAR

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POST COVID => ACCELERATE TRANSFORMATION



› Lessons learned from Covid

- › It is only by **joining forces** that we can fight against adverse events, overcome difficulties
- › **Nothing is going to be as before and what we have learned will become part of our daily future (e.g. Positive and broader collaboration in virtual events)**
- › This evolution is creating **New Opportunities** : in production, distribution, etc.



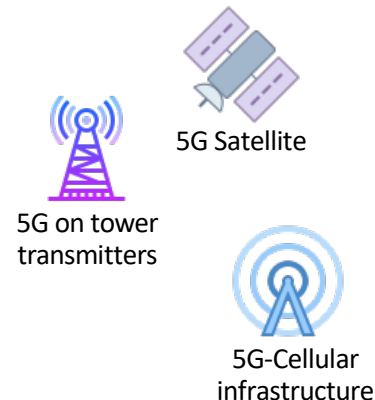
› Structural opportunity

- › accelerate change **winning resistance to innovation** while proactively **joining forces**
 - › **“Repeating”** ... GSM and DVB success stories



BROADCASTING IN POST COVID TIMES

- › The combination of unique and **trusted content** delivered via a **multilayer infrastructure** combining **internet and broadcast** has been demonstrated to reliably serve citizens during the COVID crisis
- › The need to **sustainably reach 100% of the population** (fixed) **and 100% of any territory** (mobile) with a **guaranteed quality of service** has been and remains the ultimate priority.
- › The ensemble of **5G specifications** combined with a **multilayer architecture** represents a tangible opportunity to sustainably implement this ideal goal.



THE STRUCTURAL ROLE 5G COULD PLAY



- 5G derived technologies can play a central role **from content production to distribution.**
- Implementing a solution to transparently integrate **internet and broadcasting as an IP-based infrastructure**, seamlessly distributing media content using cell sites, broadcast towers and a satellite overlay.
- The unicast delivery of personalized contents, the broadcast of events addressing large audiences and entire territories and the multicast push delivery of content with scalability, **using local storage at network edges**, can maximize efficiency and economical sustainability of large-scale content distribution.

TOWARDS IP NATIVE BROADCASTING

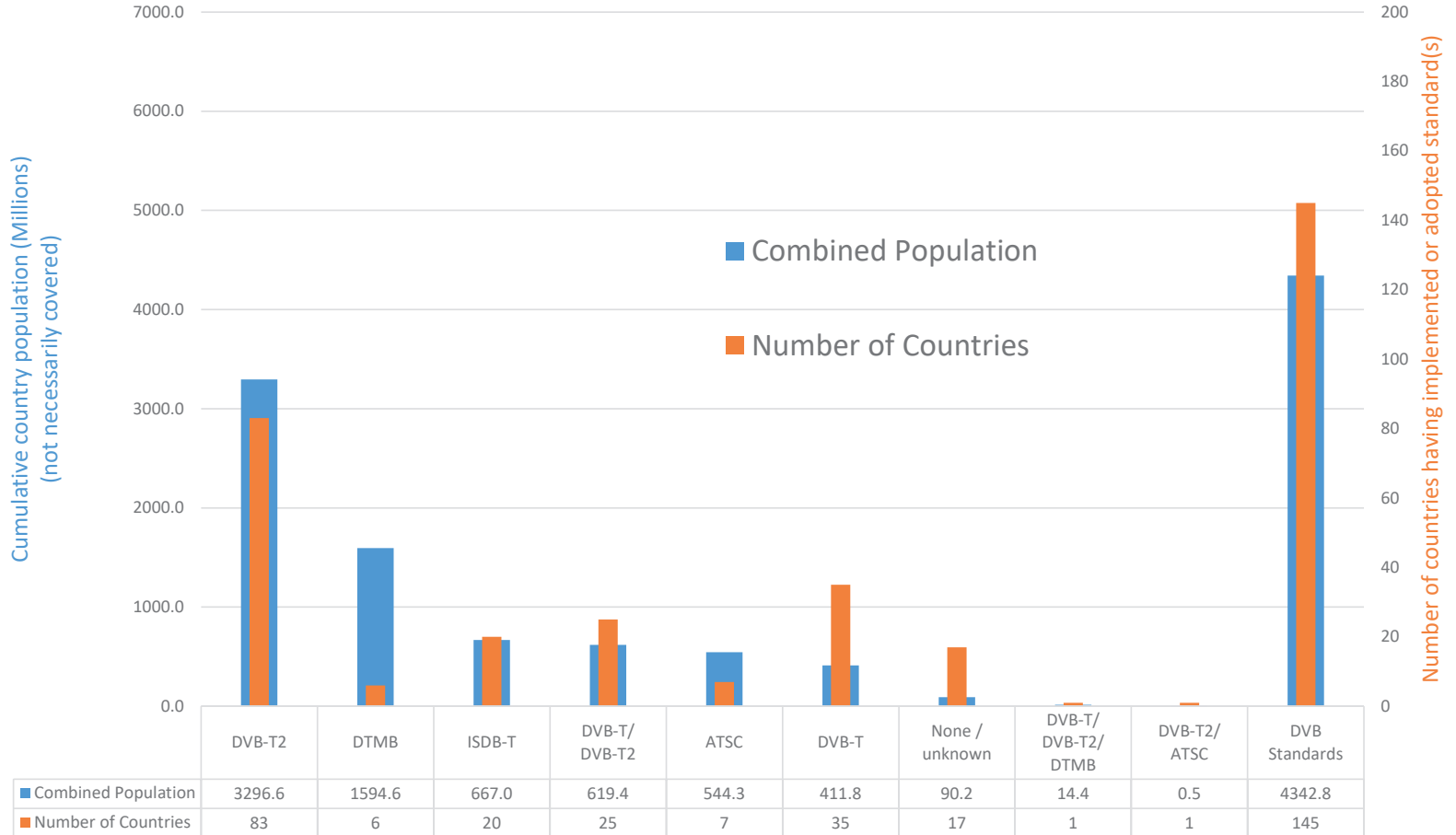


- **Linear terrestrial and satellite broadcasting will continue as a mainstream format well into 2030s** but needs to be reinvented to remain relevant in the medium/long term especially when considering the evolving consumers' behaviors and the need for new sources of revenues (e.g. targeted advertising)
- **Evolution will happen in different moments for different countries.**
- **An evolution towards IP connectivity which includes broadcast combined with edgecast and unicast** is the solution to guarantee a structural, economic and efficient role for broadcasting in the medium to long term.
- A multilayer IP solution will allow to **progressively serve all markets improving cost effectiveness and covering all population/territories.**

DVB T/T2
Deployed in
145 countries
Reaching
4.3 B users

Source - DVB Scene
March 2020

DTT Standard(s) (implemented or adopted)





5G : SUPPORTING THE MEDIA INDUSTRY EVOLUTION

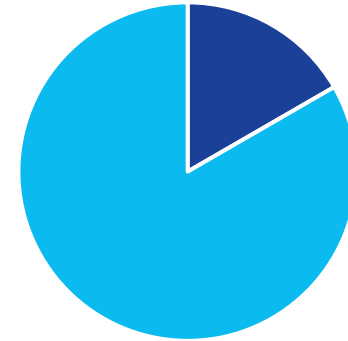
- **5G is designed to support vertical industries** enabling the deployment of software-based network elements, and the provision of **standardized interfaces and APIs towards service providers and application developers.**
- Combining a **cloud-based network architecture** approach with media network functions it is possible to deploy an integral infrastructure for media distribution with a seamless integration of unicast, multicast and broadcast functions.
- **Broadcast/Edgecast can be used to distribute popular media content to end-user network edges and network head-ends** converging existing broadcast delivery mechanisms with online media services. While the end users' access to media content remains unchanged, the playout application will seamlessly connect to the application running on the 'Cloud/Edge' solution.



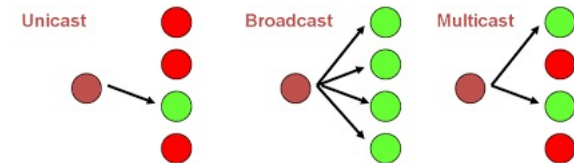
THE ADVANTAGES OF EDGECASTING

- **Distributed Edges** can run applications for high quality immersive and personalized services **with an optimal Quality of Experience by caching the playout content** as close as possible to the media consuming audiences.
- Content can be cached and processed closer to the end user to include **on-demand requests, personalization, targeted advertising, localization and optimization of the quality of the media consumption experience of end users** in vehicles such as cars, trains, planes, ships or those audiences in fixed locations such as houses or apartment complexes.

Hours/day



■ Live Broadcasting ■ Push Multicast





THE ROLE OF STANDARD EDGE GATEWAYS

- In the near future broadcast **receivers should likely be integrated in home gateways or edge gateways, with a local edge storage and with interfaces to all locally available networks**, selecting the best network for each available content using DVB-I mechanisms.
- Taking into account this market evolution we can envisage a **basic market including home, office, hospitals, bars, restaurants, etc.** installing local edge gateways creating a market of several tens of millions of units installed per year.
- This baseline market will also include **receiving gateways installed on network nodes** (e.g. NodeBs, V2X nodes).

SUSTAINABLY IMPROVING RESILIENCE AND SECURITY



- **Combining different physical infrastructure**, we can create a resilient, reliable and sustainable infrastructure to deliver essential services to the whole population and in the whole territory.
- The availability of concurrent networks is also fundamental to **guarantee reliability and security of service delivery**.
- A single infrastructure will not meet all needs. **Using a combination of several layers of security on different physical supports will provide redundancy and reliability**.
- **The cost and the power consumption** of the whole distribution infrastructure can be **optimized while guaranteeing the coverage of any territory**.
- **An optimized number of base stations and a reduced peak traffic requirement** will translate in better economies for any operator

THE DIRECT TO MOBILE BROADCASTING OPPORTUNITY



- **The need to cover users in mobility** has emerged in the last decade as a fundamental requirement for any content provider.
- **The arrival of autonomous vehicles in the coming years** will create a new opportunity for the delivery of high-quality media content
- The complexity is here linked to a **double requirement** : being able to **sustainably deliver contents (e.g. live events) to large number of users** while covering users in mobility and therefore on 100% of any territory.
- This represents a challenge that **requires the combination of cellular infrastructures for the delivery of unicast content , terrestrial 5G broadcast infrastructures and a satellite broadcast overlay** with a corresponding financial cost that needs to be properly optimized.
- The mobile terrestrial coverage will likely remain limited to high density areas in view of the reduced ROI vs a very high capex and opex costs linked to the operations over large territories with a low number of average users.

SATELLITE + TERRESTRIAL



- The solution for such a need is that of combining the existing and future terrestrial mobile infrastructures with a **hybrid IP based broadcast infrastructure combining terrestrial towers and satellites**.
- We envisage here a multilayer infrastructure with **terrestrial cellular and broadcast infrastructures delivering content to personal devices and vehicles in highly populated areas** while the vehicular market in areas uncovered by the terrestrial infrastructure (e.g. rural but also maritime, aeronautical, etc.) would be served directly via satellite.
- The availability of a multilayer broadcast infrastructure could also be very efficient **to deliver software upgrades and files** in general to large number of vehicles at the same time on 100% of any territory and at a sustainable cost. Those vehicles could be cars but also buses, trains as well as airplanes.
- The distribution of broadcast/multicast IP contents to 100% of any territory, receivable with compact self-pointing antennas/receivers, will also give access to **nomadic reception** in rural areas and developing markets.

5G FOR CONTENT CONTRIBUTIONS (1)



- **The availability of 5G networks with low latency and guaranteed quality of service** obtained using dynamically assigned and secured network slices will create a new set of **opportunities for audio-visual production and contribution.**
- The combination of a **flexible bandwidth on demand mechanism** combined with a **cloud-based production infrastructure** is going to revolutionize not only professional audio-visual production but **opening new markets for semi-professional and individual content production and/or contribution.**
- The shared experience of large-scale videoconferencing combined with the acceleration in remote audiovisual production, strongly demonstrated during the Covid crisis, is heralding the creation of a new market where **thousands of professionals will be able to efficiently produce contents and develop new story telling.** These new technologies will likely allow the development of new semi-professional services and the expansion of bandwidth on demand services down to the consumer level.



5G FOR CONTENT CONTRIBUTIONS (2)

- These same products and services will also be used in areas other than media production starting from **applications in healthcare** supporting applications as diverse as **telemedicine, tele-surgery and flexible and large-scale de-hospitalization**.
- **5G based networks in combination with fiber connectivity will represent the new backbone between media studios, venues and offices.**
- Satellite contributions (GEO based) largely used for many years for major events (where direct fiber connectivity was not available) may progressively be **replaced by 5G contribution solutions once bandwidth on demand with guaranteed QOS will be made available.**
- The availability of **LEO satellite infrastructures**, promising low latency and high bit rates could also be considered if and when guaranteed quality of service can be provided by these new satellite network operators.

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THANK YOU !

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