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5G AND MEDIA

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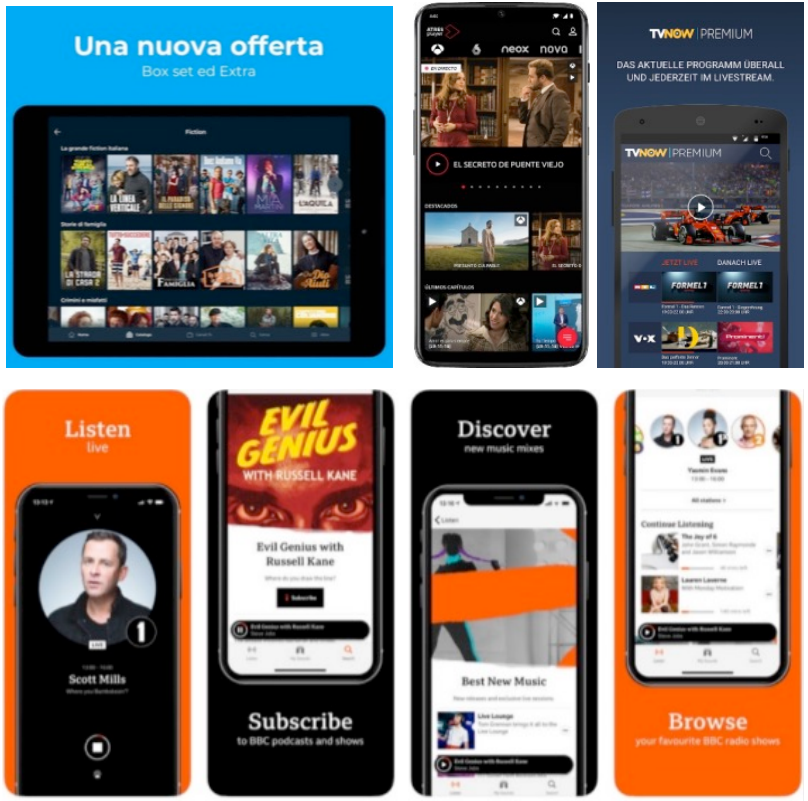
5G FOR CONTENT DISTRIBUTION

- **Linear TV / Radio**
  - News, sports, live events,…
- **Non-Linear**
  - Catch-up, on-demand, personalization, podcast, targeted advertising,…
- **Enhanced Media Services**
  - Linear + Non-Linear
- **Public Warning Services**
  - almost 100% Pop & Territory, no congestion …
- All widely offered by public service and commercial media organizations



5G FOR MEDIA PRODUCTION AND CONTRIBUTION

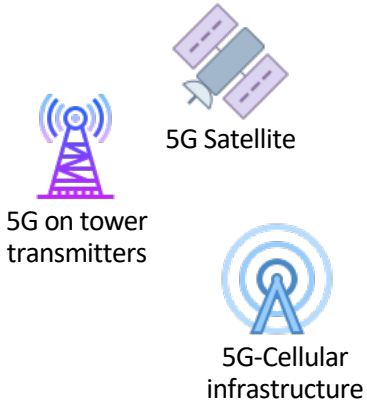
- A new dimension for **Remote Production**
  - Higher bandwidth, low latency, synchronization, edge computing are key features for enhanced production workflows and flexible wireless deployments.
- **Newsgathering** and **Outdoor Broadcast**
  - Quick response to events with a new approach to newsgathering and outdoor broadcast leveraging network slicing and the connection of media production equipment to 5G networks.
- **Non-Public Networks** and **Media Campus**
  - Leveraging the development of non-public networks to integrate wireless production equipment into media premises, TV studios as well as on third-party networks. **Security** over public and non-public networks is also a key issue for media production applications.
- **Edge Computing**
  - Bringing cloud production processes to the edge and exploiting the operational models for media organizations to access network resources in 5G networks.

WHY 5G FOR DISTRIBUTION ?

- **5G** offers **a multilayer** support for **IP distribution**
  - distribution of **linear** and **non-linear** contents are supported by 5G standards
  - The present 5G 3GPP specifications include unicast, multicast and broadcast modes. A unified architecture can be configured according to the specific needs of contents to be delivered.
- **5G** is a **global standard** with **world-wide market reach**
- **This is a practical way** to address **all devices**
- **But** a UNICAST only model:
  - Lacks scalability for increasing audiences
  - Coverage is dependent on terrestrial network operators (fiber and cellular)
  - No free access for users (you need to pay a monthly subscription)
  - No guaranteed QoS or service integrity
  - Distribution cost
  - High degree of gatekeeping in the distribution chain

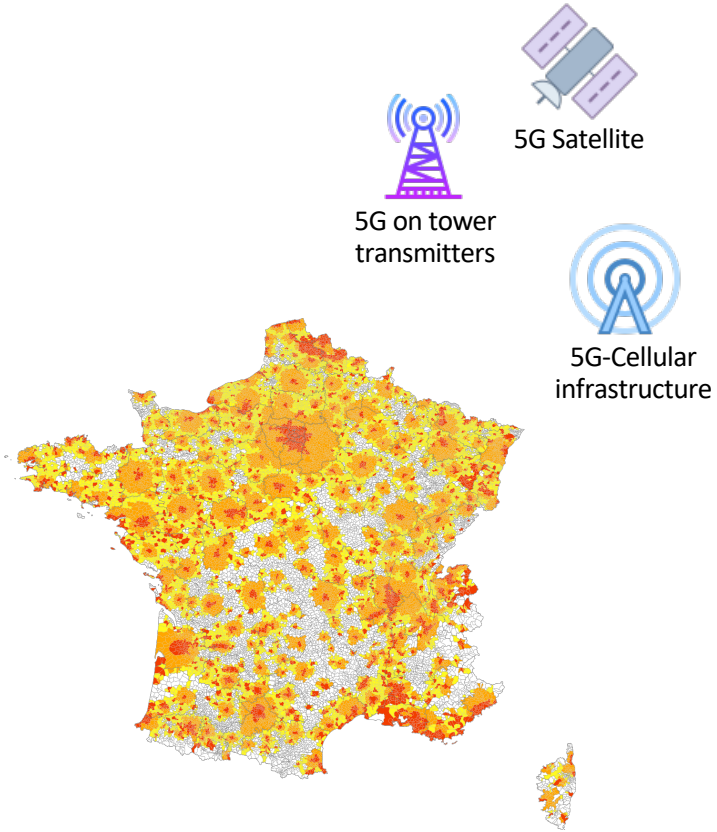
USE THE LAW OF PHYSICS WHERE THE WORK BEST

- **Collaborative 5G infrastructure:** providing services over a wide area using a cooperative multilayer network
- **Enhanced user experience:** creation of a delivery system able to effectively meet the evolving user requirements for access to media services :
  - from **highly personalised** and interactive to **highly popular live** events
  - in a technically and **cost-efficient** way
- **Intelligent receivers**: optimising reception of the provided services (including two-way unicast services)



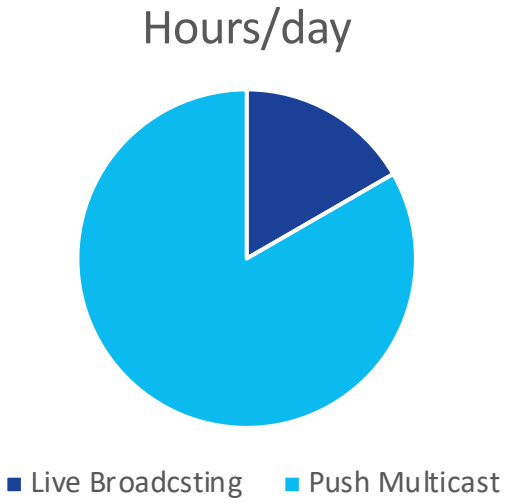
A GREEN SOLUTION BASED ON A MULTILAYER APPROACH

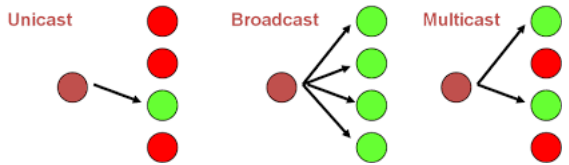
- **The cost of and the power consumption** of the whole distribution infrastructure is **optimized combining cellular 'base stations' with broadcasting towers, covered by a satellite overlay**, guaranteeing almost 100% area coverage of territories. An optimized number of base stations will mean **better economies and less energy consumption**.
- **Towers will cover urban/suburban** outdoor areas for mobile personal devices (and where satellite delivery solutions will not be able to reach), the **Satellite overlay will cover vehicles and all other mobile** (boats, planes,…) and nomadic reception devices.



A GREEN SOLUTION BASED ON A MULTILAYER APPROACH

- Most content in today's linear channels is pre-recorded and only a small part is native live (typically 3 or 4 H/day). **Only live content has to be delivered in real time**. **Pre-recorded content can be stored in caches on network edges** during the time of lesser network load, live content can also be stored in the same way for later on-demand viewing
- The stored content can then be delivered in two ways: as a linear channel - combining live an non-live programmes in a schedule or on-demand from a catalogue, **network load can be optimised in time** (e.g. outside the live transmissions the capacity is used to feed the caches) or by utilising the multiplex gain as not all channels require constant capacity





THE MEDIA INDUSTRY IN THE 5G ECOSYSTEM

5G Networks and Operation Models

- Enhancing linear and nonlinear media to reach mobile devices and cars
- Scalability and wide-area coverage by broadcast, multicast and unicast capabilities
- Deployment models for production, contribution and distribution
- The potential of network slicing, MEC, cloud architectures, public and non-public networks,…

SYNERGIES WITH INDUSTRY VERTICALS

Automotive Industry

- Connected cars with universal IP connectivity and coverage
- Sustainable quality of service and service continuity on the move
- Use of unicast, multicast and broadcast for infotainment, safety or software updates

SYNERGIES WITH INDUSTRY VERTICALS

Public Warning Services

- Common interests in terms of near-universal coverage, reliability and availability
- Advancing on network architectures able to support the delivery of multimedia messages to massive audiences

SYNERGIES WITH INDUSTRY VERTICALS

Connected Industries and Automation

- Flexibility, versatility, usability and efficiency for professional applications
- Seamless integration of equipment and high degree of automation in the domain of media production
- Exploring convergence of different communication technologies in use today
- 5G as a standard wireless technology enabling wireless communication from the field to the cloud.

WHAT ARE THE NEXT STEPS?

Ensure 5G meets the requirements defined by the media industry

- Engagement in **3GPP standardization** to ensure standards can be used for **media production, contribution and distribution**

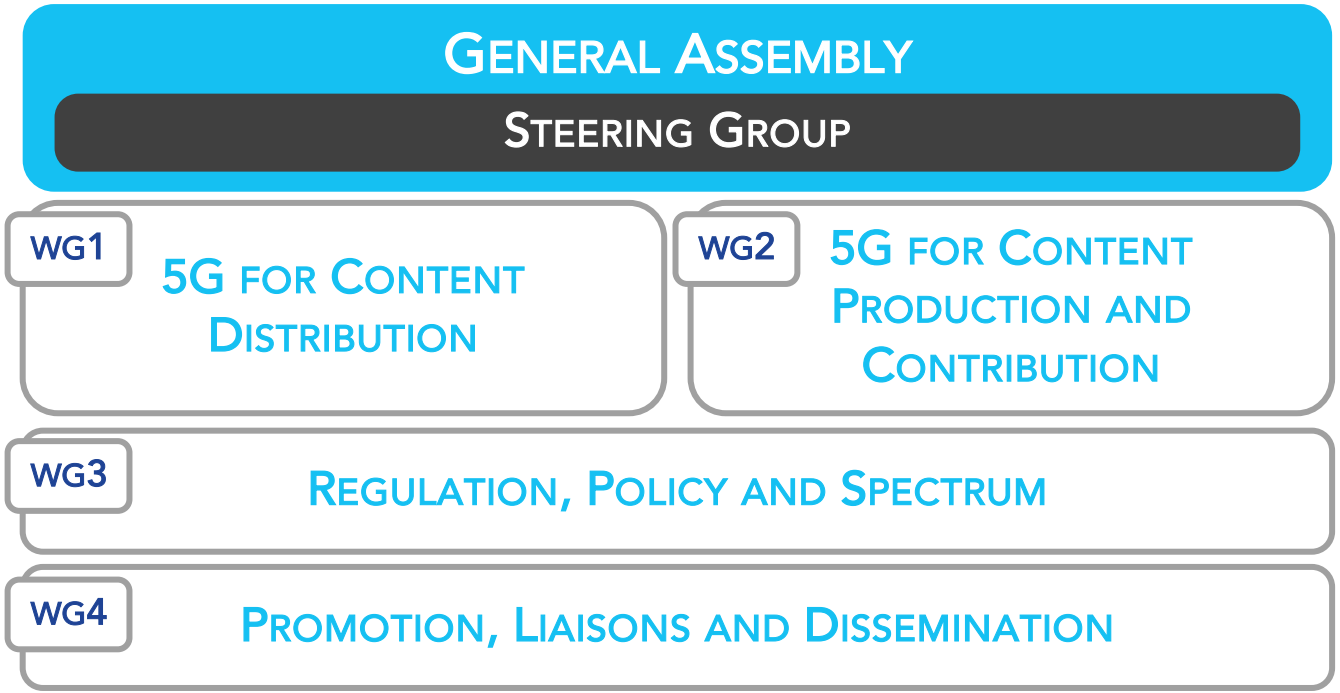
Assessing business and deployment models

- What are the **business models** and **commercial arrangements** required for their **deployment** and **implementation**?

Enabling the market for successful implementation

- What are the requirements in terms of **network equipment**, **terminals** and **infrastructure**?

5G-MAG STRUCTURE



5G-MAG MEMBERS

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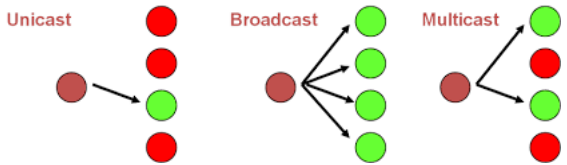
BACK UP

COMBINING BROADCAST/MULTICAST AND UNICAST

- Combining broadcast/multicast using **Towers + Satellite overlay + Unicast Cellular** to
  - The **broadcast of events** interesting large number of users and entire territories
  - The **unicast delivery of one to one personalized contents**
  - The **multicast push delivery** of multimedia contents
    - entertainment contents but also other public service contents (e.g. live traffic/alerts, navigation corrections and emergency information)
    - and in general software and information distribution to large population of users with a zero marginal cost per additional user
    - The same contents delivered to mobiles/vehicles can be received and managed at the very edge of the network (end devices) and at the level of any edge server in general
  - Using a **local storage** to maximize efficiency and economical sustainability.
  - At the exception of some limited cases where the information flow can be purely unidirectional (emergency transmission or free to air broadcast content delivery) , it is always assumed the existence of a bidirectional link resource for the integration and orchestration of the 5G multilayer approach.
  - Broadcast-only would also work in areas where there is no unicast/uplink coverage



5G FOR CONTENT DISTRIBUTION

› **Public Service Media Requirements** input to 3GPP

- Predictable and Sustained QoS
- 100% Dedicated Broadcast Carriers
- Large SFN Coverage
- Receive-Only Mode without SIM-Card and Uplink
- Standalone eMBMS Network
- Shared eMBMS Operation
- Fixed and Mobile Reception

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5G FOR CONTENT DISTRIBUTION

› **5G Broadcast (Release 16)** is the **solution offered by 3GPP** to support the **requirements of public service media distribution**

Large coverage areas
100, 200 and 300 µs Cyclic Prefix

Fixed and Mobile reception
Broadcast and mobile networks
Support for higher velocities

Flexible network capacity
100% allocation of broadcast sub-frames
Enhanced Synchronisation subframe (CAS)

Dedicated broadcast networks
Specified TMGI (PLMN) for broadcast carriers

Free-to-air reception
Receive-only devices without SIM

Defined Interfaces
xMB for Content Providers
MBMS-API for Application Developers

Transport-only mode
Option to carry existing A/V formats

Shared broadcast
Common broadcast carrier available to multiple mobile networks