

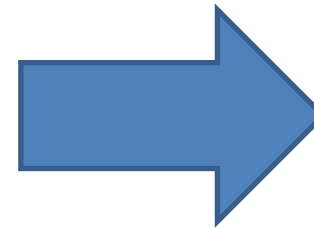


# Networld2020/NEM joined WG white paper presentation

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# NEM members taxonomy



Many specific requirements for the networks

# Future networks should (1/2)

Future delivery networks should :

1. Be ATAWAD (any device and multiscreen), seamless access to any content (the most important topic following a recent survey)
2. Support more and more devices (high end but also low end devices)
3. Support higher quality (4K, 8K, 3D, ...)
4. Support better latency (games)
5. Could be configured according to the content requirements (i.e. SDN/NFV)
6. Support LTE/DVB convergence
7. Support Personal device synchronisation and auto discovery
8. Include Home networking
9. Support B2B streaming technologies based on consumer equipments
10. Support Quality of experience placement of content in the network, graceful degradation, complexity hiding

# Future networks should (2/2)

Future delivery networks should :

11. Support Virtualisation of networks (NFV/SDN, seamless connection via tablets to content)
12. Support Networking and computing technologies enabling “Visualisation as a Service” business models
13. Support Very high speed transmission for media (optical and wireless infrastructure), ubiquitous access to it for producers and consumers, strong networks geographically widespread, ultra-broadband
14. Offer New low power wireless protocols
15. Be interoperable (wireless, fixed and satellite)
16. Allow rights management and rights information management
17. Improve accessibility for the disabled
18. Allow for handling big data
19. Convergence: Internet, phone, TV, mobile and content (music, video, games, book, ...)

# Future networks should (3/3)

- In particular, standards able to support bandwidth reservation, guaranteed throughput, low or at least consistent latency, real-time monitoring and clock synchronization are needed, also as a way to enable large interoperability between different platforms and markets.
- Security & privacy aspects are very much an inextricable aspect of content distribution, and will play an enabling role in the deployment of networked visualization systems, in particular for professional markets. For example, challenges such as privacy, remote participant identification, secure content sharing, in remote collaboration/video conferencing are yet to be resolved.

# Parameters (1/2)

1. Content delivery
  - Unicast
  - Multicast
  - Broadcast
2. Content transmission
  - Linear
  - On Demand (Synchronous/Asynchronous)
3. Interactivity
  - Latency
4. Content security
  - DRM
5. Authentication, Accounting, Authorisation
6. Identification
  - Content provider
  - End user
7. Network capabilities Connectivity
  - Best network connectivity
  - Connectivity profile configurability (IoT)
  - Location
  - Cost of the service
  - User context
    - Presence
    - Device capabilities
    - User personalisation (including disabilities)
  - Storage (link to big data)
    - Durability

# Parameters (2/2)

8. Content popularity
  - Audience (Content provider -> Service provider)
9. Content Lifetime (Content Provider -> Service provider)
  - ex : I want that this content remains x hours available in the network
10. IoT content
  - Content broker/content aggregator
  - A sensor is a content provider
11. ATAWAD
  - Transcoding service
  - Service continuity
12. Service quality (measurable),
  - SLA
  - QoS
  - QoE



## Use cases in the M&E Whitepaper

5G shall enable at least six main families of M&E use cases in the 2020s with an overall user experience that well exceeds that of 4G and other legacy networks

1. Ultra High Fidelity Media
2. On-site Live Event Experience
3. User Generated Content & Machine Generated Content
4. Immersive and Integrated Media
5. Cooperative Media Production
6. Collaborative Gaming





## Use case 1: Ultra High Fidelity Media

Rapid progress in display and capture technologies enable highly immersive viewing in high resolution (UHD), multi channel sound  
Linear and non-linear content

Stationary (large UHD TV-sets) and portable devices  
(smartphones, VR devices)

5G should enable high quality user experience, through appropriate network design and management, e.g. by high speed transport, network (local) caching of content



## Use case 2: On-site Live Event Experience

Large event sites (cinemas, stadiums etc.) provide improved connectivity to enable improved customer experience: replay, choose a specific camera, language, augmented reality to bring additional information



## Use case 3: User Generated & Machine Generated Content

People or objects create increasing amounts of content to share it with others or store it in the cloud

future 5G network should support on demand high upload bandwidth and streaming from various devices (camera, health and wellness measurements, building sensors)



## Use case 4: Immersive and Integrated Media

Media becomes immersive and highly interactive

ambient media consumption at home, on the move, with content capable of following the users and adapt to his ambient for viewing

5G should enable immersive video, from 2D to 3D virtual presence

Immersive video conferencing for collaborative and remote working



## Use case 5: Cooperative Media Production

Content will be captured and shared immediately,  
utilising 5G enabled cameras and microphone, from anywhere to  
anywhere with additional metadata automatically pre-attached  
e.g. spatial location data

content will be worked upon by different users in multiple  
locations simultaneously and the content should be able to be  
automatically repurposed for different requirements

Large reduction in media production times is expected



## Use case 6: Collaborative Gaming

Gaming will expand into a full immersive multi-sensorial environment

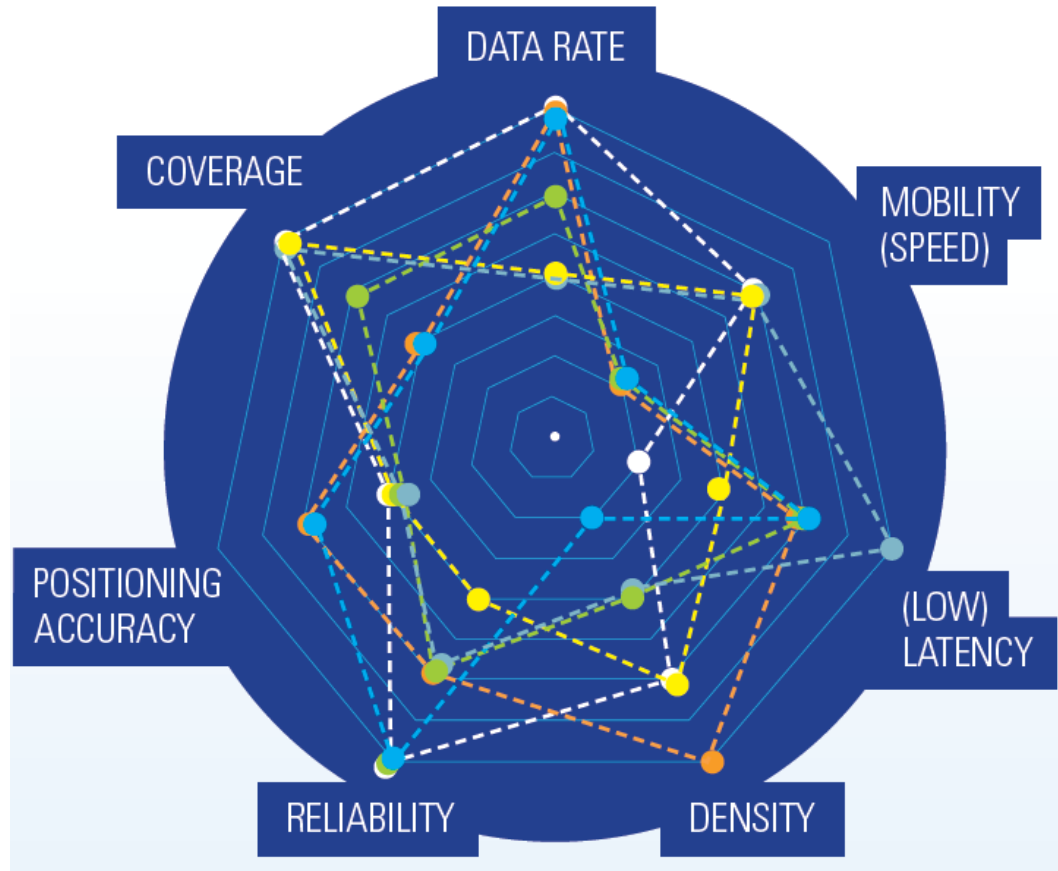
- will result in a more realistic experience, from home towards anywhere

- improved ability for users to collaborate within the game, mixed physically and augmented reality

- no limitation on the number of simultaneous users



# Critical requirements



- Ultra high fidelity media
- On-site live
- User/Machine generated content
- Immersive and integrated media
- Cooperative media production
- Collaborative gaming

# Demos and pilots in 5G PPP Phase III

	<b>Security</b>	<b>Performance</b>	<b>Scalability</b>	<b>Agility</b>
	Reliability, identity, confidentiality, integrity, availability	(Peak) Data Rate, mobility (speed), data rate uplink, E2E latency	Coverage, density / Nb of devices, energy efficiency, positioning accuracy / location	Service deployment time, service reconfiguration time, elasticity
1: Ultra High Fidelity Media	TT	PPP	PP	CDN?
2: On-site Live Event Experience		PPP	PPP	PPP
3: User Generated & Machine Generated Content	PP	PP	PPP	P
4: Immersive and Integrated Media		PPP	T	T
5: Cooperative Media Production	TT	TT		
6: Collaborative Gaming		PPP	PP	T

See note on next slide



# Criteria considered for filling the matrix (on the previous slide)

Important note:

- Several criteria were taken into consideration for filling the matrix. Besides the expected technology readiness from 5G network technology perspective, also criteria as e.g. availability / maturity of required UE equipment, potential cost aspects (will a Phase 3 project have the budget to do this?) and expected readiness and interest from a vertical sector partner (and users) to participate in a respective trial or pilot were considered and influenced the decision.

Thanks  
for  
your  
attention !