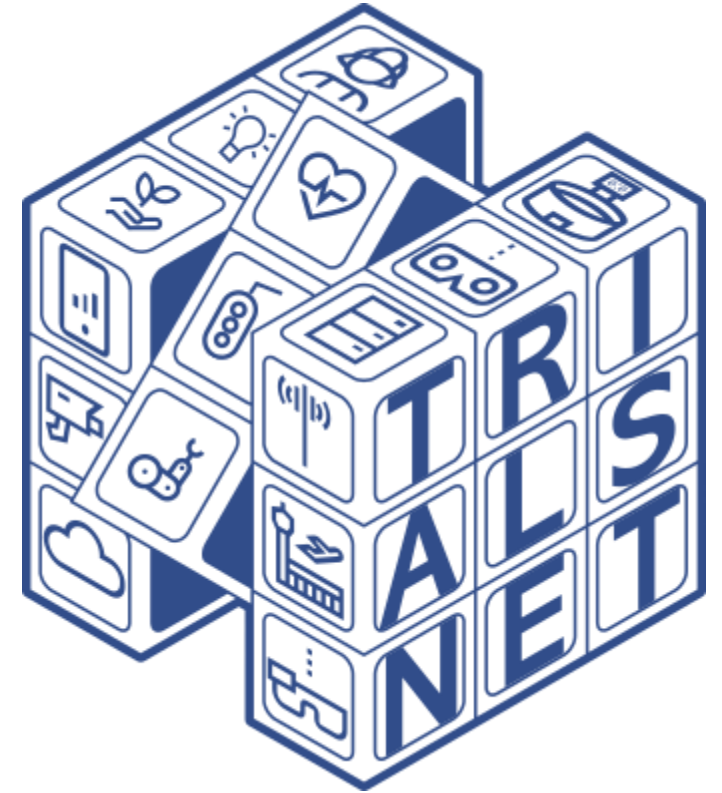


TrialsNet

Short introduction to multimedia use cases, challenges addressed, requirements and initial results from preliminary tests.

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Introduction

TrialsNet will deploy full large-scale trials to implement a heterogeneous and comprehensive set of innovative 6G applications based on various technologies covering three relevant domains of the urban ecosystems in Europe.

Multimedia use cases are within Culture, Tourism & Entertainment domain. The CTE domain offers the possibility to stretch the network performance requirements because it needs in all the scenarios low latency, high bandwidth availability and reliable performance for all the users involved.

VR and AR can be used to enhance the visitor experience at cultural heritage sites and museums, providing interactive and immersive experiences and educational opportunities.

In the entertainment industry, B5G technologies can enhance the quality and reliability of streaming services, allowing for a more seamless and enjoyable experience for consumers.



General challenges

- **Enabling significantly improved quality of experience**
- **Living the experience from anywhere**
- **Achieve seamless service continuity**
- **Ensure privacy protection**



UC10- Immersive fan engagement

This use case aims at increasing the engagement of people who are fans of sport, e.g., during a basketball match.

Two applications will be developed:

- Home use, taking the spectator to the front row of the match with Virtual Reality (VR) and immersive video on smartphones.
- Live in the stadium, bringing the action to the fan regardless of its seat.



UC10- Immersive fan engagement

Requirements:

Device Type	Requirements	Target
App at-home	Upload per 360deg. camera	100Mbps
App at-home	Upload per 180deg. camera	50Mbps
Both App	Upload per HD camera	5-15Mbps
Both App	Upload per Mosaic	10Mbps
Both App	QoS to avoid congestion	API or ad-hoc configuration

Both App	Network Jitter	<15ms
Both App	Network Latency	<30ms
App in-venue	Download per user	10Mbps
App in-venue	Simultaneous users	Up to 5,000
App in-venue	Geo-blocking in the venue	<5 meters

Preliminary tests conclusions:

- Current 5G uplink network provides bandwidth values that fall short of the requirements for live video transmission in venue and at home use cases.
- Tests conducted involved limiting the uplink bandwidth to 18-20 Mbps, whereas the typical bandwidth needed for the described setup in the immersive Fan Experience in-venue use case scenario is approximately 80Mbps.
- The “At home” use case scenario was not tested, given that the uplink bandwidth requirements for this use case surpass those of the “In venue” use case.



UC12- City Parks in Metaverse

This use case develops around the social metaverse concept.

A team of four players with a tablet is tasked with acquiring a series of virtual artefacts (keys) by solving different challenges in four cultural-historical spots of the Valentino Park in Turin. Once all artefacts are found, the game continues in a combat against an evil wizard utilizing VR headsets. The ultimate reward is a virtual exploration with a VR headset of a nearby fortress that is currently closed for renovation.



UC12- City Parks in Metaverse

Requirements:

Device Type	Requirements	Target
Devices	Maximum latency	100 ms
Devices	Maximum number of packets lost	0.5%
Devices	Throughput min (up and down)	10Mbps
Devices	Throughput recommended	40+ Mbps
Devices	Number of users active in the metaverse	24-50 per room

Preliminary tests:

- The conclusion of the first measurements in the lab indicates that the aggregated downlink and uplink loads could be managed by the current 5G network.



UC13- Extended XR museum experience (Turin)

The goal of this use case is to create a modular metaverse platform for visiting museums in Turin through portable devices. The use case will entail creating new interactive experiences in collaboration with museums and will exploit two different metaverse platforms. Users will be able to visit collections with friends and family in remote locations and/or in presence in selected locations. A captivating narrative will also be developed to make the experience more engaging, interactive, and informative.



UC13- Extended XR museum experience (Turin)

Requirements:

Device Type	Requirements	Target
Devices	Maximum latency	100 ms
Devices	Maximum number of packets lost	0.5%
Devices	Throughput min. (up and down)	10Mbps/ user
Devices	Throughput recommended	50 Mbps /user
Devices	Number of users active in the metaverse	24-50 per room

Preliminary tests:

- The preliminary tests that have been carried out focused on the application side. The results of the first measurements indicate that 5G network capacity and application roundtrip delay were sufficient to satisfy the requirements of such test setup.



UC13- Extended XR museum experience (Athens)

In the Athens site, AR-based technologies will be used to leverage on content that elaborates on culture/historic aspects, which will be expanded and be updated. In addition to the content, there will be scope for optimizing the itineraries, to enhance the user experience (and safety when needed). The areas of interest are museums and pathways of historical importance in Athens, Greece.



Parthenon 3d model

UC13- Extended XR museum experience (Athens)

Requirements:

Device Type	Requirements	Target
Devices	Maximum latency	100 ms
Devices	Maximum number of packets lost	0.5%
Devices	Throughput min. (up and down)	10Mbps/ user
Devices	Throughput recommended	50 Mbps /user
Devices	Number of users active in the metaverse	24-50 per room

Preliminary tests:

- The tests successfully demonstrated the main capabilities of the application software developed. They validate the overall architecture of the application, showing it is capable of downloading the Asset Bundles that comprise the content of both the AR and VR applications on demand. The main conclusions of the first measurements indicate that 5G network capacity and one-way delay are sufficient to satisfy the requirements of the use case. Regarding the round-trip time latency, it was insufficient but this was due to the file size of the individual asset bundles (some of them were more than 225 MB).



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Thank you

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