

Hybrid Extended Reality for Creative Arts

This study was carried out within the “HEAT – Hybrid Extended reAlity” Project GA 101135637 funded by the EU Horizon Europe Framework Programme (HORIZON). This manuscript reflects only the authors’ views and opinions, neither the European Union nor the European Commission can be considered responsible for them.

Motivation



- **Performing arts** are **creative** arts that are performed by individuals or groups in front of a live audience.
- The performing arts industry is **varied**, consisting of professional as well as amateur performance organisations and theatres.
- Performing arts are intrinsically **human-centred**: actors, dancers, musicians, singers, etc. interpret the artistic streak of creative authors arousing emotions in the audience.
- Creative arts are conceived as a **social experience**, with the **physical** experience, **emotional** connection, and ephemeral as their **strong values** and at the same time their **limitations** for a direct **digital transformation**.
- This is strongly **limiting** important **opportunities** such as widening their audience and impact and, in some cases, even the potential of connecting with new generations.



HEAT - Hybrid Extended reAlity



- Call: HORIZON-CL4-2023-HUMAN-01-CNECT- A human-centred and ethical development of digital and industrial technologies
- Topic: HORIZON-CL4-2023-HUMAN-01-21- Next Generation eXtended Reality
- Type of action: HORIZON Research and Innovation Actions (RIA)
- Total budget value: € 6 993 207.50
- Project starting date: 1 June 2024
- Project duration: 36 months



HEAT - Consortium



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Ambition



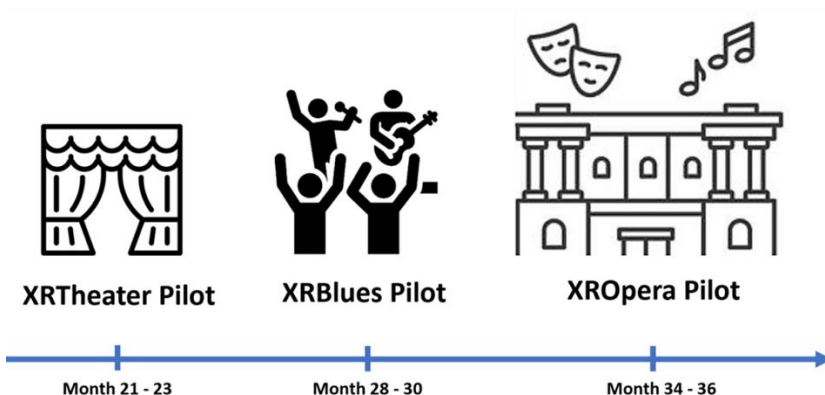
- **HEAT** vision and ambition in the **creative arts** sector is to exploit and demonstrate the full potential of interactive and XR technologies, by enabling rich **hybrid multi-modal** experiences with increased engagement and reach, in a modular, replicable and **cost-efficient** manner.



Application scenarios



- **HEAT** will provide well designed and fully tested **performing arts** scenarios in real-world environments for enhanced XR experiences: a **modern theatre act**, a **music festival**, and an **opera show**.
- All pilot actions will ensure that **GDPR** and **ethics** are addressed for end-users (privacy and ethics by design methodology).

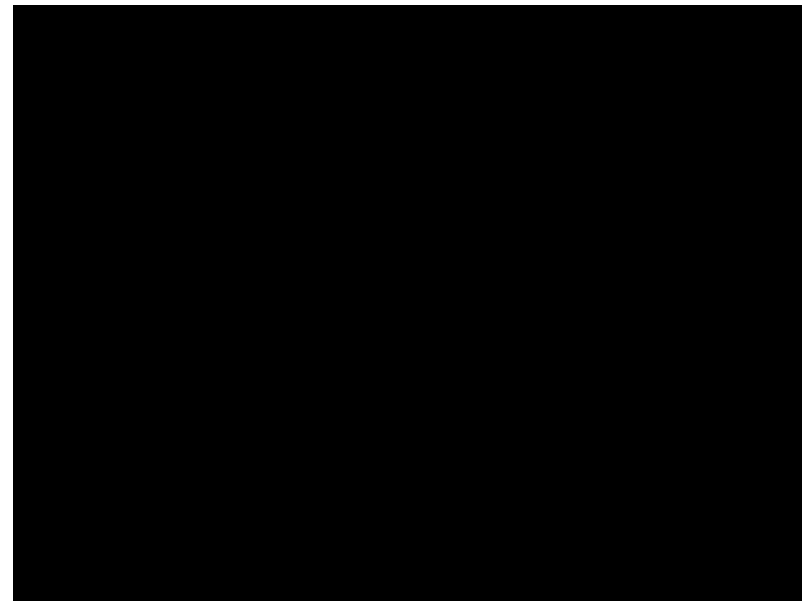


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“On the wild” volumetric capture



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Hologram volumetric capture



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Holoportation



VR holoported user to a
reconstructed environment (3DGS)



XR holographic display

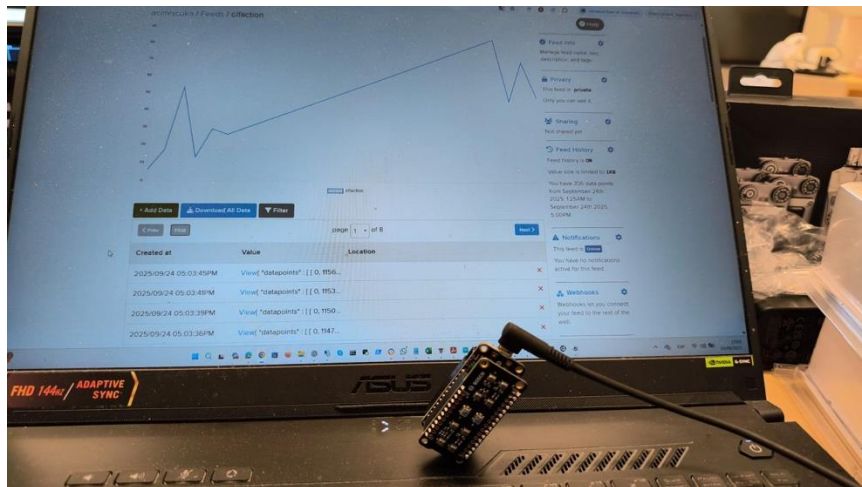


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Multi-sensory olfaction capture and rendering



Semiconducting carbon nanotubes
electronic nose



Olfaction dispenser



Spatial Audio capture

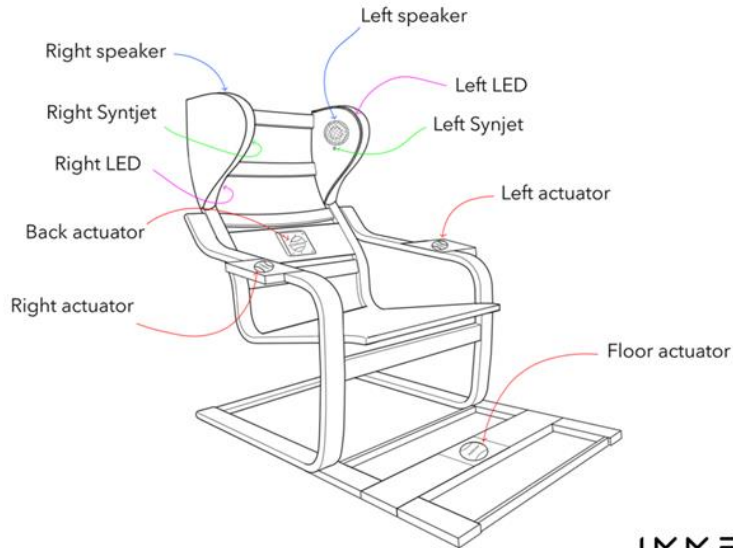


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Haptic multi-sensory chair



IMMERSION
IMAGINATION. INTERACTION ...



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XRTheater hardware pool



Displays:



Large-scale HoloVizio 640 RC – location based



HoloVizio 80 WLT – 3D LF monitor



VR/AR glasses – e.g. Quest3



2D display – 3D like Holobox, LED Fan, etc.

Capture setups:



3D camera setup with processing



Digital Audio Mixer



3D / 6DoF



Electronic Nose

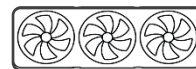


DMX/ART-NET Controller

Scents, Haptics, Sound, Infra:



Haptic Chair



1x-3x Scent emitter - n units



DMX/ART-NET Controller



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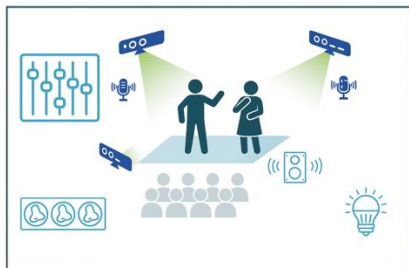
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XRTheater setup



Content Producer / Live Performance

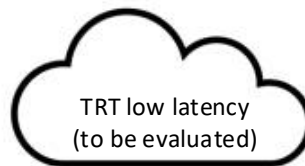


Theatre Act – MacBettu (Cagliari)

Control
±
Sync Data

Ambisonics Live
Audio
+
Live Video
Streaming

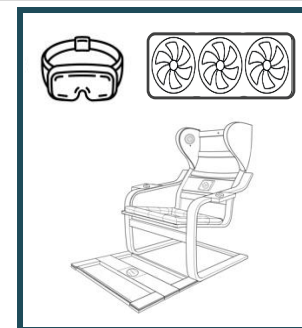
Cloud / Edge Server



Ambisonics Live
Audio
+
VR Streaming

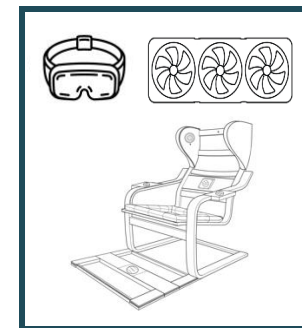
Control
±
Sync Data

Ambisonics Live
Audio
+
VR Streaming



End – User(s)

Remote 1 (seat XX)



End – User(s)

Remote N (seat YY)

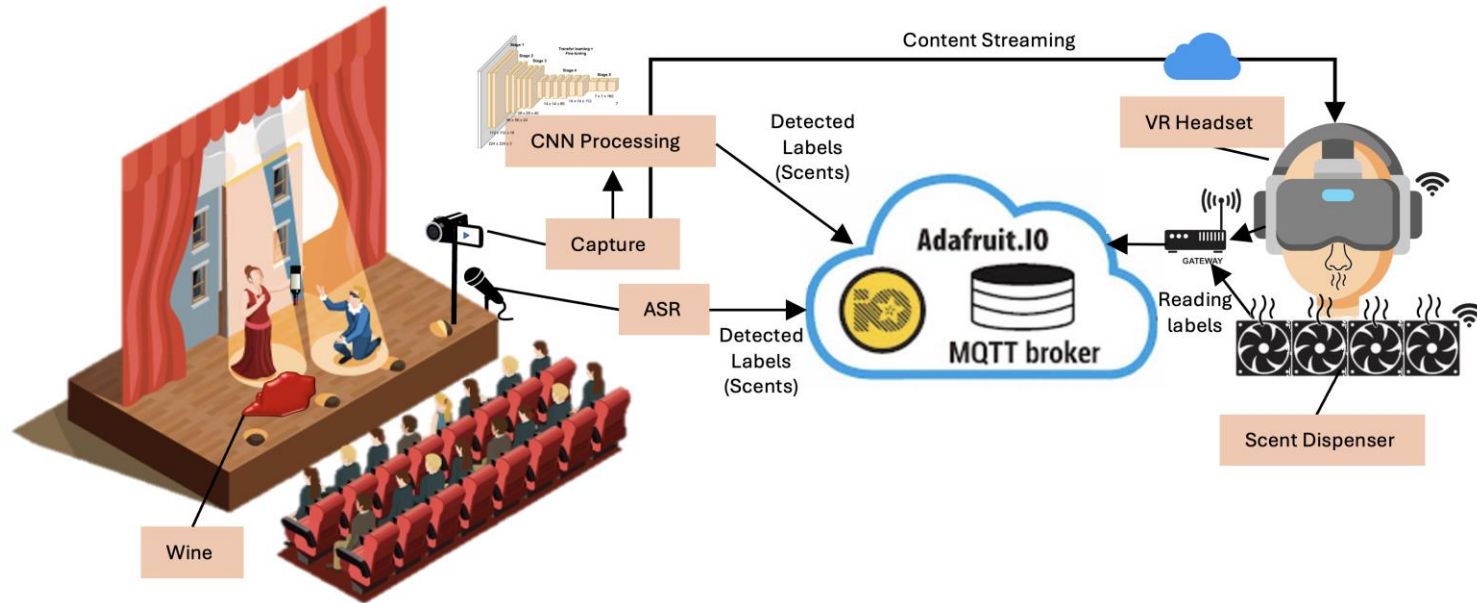
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XRTheater AI-based olfaction pipeline



XRBlues hardware pool



Displays:



Large-scale HoloVizio 640 RC – location based



HoloVizio 80 WLT – 3D LF monitor

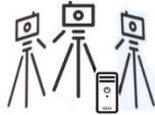


VR/AR glasses – e.g. Quest3



2D display – 3D like Holobox, LED Fan, etc.

Capture setups:



3D camera setup with processing



Digital Audio Mixer



6DoF

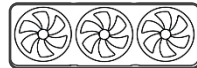
+

Embedded Mic on remote side (PC, Phone) – 1 units



DMX Controller Output

Scents, Haptics, Sound, Infra:

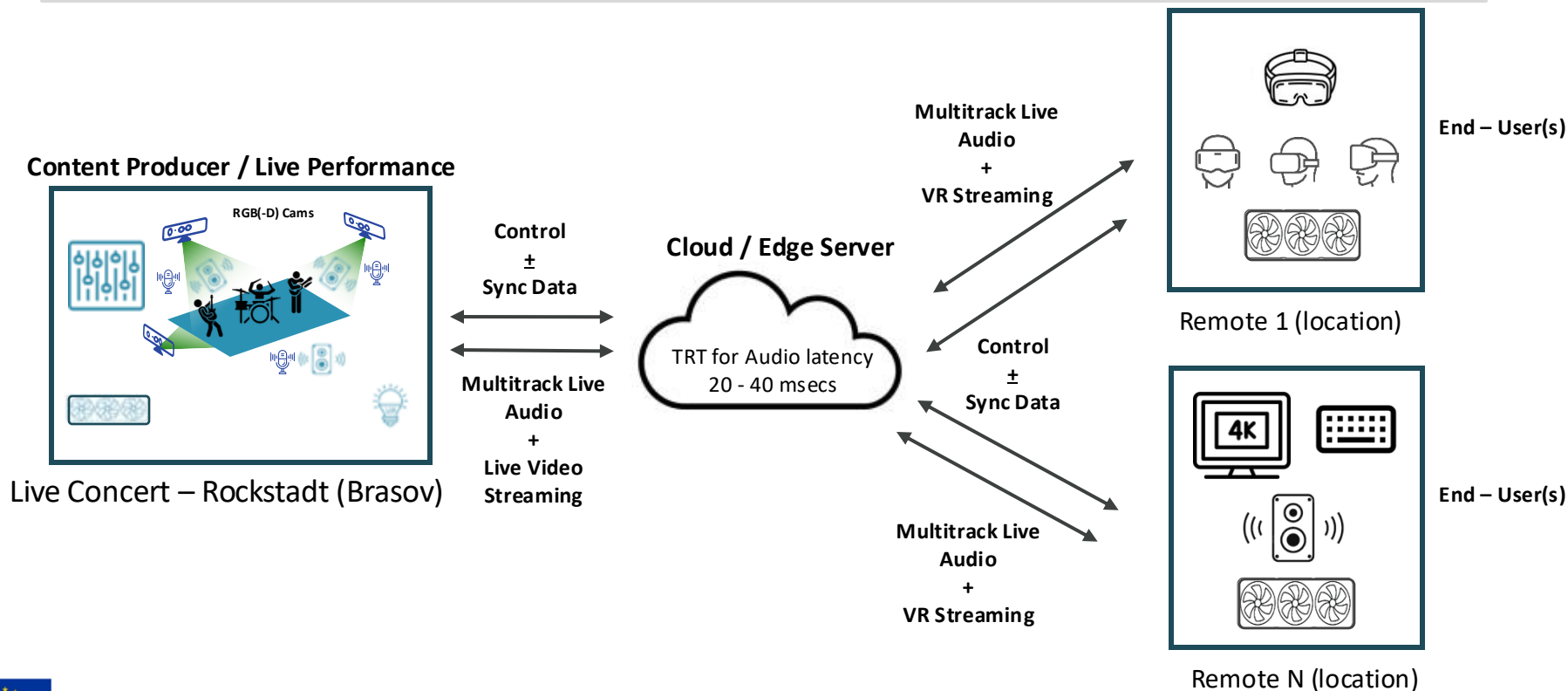


1x-3x Scent emitter - n units



Loudspeakers - 2 units

XRBlues setup

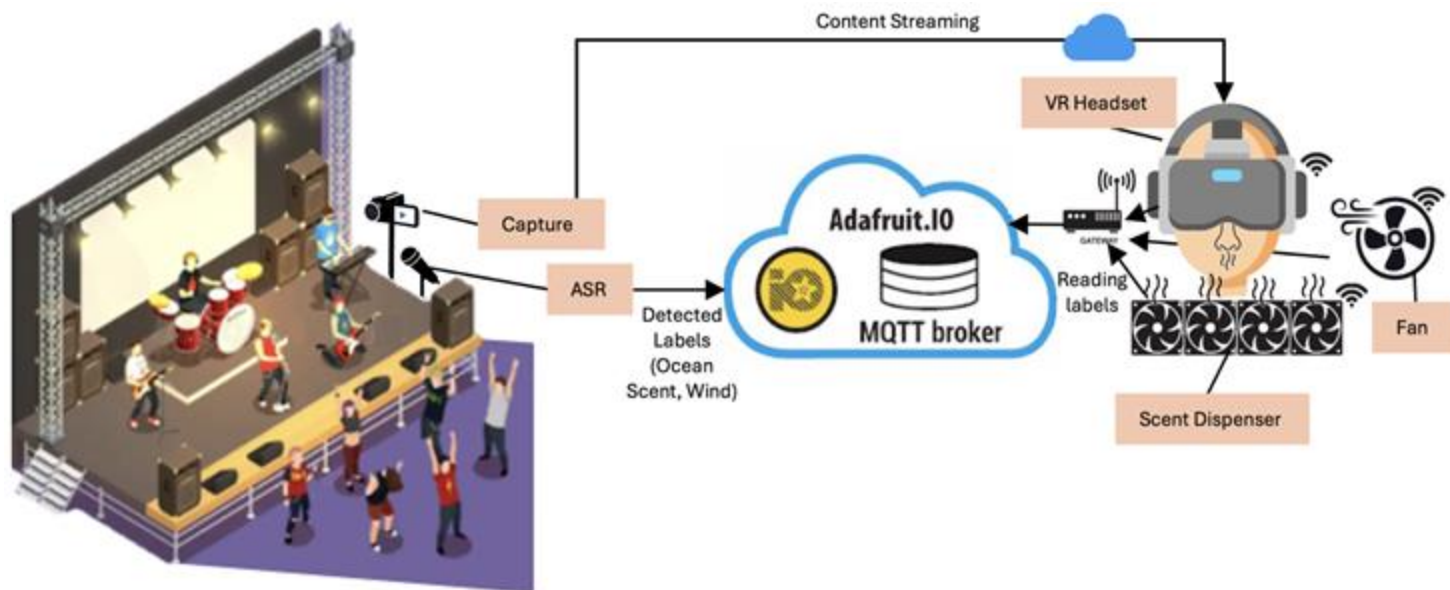


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XRBlues AI-based olfaction pipeline



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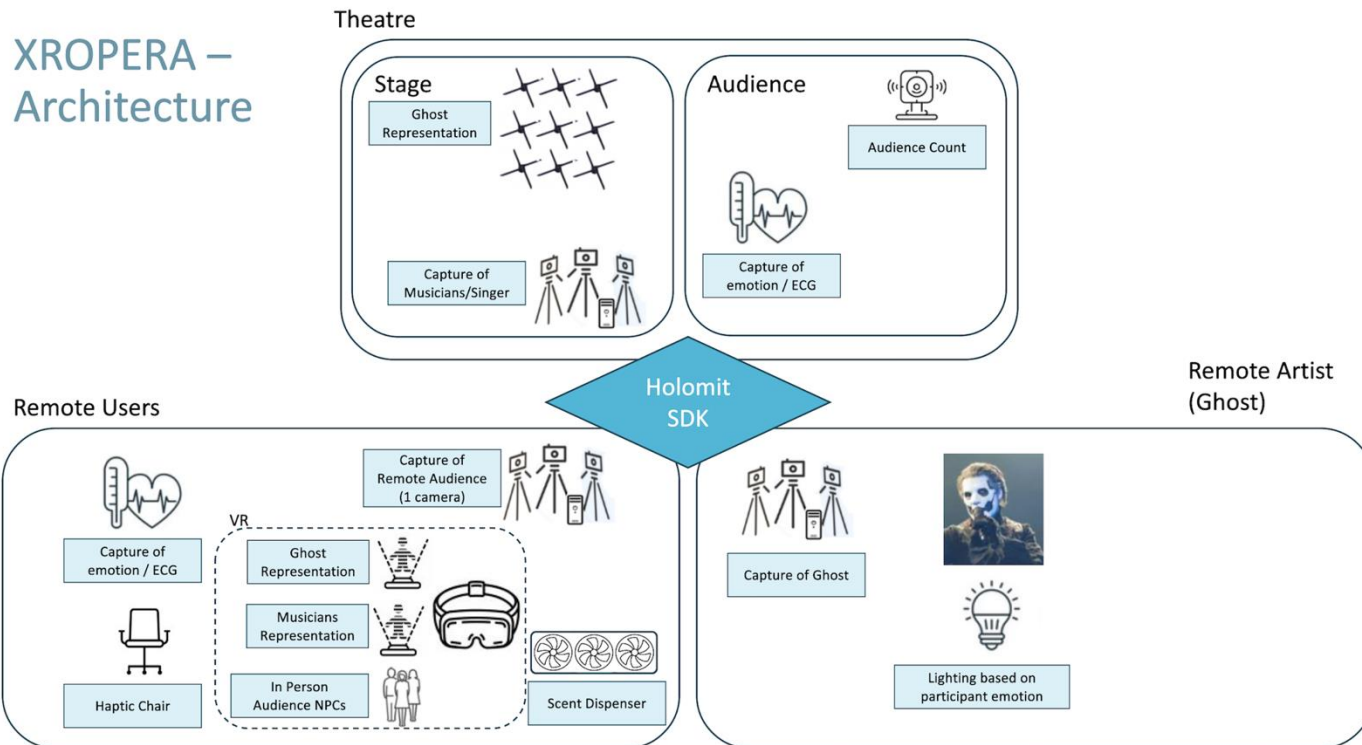
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XROpera setup



XROPERA – Architecture



Immersive Live Concert in the HEAT Project



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HEAT Demos – Virtual Concert



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Virtual Concert: live streaming



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Thank you



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