XR Activities for the 5G Era
- MEC (Multi-access Edge Computing) Use Cases

5G XR Services Planning & Development Dept.
KDDI CORPORATION

Tomorrow, Together　おもしろいほうの未来へ。
KDDI *au*

Agenda

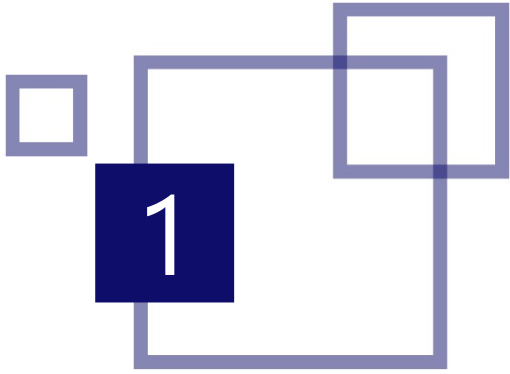**1** 5G Deployment and Telco Edge Computing
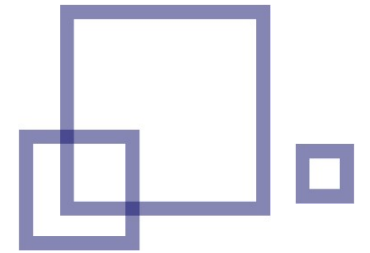
2 KDDI XR Strategy

3 Edge Computing use cases

4 GSMA TEC Trial

1

5G Deployment and
Telco Edge Computing

5G Launch in March 2020 and Now...

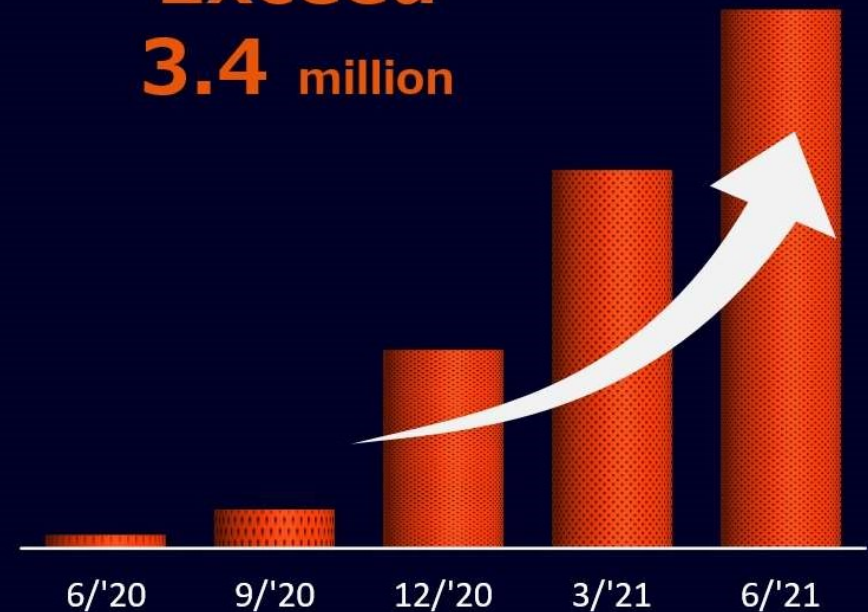For **wide variety** of our customers' experience

Sales of 5G UEs

The end of June, 2021

As of Oct 2021,
41 kinds of UEs
and mobile routers

Exceed 3.4 million

| 6/'20 | 9/'20 | 12/'20 | 3/'21 | 6/'21 |

5G Network Deployment

We will introduce the latest global standard technologies and accelerate realization of 5G based society

5G base stations

FY2021/E

FY2020/E

10K
Base Stations

50K
Base Stations
(Planned)

5G/Beyond 5G investment

~FY2030

$18B
(Planned)

5G

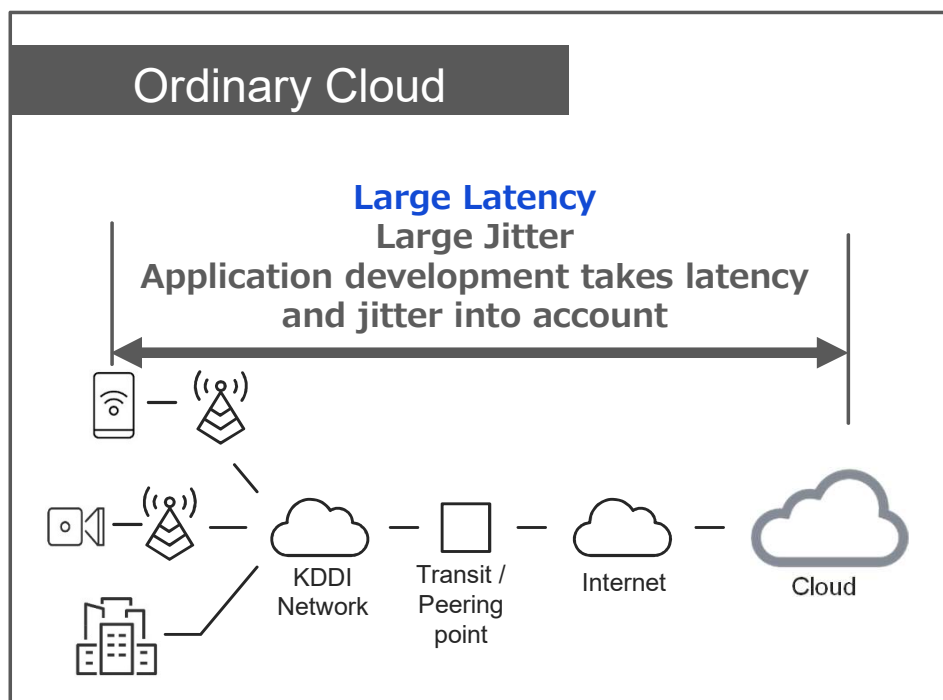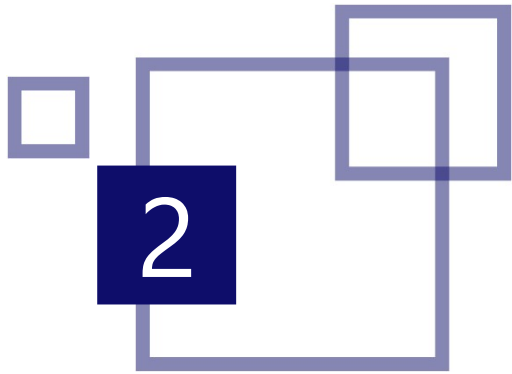| 1. High Speed	2. Massive Device Connectivity	3. Ultra Low Latency

3. Ultra Low Latency

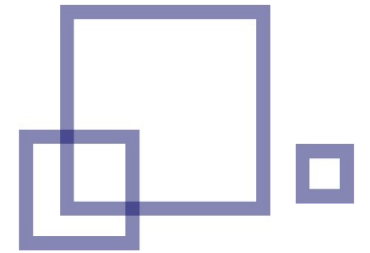**Unprecedented user experience by ultra low latency**
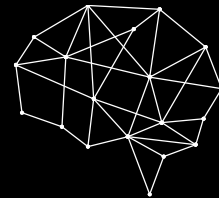
The value of edge computing
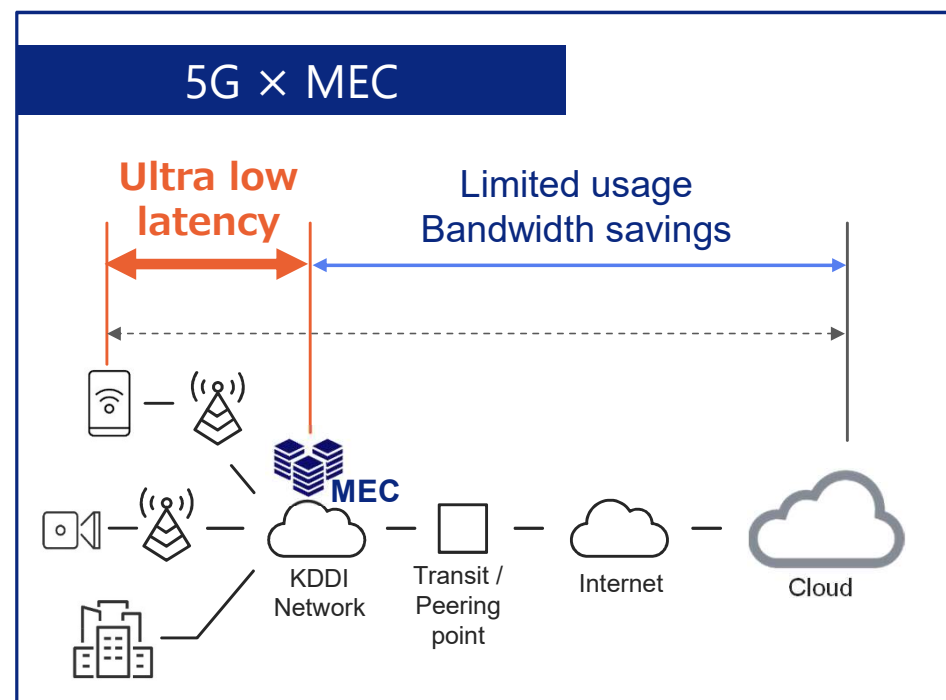
Ultra low latency is available with the combination of 5G and MEC.
Unprecedented user experience available to end users.

2

KDDI XR Strategy

"Society 5.0" world – where data circulating between Cyber space and Physical space

Cyber space
Data analytics · Learning · Prediction

Society 5.0

Data
(collection)

Feedback

Physical space
Real world · Life · New business

9

Due to Covid-19 pandemic, Virtual/Cyber space activities have been advanced
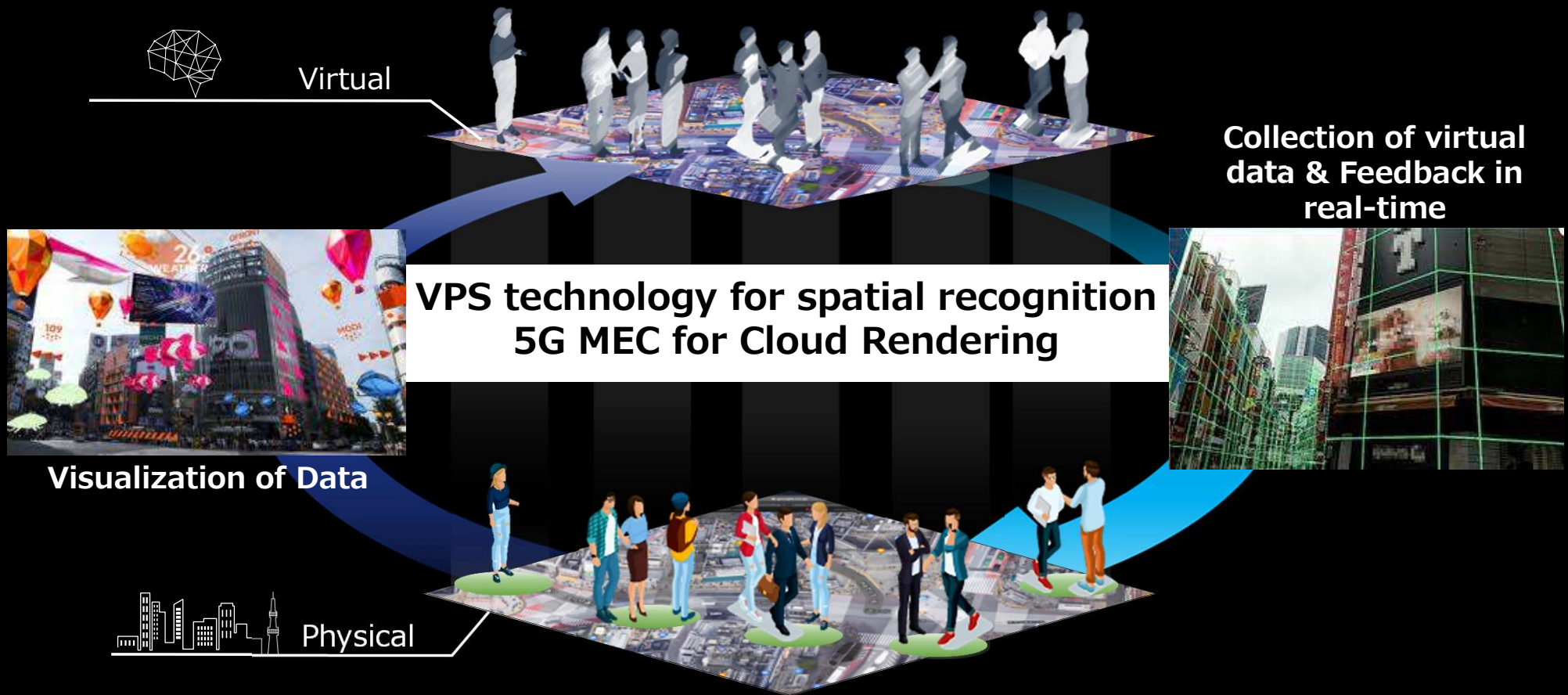

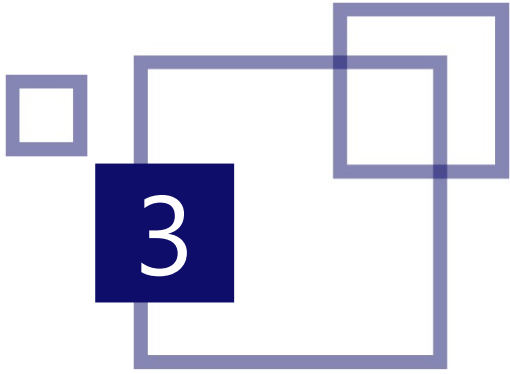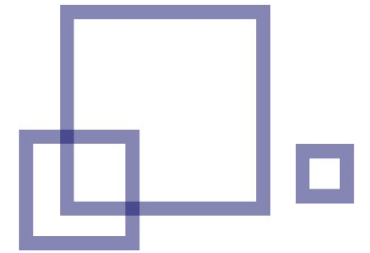**Virtual SHIBUYA Halloween Fes**
400,000+ joined

Virtual HAMASTA (baseball stadium)
30,000+ joined (per game)

Toward "Fusion of Virtual and Real worlds" as after-COVID is approaching

Virtual

Collection of virtual data & Feedback in real-time

**VPS technology for spatial recognition
5G MEC for Cloud Rendering**

Visualization of Data

Physical

3

Edge Computing use cases

Major Use Cases

Healthcare (ML assisted diagnosis)

Edge computing can provide a desirable environment for ML assisted image analysis / video analysis for healthcare.

Connected Vehicles

Edge computing is suitable for gathering sensor data from vehicles, monitor in real time, and assist the vehicle.

Smart Factory

AI inference application can run on edge computing for smart factories to provide anomaly detection etc.

Real-time gaming

Gaming run on edge clouds can provide real-time game experience to end users with low performance devices.

AR / VR

Low latency of edge computing can realize rendering of AR/VR applications.

Interactive live video streaming

Interactive live video streaming with high quality video and audio can be realized by edge computing.

MEC use case 1: Virtual Human
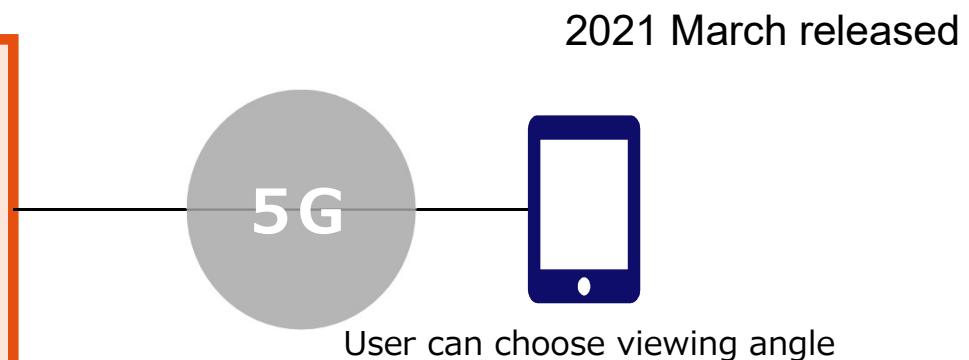
MEC use case 2: Free-viewpoint video

Free-viewpoint video enabled by 5G
Video image combined by multiple cameras
Specify the angle with a 5G smartphone and watch smoothly.

(KDDI CORPORATION, KDDI R & D Laboratories, Inc.)

2021 March released

Video processing

Deliver video of specified angle

5G

User can choose viewing angle

Deployed on Wavelength

© 2021 KDDI

Demo Video

https://biz.kddi.com/5g/aws_wavelength/

5G × Edge Computing

Ultra-low latency and low jitter accelerates new value creation

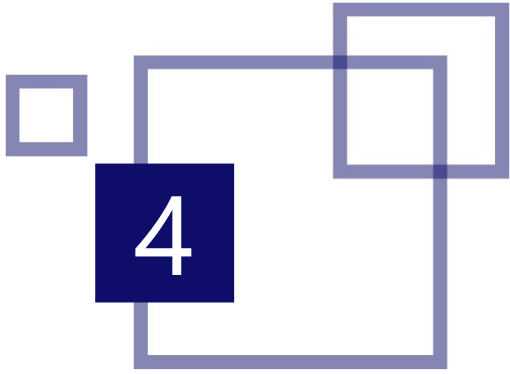〜 5G x Edge Computing enables new value creation on site 〜
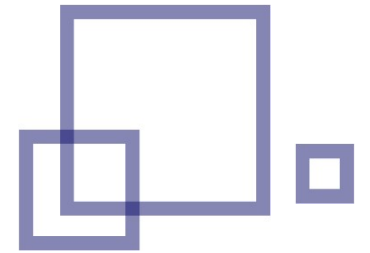
Testbed Environment

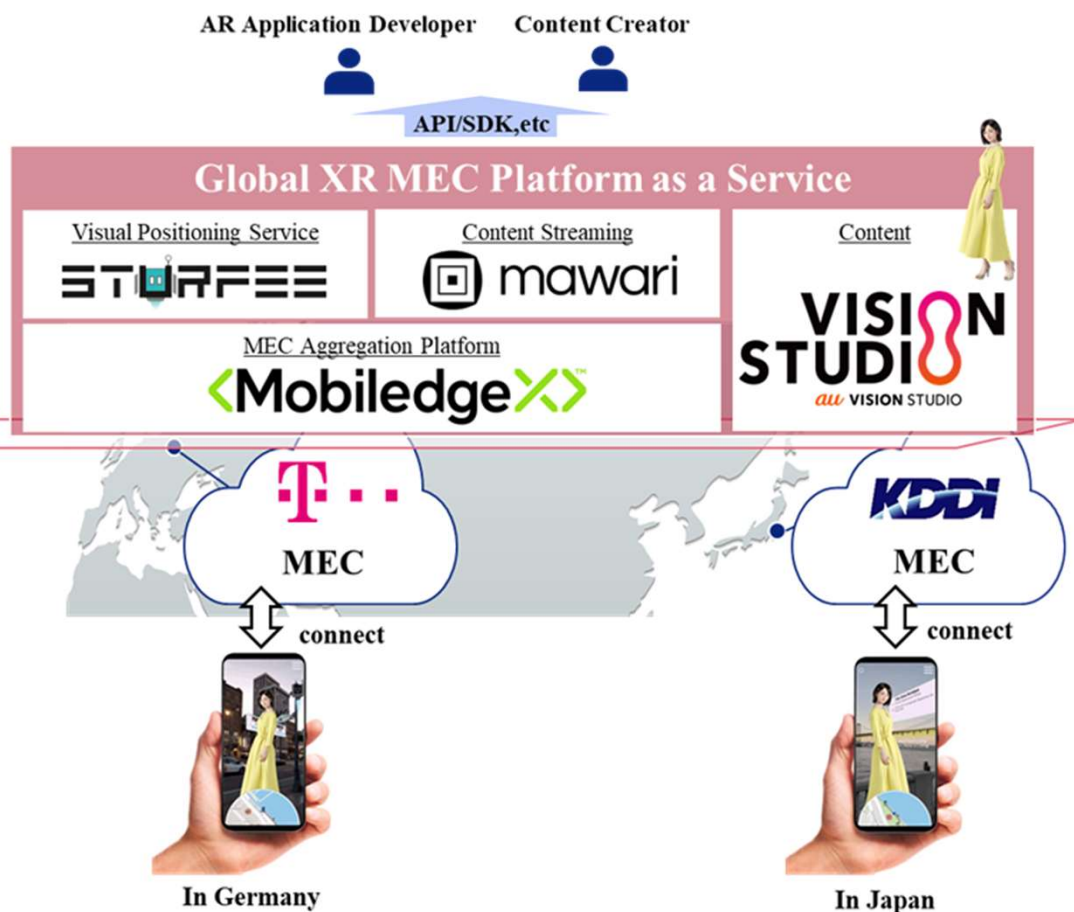**5G×AWS Wavelength is available in "KDDI Digital Gate",
a DX co-creation space**

Design thinking and co-creation with partners are key components of new value creation.

18

4

GSMA TEC Trial Overview

XR MEC PaaS Trial with DT, MeX, Sturfee, Mawari

Concept:
Easy and consistent way of developing XR applications and deploying to global Multiple Operator MECs

Teaming up:

- **Operator MECs – DT in Germany** and **KDDI in Japan**
- **Platform – MobiledgeX**
- **Application – Sturfee** and **Mawari**

Launched in June 2021, as part of GSMA TEC Trials initiative

- Press-released on 29 June 2021

Acceleration of global edge-enabled XR application development

- PaaS providing XR core techs (VPS and XR-streaming) as API/SDK

  -> Developers can locate their immersive XR content on various global regions!

  – VPS: satellite-imagery based high-precision localization system of <u>Sturfee</u>

  – XR-streaming: New delivery framework for an interactive 3D Content of <u>Mawari</u>


KDDI's au VISION STUDIO created a super photo-realistic 3DCG character "coh" which looks like real humans

-> Rendering requires huge computing resources and cloud based processing on top of 5G edge NW is essential to realize ultra-low latency interactive UXs.

MobiledgeX Edge-Cloud platform provides unified access to 5G edge networks jointly provided by KDDI and Deutsche Telekom

TEC Trial Results

- ## Global PaaS for edge-enabled XR techs successfully completed!

  1. Sturfee/Mawari could easily deploy their unified backend services on top of a common platform (MobiledgeX) across KDDI's and Deutsche Telekom's 5G edge resources

  -> Dynamic/Optimized deployment with just one API call to multiple MNO's edge networks

  2. The demo app delivers multiplayer experience featuring hyper-realistic, personalized digital assistants that lead app users on a guided tour of Bonn, Germany or Tokyo, Japan.

  -> Various immersive XR content can be overlaid atop the user's real world view via VPS
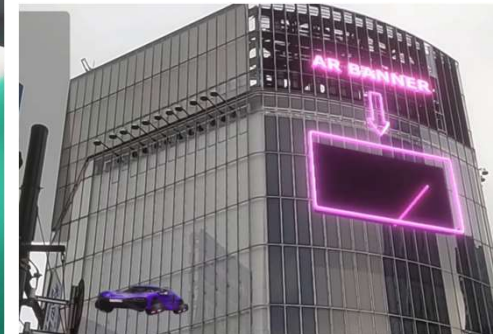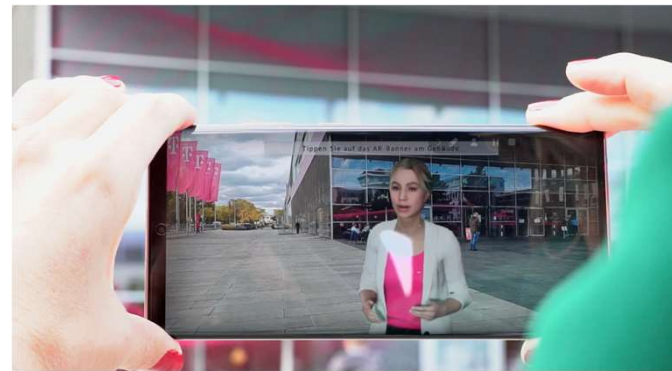
News Release/Demo Video

https://www.gsma.com/futurenetworks/resources/kddi-deutsche-telekom-and-partners-demonstrate-next-generation-ar-mobile-app-experience-in-alignment-with-gsma-tec-initiative/

https://www.globenewswire.com/news-release/2021/10/26/2320942/0/en/KDDI-Deutsche-Telekom-MobiledgeX-Sturfee-and-Mawari-to-Demonstrate-Bloom-City-Next-Generation-AR-Mobile-App-Experience-in-Alignment-with-GSMA-Foundry-Telco-Edge-Cloud-TEC-Trials-In.html

https://youtu.be/NoaqIsZoW2o

23

Demo Video

https://youtu.be/NoaqlsZoW2o

Next Steps/Future Plans toward MWC Barcelona

- Make the APIs/SDKs available for XR developers' use via "KDDI Open API"

- Collaboration with additional MNOs and expand coverage in the world

- Develop and deploy innovative applications / use cases using the XR MEC PaaS

-> Accelerate the fusion of Virtual/Real worlds with 5G and MEC

Tomorrow, Together

KDDI

おもしろいほうの未来へ。

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