ONS NA 2019

XR (eXtended Reality) & Telecom Sector

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Ali Tizghadam
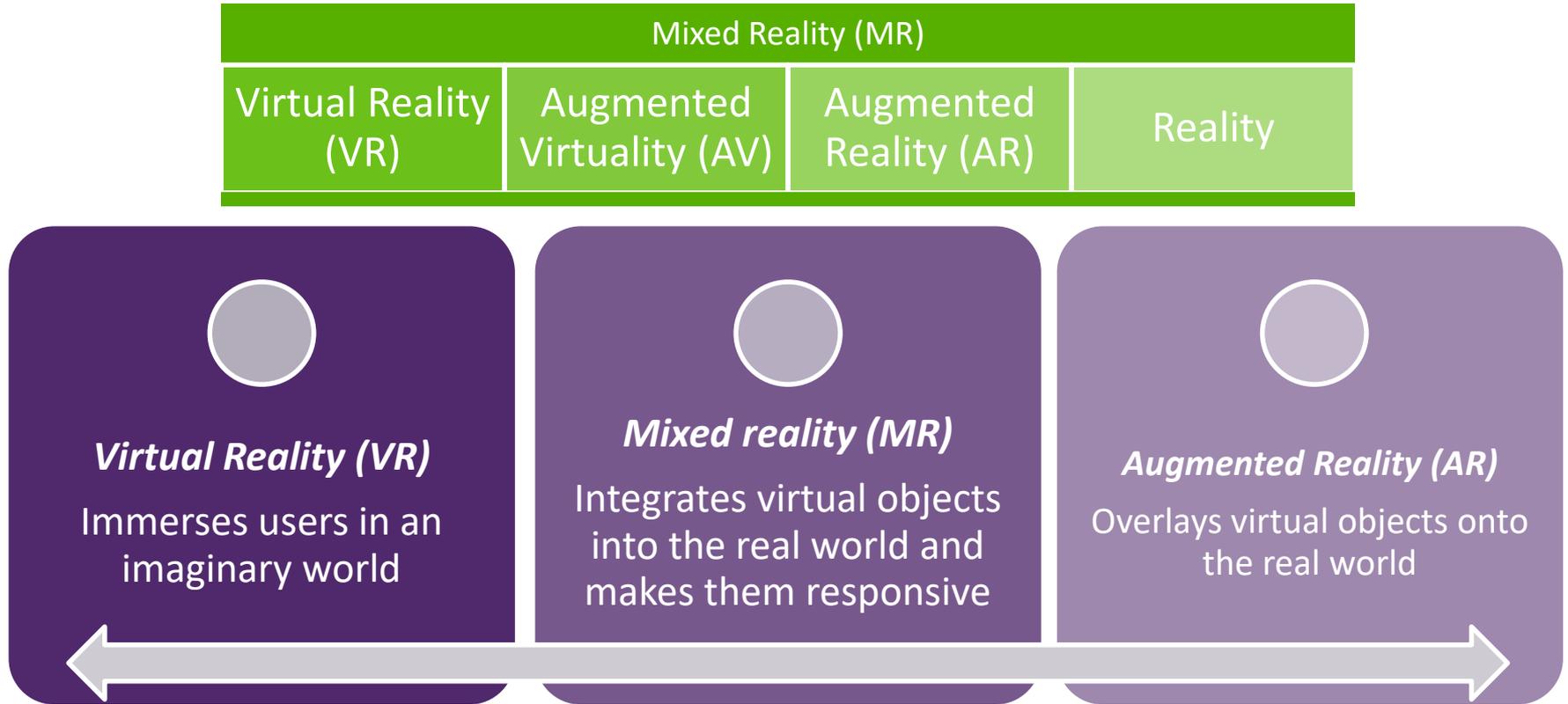Principal Technology Architect
Network Softwarization

Technology Strategy & Business Transformation

Special thanks to Rainer Iraschco

San Jose, CA
April 2019

What is XR? Milgram Virtuality-Reality Continuum

Mixed Reality (MR)			
Virtual Reality (VR)	Augmented Virtuality (AV)	Augmented Reality (AR)	Reality

Virtual Reality (VR)

Immerses users in an imaginary world

Mixed reality (MR)

Integrates virtual objects into the real world and makes them responsive

Augmented Reality (AR)

Overlays virtual objects onto the real world

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AR in Action

DEGREE OF IMMERSION & INTERACTION

Multi-player game
Real Time/world AR
VR On Line teaching
VR Education
Single player game
Explorable video
Live broadcast
On Demand video clips
Pokemon Go

THE WILD WITHIN

FOX SPORTS VR

360°

TECHNICAL CHALLENGES

- IKEA Place AR App

of coordinated covers
...ok. Cover: 50% viscose/
...chair **£80** ...4cm. Sågmyra grey/check.
... H100cm. Each piece of furniture is unique. Hand made, gives soft
... 202.016.82

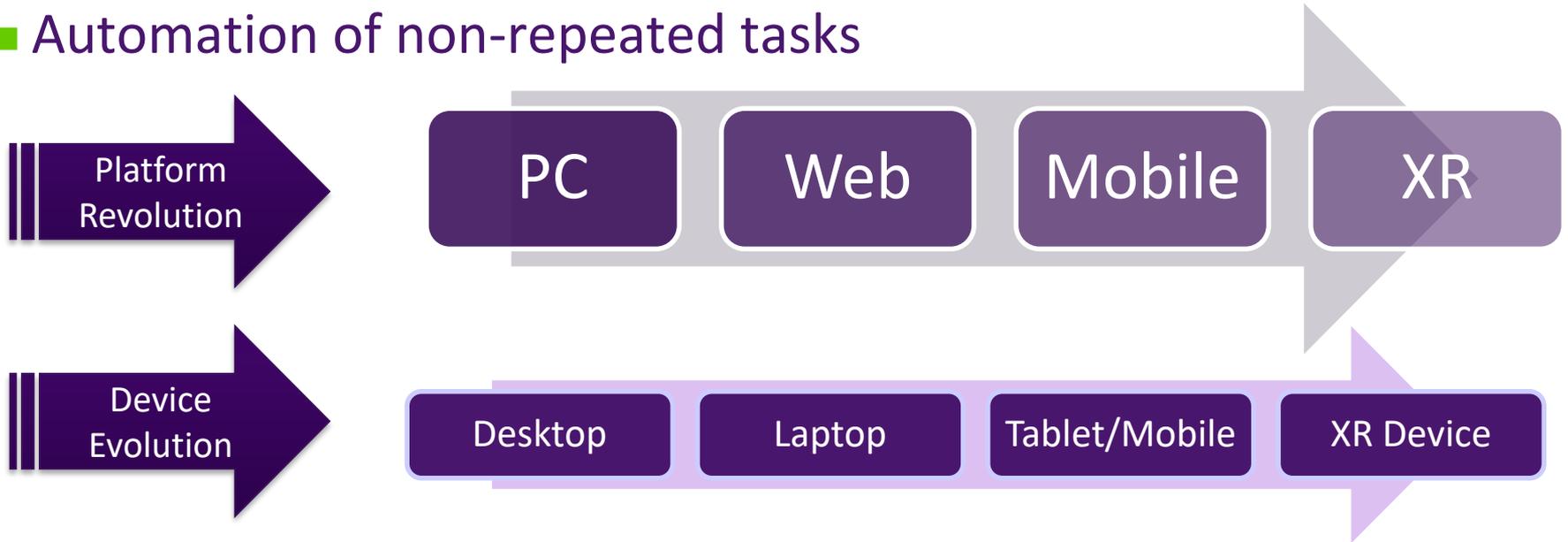Scan page to see more

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Interfaces are Evolving

- **Intelligent interfaces**
  - Tracking habits (mobile phones – car insurance)
  - New products and solution sets
- **Immersive ambient user experiences**

MUI: Mobile User Interface
NUI: Natural User Interface

CLI	GUI	MUI	NUI

Keyboard	Touchscreen	Voice commands	Gesture

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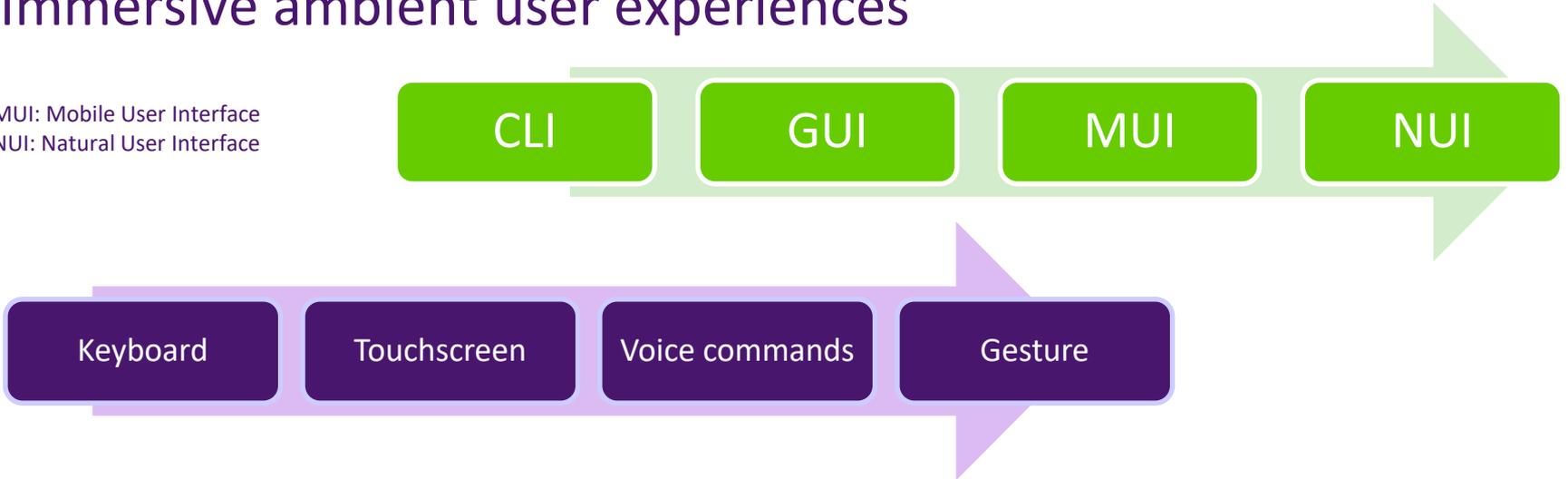
Platform Shifts / Opportunities

- Time is money, downtime is expensive

- Telecom enabling new services (e.g. tele-surgery, …)

- Automation of non-repeated tasks

Platform Revolution → PC | Web | Mobile | XR

Device Evolution → Desktop | Laptop | Tablet/Mobile | XR Device

Telco Service Providers in Transition

Service providers are evolving

- Service types are changing
- Life span of services are changing
  - Short-lived services are on demand
  - Need rapid deployment / retirement
  - Operations requirements are different
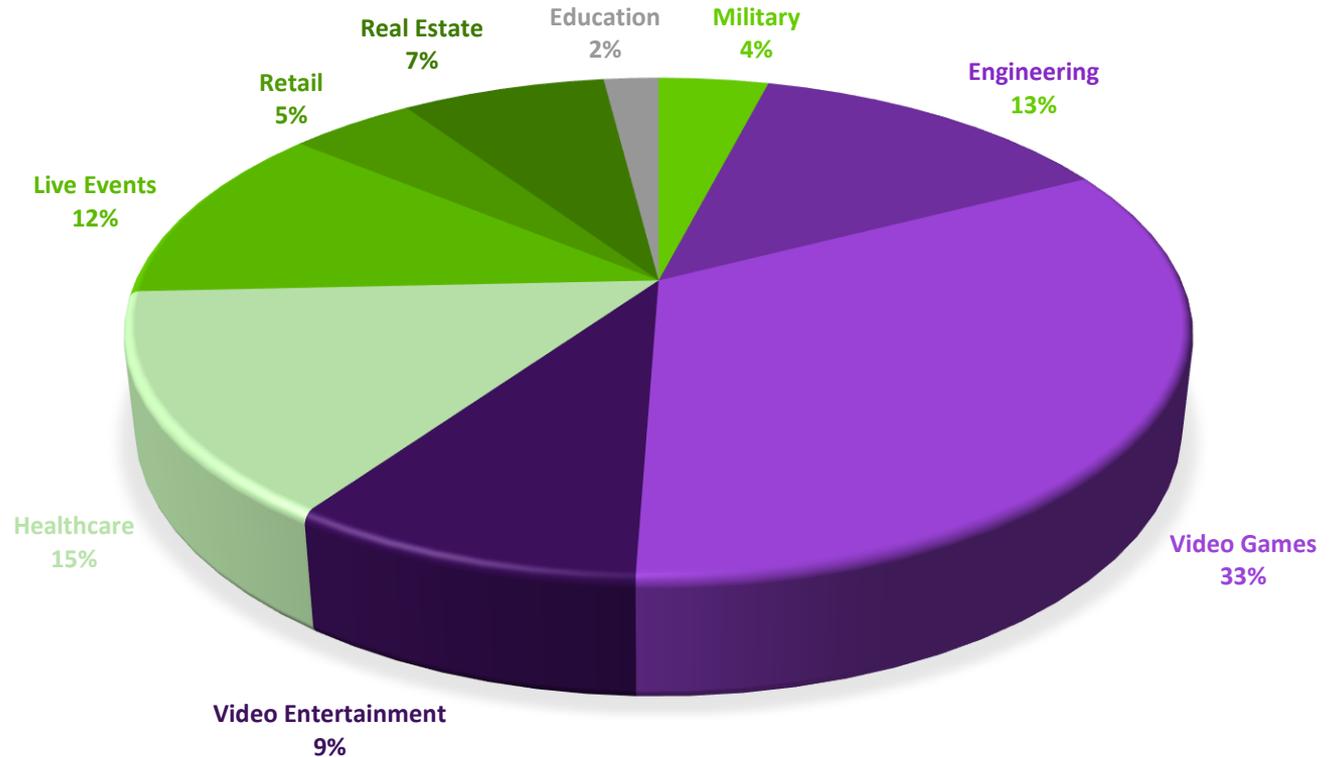 - Support model should evolve

What to do?

- One size fit all approach does not work
- Most of telecom services will be converted to apps
- Requires an intelligent agile service delivery platform
- Requires streamlining service development
  - Software dev, DevOps
- Requires streamlining operations
  - Quick, agile

Any content/service

on any device

anywhere, anytime

VR/AR Business Case by 2025

Sector	Bn $
Military	1.4
Engineering	4.7
Video Games	11.6
Video Entertainment	3.2
Healthcare	5.1
Live Events	4.1
Retail	1.6
Real Estate	2.6
Education	0.7

Real Estate 7%
Education 2%
Military 4%
Retail 5%
Engineering 13%
Live Events 12%
Healthcare 15%
Video Games 33%
Video Entertainment 9%

Source of data: Goldman Sacks Global Investment Research

TELUS's View on XR for Efficiency

- **Inspired by movie "The Matrix"**
  - **Trinity learns how to fly a helicopter**

- Neo: can you fly that thing?
- Trinity: not yet

Trinity calls tank

- Tank: Operator
- Trinity: Tank, I need pilot program for B12 helicopter

Tank finds the and moves pilot instruction to Trinity's mind

TELUS View on AR in Customer Service Domain

https://www.youtube.com/watch?v=2W6807OQxs4&feature=youtu.be
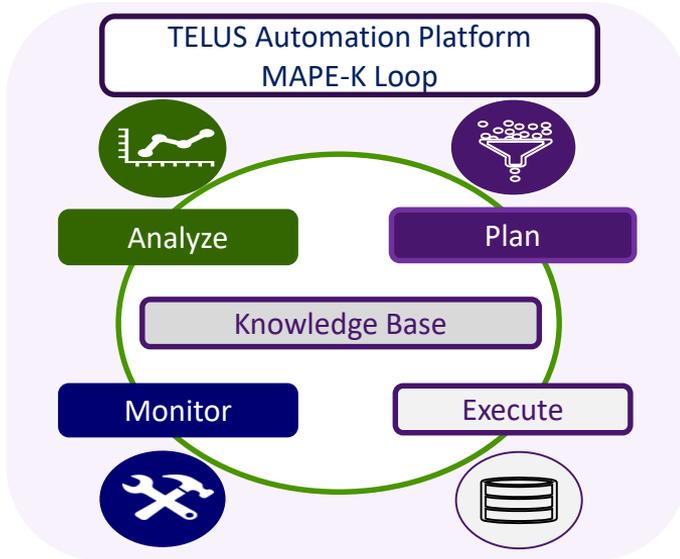
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HOW Does it Work?

1. Launch downloaded AR app and view NSG via device's camera

2. Connect to DC hosting servers running the TELUS Intelligent Platform

TELUS Automation Platform
MAPE-K Loop

Analyze

Plan

Knowledge Base

Monitor

Execute

5. Overlay instructions & info on screen

Customer: R. Iraschko
IP Address: 216.123.228.252
Address: 411 1st SE, Calgary

4. Relay instructions & info back to device

3. AR application authenticates user, locates NSG using target or image recognition, & retrieves instructions
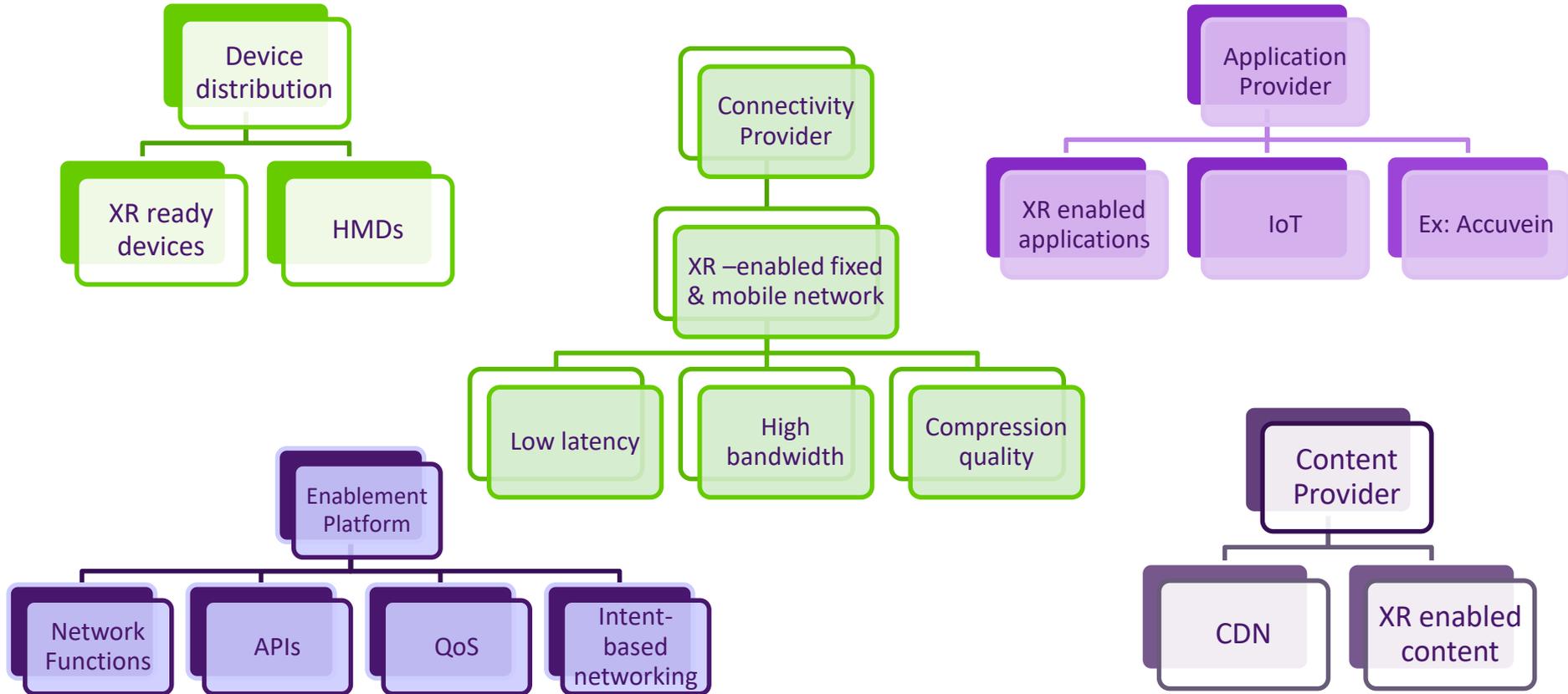
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Demo

https://youtu.be/5nl3F8b3LYs

Lessens Learned

Devices incapable of running the AR App due to the lack of support from XR development tools: For example ARKit runs only on iOS 11 and later

Poor image / model tracking

Poor alignment between superimposed and real-world images

Bandwidth / latency issue between user and the servers hosting AR platform

Customers prefer written instructions

Users complained about headache when smart glasses used

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Some AR Development Tools

	Vuforia	ARKit	ARCore	EasyAR	Maxst	Kudan
Type	SDK	Framework	Framework	SDK	SDK	SDK
Platforms	iOS, A, W	iOS	A (iOS)	iOS, A, W	iOS, A, W	iOS, A
Open (Free)	Yes	Yes	Yes	Yes	Yes	Yes
Commercial	Yes	No	No	Yes	Yes	Yes
Unity3D	Yes	Yes	Yes	Yes	Yes	Yes
Cloud	Yes	No	No	Yes	No	No
Smart Glass	Yes	Yes	Yes	No	Yes	No
SLAM	No	No	No	No	Yes	Yes
OpenCV	No	No	No	No	No	No

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Role of Telecom Operators in XR Ecosystem

Device distribution
- XR ready devices
- HMDs

Connectivity Provider
- XR –enabled fixed & mobile network
  - Low latency
  - High bandwidth
  - Compression quality

Application Provider
- XR enabled applications
- IoT
- Ex: Accuvein

Enablement Platform
- Network Functions
- APIs
- QoS
- Intent-based networking
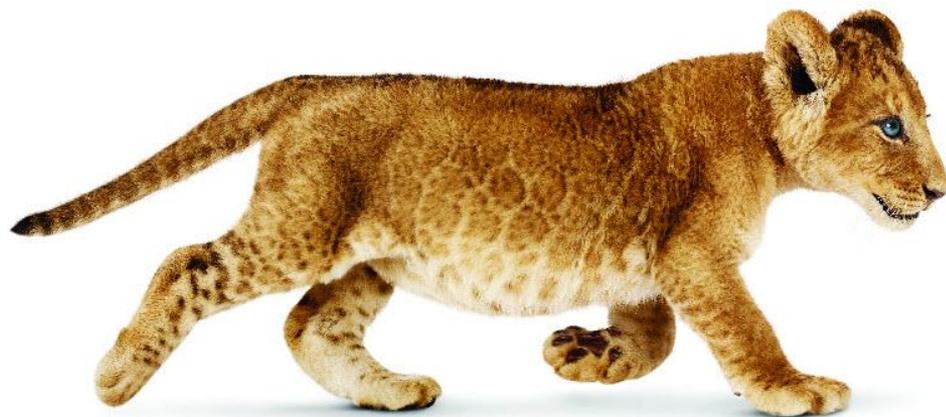
Content Provider
- CDN
- XR enabled content

Challenges for Using XR in Telecom Sector

Although the potential of XR is impressive, there will be many challenges and roadblocks.

- Bulky and expensive devices
- Limited penetration of technically ready smart devices
  - Device issues
- Scarcity of killer content and applications
  - Identify key target personas and explore targeted scenarios
- Insufficient network speed and latency
- Customer / user willingness to use

Ideal goal: remove "Tele" from Telecommunications

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